

6/46

**Frog Pond**

**(Morning Star group)**

**Gold-Silver**

NAME

OLD NAMES

PRINCIPAL ORE

MINOR MINERALS

41 South

7 West

10-15

T

R

S

.....**Jackson**..... COUNTY

.....**Waldo**..... AREA

..... ELEVATION

..... ROAD OR HIGHWAY

..... DISTANCE TO  
SHIPPING POINT

PRESENT LEGAL OWNER (S) ....**James V.C. McCauley**....

OPERATOR **E.L. McNaughton, Route 1 Box 800**.....

Name of claims                      Area    Pat.    Unpat.

**17 unpatented lode claims**

EQUIPMENT ON PROPERTY

**Essential buildings and mill.**

PUBLISHED REFERENCES

Ore. M. M. Handbk, 14-C Vol. II Sec.1

MISCELLANEOUS RECORDS

**Report by E.L. McNaughton in Grants Pass office file**

Address .....

.. **308 Wells Fargo Building,** .....

.. **San Francisco, California** .....

.. **Grants Pass, Oregon** .....

Name of claims                      Area    Pat.    Unpat.

Libbey

STATE DEPARTMENT OF GEOLOGY AND  
MINERAL INDUSTRIES

STATE ASSAY LABORATORY  
402 E. 1 STREET  
GRANTS PASS, OREGON

April 11th, 1940

Mr. Charles W. Merrill, Supervising Engineer,  
U. S. Bureau of Mines,  
206 U. S. Post Office Building,  
San Francisco, California.

Dear Mr. Merrill:

A further search through our files has revealed the missing report on the Frog Pond Mine, a copy of which is attached hereto. I am sorry that my previous search did not locate this report.

Yours very truly,

Ray C. Treasher,  
Field Geologist.

Manuscript copy from the forthcoming Handbook of Mines, Jackson & Josephine Counties

FROG FOND MINE (gold; silver)

WALDO DISTRICT

Owners: C. H., & M. D. Elliott, Takilma, Oregon. Under lease to E. L. McNaughton, Route 1, Box 800, Grants Pass, Oregon.

Location: secs. 10, 15, T. 41 S., R. 7 W., on Johnson Gulch, a tributary of Althouse Creek.

Area: 17 unpatented lode claims

Development: The workings consist of a crosscut tunnel 127 feet long; the No. 1 shaft, 17 feet deep with a 26 foot drift at the bottom; the No. 2 shaft 10 feet deep lying in the bottom of a large open cut. A 30 foot drift was run from the bottom of this shaft, and two other 25 foot tunnels were run from the open cut. Two other shafts are caved. Numerous open cuts and old placer workings expose a total of three well defined ledges, the West Ridge (N. 10° W., 60° E.), the Shale (N. 60° E., 60° S.E.) and the Blue (N. 60° W. 42° N.E.), and about nine other outcrops which show some values.

Geology. "The geology of the property is similar to that of the Waldo district, being chiefly occupied by the old sedimentary rocks of Paleozoic age, including argillites, quartzites, limestones, some amphibole and chlorite schists, with small areas of shale. The igneous rocks outcropping include granodiorite, andesitic greenstones, and serpentine."

"The rocks as a whole strike east of north and dip about 45° to the eastward. The whole sedimentary series has undergone considerable fracturing and faulting."

"Instances occur in the mine workings of what appears to be aplite. It occurs in dikes which have been practically replaced by quartz, calcite, and sulfides."

"Considerable fracturing and faulting has occurred since mineralization as is noticed in the workings. Considerable talc is found between the various bedding planes."

"The ore deposits occur as replacement bodies in the limestones, schists, aplite, and other rocks, in places the older rocks are entirely replaced, at other points the rocks are only partly replaced. Of the replacement minerals quartz, calcite and sulfides predominate. In places the quartz and sulfides have entirely replaced the older rocks, at other the sulfides are sparsely distributed. The ~~shiftable~~ sulfides occur not only disseminated through the rock itself but also in veinlets in the cleavages and fractures, forming a network in all directions. The principal sulfide being pyrite. Quartz is usually of a dark color, but it also occurs in white quartz, in small veins usually parallel to the foliation. Calcite is found in small veinlets in the various fractures. Gold occurs both as free and also associated with sulfides, chiefly with pyrite. Mercury has been found on the property disseminated in the surface soil. Primary tourmaline has also been noticed."

"The mineralization of the deposits occurred into successive intrusions, the first being quartz and pyrite, and after later fracturing a second intrusion of quartz occurred carrying with it pyrite, pyrrhotite, minute amounts of chalcopyrite, arsenic, antimony, and mercury. These occurred in an overlapping series probably in the order named."

"The mineralized zone is definitely known by assay to be 104 feet wide, based on the ores opened by the main crosscut. The present faces of the crosscut shows mineralization, without any appreciable difference from other portions of the crosscut. The actual definite width of the ore body has not been determined, but opencuts to the south of this crosscut have exposed mineralized rock similar to that of the crosscut. Insufficient work has been done towards the top of the hill to give any definite idea as to the extent of the width of the deposit."

Miscellaneous: Sufficient timber for all mining purposes. Water ample from Johnson Gulch, Silver Gulch, and Frog Pond. Depth of snow in winter from 5-10 feet. The Bolan Lake forest road traverses the south boundary of the property.

Equipment: Cookhouse, bunkhouse, blacksmith shop, compressor room, mill building. The mill consists of a Universal crusher, 6-foot Huntington ball mill, monarch table, plates and engines. 7

Values are reported from \$4 to \$22 gold and silver in the main crosscut, with an average of over \$10.00. Detailed assay results are given in the complete report.

Informant: Report by E. B. MacNaughton, Dec. 20, 1938.

The Frog Pond Mine is now known as the Morning Star Group of which the Frog Pond is in Oregon and the remainder in California. The group is owned by James V. C. McCauley, 308 Wells Fargo Building, San Francisco, California. Assessment work only has been done, and it is now tied up in controversy.

Informant: W. R. Burner, Grants Pass, Oregon. 2/28/40



CRIB MINERAL RESOURCES FILE 12

RECORD IDENTIFICATION

RECORD NO..... M055867  
RECORD TYPE..... XIM  
COUNTRY/ORGANIZATION. USGS  
MAP CODE NO. OF REC..

REPORTER

NAME..... PETERSON, JOCELYN A.  
DATE..... 76 08  
UPDATED..... 81 02  
BY..... FERNS, MARK L.; (BROOKS, HOWARD C.)

NAME AND LOCATION

DEPOSIT NAME..... FRDG POND

COUNTRY CODE..... JS  
COUNTRY NAME: UNITED STATES

STATE CODE..... OR  
STATE NAME: OREGON

COUNTY..... JOSEPHINE  
DRAINAGE AREA..... 17  
PHYSIOGRAPHIC PROV..... 19

QUAD SCALE            QUAD NO OR NAME  
1: 62500            CAVE JUNCTION

LATITUDE            LONGITUDE  
42-00-21N            123-30-43W

UTM NORTHING        UTM EASTING        UTM ZONE NO  
4650330.0            457607.6            +10

TWP..... 041S  
RANGE..... 007W  
SECTION.. 15  
MERIDIAN. WILLAMETTE

LOCATION COMMENTS: PART OF GROUP IN CALIF.

COMMODITY INFORMATION

COMMODITIES PRESENT..... AU    AG    CU    AS    SB    HG



MINOR COMMOD..... AG

OCCURRENCE(S) OR POTENTIAL PRODUCT(S):

POTENTIAL.....

OCCURRENCE..... CU AS SB HG

ORE MATERIALS (MINERALS, ROCKS, ETC.):

GOLD, PYRITE, PYRRHOTITE, SMALL AMTS OF CU, AS, SB, AND HG SULFIDES; CHALCOPYRITE GALENA, SPHALERITE

COMMODITY SUBTYPES OR USE CATEGORIES:

0.156 AU: AG

COMMODITY COMMENTS:

PYRRHOTITE MORE ABUNDANT IN WALL ROCK, PYRITE MORE ABUNDANT IN VEIN

ANALYTICAL DATA (GENERAL)

UNWEIGHTED AVERAGE OF 123 AU ASSAYS IN 1938 WAS 0.19 OZ/TON & FOR 74 AG ASSAYS 1.22 OZ/TON

EXPLORATION AND DEVELOPMENT

STATUS OF EXPLOR. OR DEV. 2

PROPERTY IS INACTIVE

DESCRIPTION OF DEPOSIT

DEPOSIT TYPES:

MINERALIZED FRACTURE ZONE

FORM/SHAPE OF DEPOSIT:

SIZE/DIRECTIONAL DATA

SIZE OF DEPOSIT..... SMALL

MAX WIDTH..... 104 FT

COMMENTS (DESCRIPTION OF DEPOSIT):

THREE WELL DEFINED ORE ZONES REPORTED

DESCRIPTION OF WORKINGS

SURFACE AND UNDERGROUND

COMMENTS (DESCRIP. OF WORKINGS):

WORKINGS INCLUDE 3 ADITS AND A SHAFT WITH AGGREGATE LENGTH OF ABOUT 300 FT.

PRODUCTION

NO PRODUCTION

GEOLOGY AND MINERALOGY

AGE OF HOST ROCKS..... LTRI

GEOLOGICAL DESCRIPTIVE NOTES. HIGHLY DEVELOPED BUT FOR ASSESSMENT WORK ONLY

LOCAL GEOLOGY

NAMES/AGE OF FORMATIONS, UNITS, OR ROCK TYPES

- 1) NAME: APPLGATE GROUP  
AGE: LTRI

SIGNIFICANT ALTERATION:

TOURMALINE

GENERAL REFERENCES

- 1) OREGON METAL MINES HANDBOOK, 1942: ODGMI BULL 14-C VOL 2, SEC 1, P 199
- 2) BROOKS, H C AND RAMP L, 1968, GOLD AND SILVER IN OREGON: ODGMI BULL 61, P 252.
- 3) RAMP, L AND PETERSON, N V, 1979, GEOLOGY AND MINERAL RESOURCES OF JOSEPHINE COUNTY, OREGON: ODGMI BULL 100, TABLE 1, NO 452



JOSEPHINE COUNTY

*Bolan Lake area*  
Frog Pond Mine

Sec. 15, T41S, R7W

Replacement(?) deposit, reportedly 100<sup>+</sup> feet wide, in metasediments of the Applegate Group.

Property was examined and sampled by Lloyd Frizzell and Don Hansen during summer and fall of '74. In spite of their negative conclusions, it probably should be further investigated.

Bull. 61, p 252

Mr. & Mrs. E.O. Greene  
Takilma, Oregon

&

Mr. Jack Harbaugh  
918 N. 28th St.  
Boise, Idaho

Option & lease to:

Lloyd Frizzell, Grants Pass  
and Dr. Don Hansen, Spokane, Wn.

F206 Pond

~~R. FRIZZELL~~

2072



OUTLINE OF  
WALDO DISTRICT  
JOSEPHINE COUNTY, OREGON

The Waldo District includes that area of Josephine County south of Kerby and east of the Illinois River, limited on the east by the County Line and on the south by the State Boundary, and comprises chiefly the area drained by the Althouse and Sucker Creeks.

Mining was begun in the district in the spring of 1853 with a placers miners "stampede" to Althouse Creek. Since that date placer mining has been carried on in the district continuously to date. Various lode mines have been opened, including the copper mines of Takilma and the gold mines of Sucker Creek and those near Holland. But due to the mountainous condition of the southern part of the district and the lack of roads no lode mining was attempted in this area until 1935, when the Forest Service built their road to Bolan Lake. Even to date there is only one road available for this vast mountainous area.

The Frog Pond Mine lies in about the center of the extreme southern portion of the Waldo District at an elevation of some 4700 feet, and occupied the upper portion of the watershed of Johnson Gulch, which gulch at one time produced the major portion of the gold of Althouse Creek. Of further importance is the fact that the ores of the Frog Pond Mine can be traced across the divide onto the southern slope in California, and into the headwaters of Indian Creek with its rich placers. Indian Creek flows into the Klamath at Happy Camp California and has had an enviable reputation.

#### GEOLOGY OF WALDO DISTRICT:

The Waldo District is occupied chiefly by old sedimentary rocks including Argillites, Quartzites and Limestones and by dark colored subsilicious rocks including, Andesite, Serpentine, Auganite, Pyroxenite etc., also intrusives such as Granodiorite and its related Aplites, together with the older Greenstones.

The oldest rocks known in the District are the Paleozoic Arillites and Limestones, which occupy much of the mountainous portion. In general these rocks strike east of north and dip steeply eastward. Closely related to these are the Quartzites.

The earliest igneous rocks are the Paleozoic interbedded greenstones, both intrusive and extrusive, followed in order by the serpentines, granodiorites and related rocks and the dacite porphyries.

#### Origin OF ORE DEPOSITS:

The mineralogy of the ores (according to Diller, Winchell and Shenon of the U.S.G.S.) is evidence of their hypogene (deepseated) origin. That is, the mineral assemblage, as shown, belong to Lindgrens Mesothermal type, deposited at moderate depths by hot solutions. The source of these solutions has not been definitely established, but is credited to the batholithic intrusions of granodiorite and related magmas and not from surface waters is supported by the following evidence:

(1) The solutions which formed the gold ores were associated with (if not identical) solutions which deposited the ores of mercury and antimony. There is no known adequate source whence surface waters could obtain these elements, where as, they are known to be formed from gasses.



(2) The solutions which formed the gold ores apparently invariably contain small amounts of copper, lead, zinc, antimony, arsenic and tellurium, all elements known to be derived at times from magmatic origin. Also gold ores are intimately associated with various aplite dikes, and in a few cases also deposited with tourmaline.

The ores of the District occur in vein, veinlets, in brecciated zones and as replacement bodies, in several kinds of rocks, but chiefly in greenstones and the metamorphosed sediments. A few prospects are found in serpentine. The most persistent veins appear to lie in a general east west direction, with dips of varying degree eastward. The vein fillings consist mainly of quartz, Calcite, and sulphides (of which Pyrite predominates).

GENERAL REPORT  
FROG POND MINE  
JOSEPHINE COUNTY - OREGON  
E. L. MacNaughton.  
Dec. 20, 1938

Summary

The Frog Pond Mine as a whole consists of a series of replacement deposits. Of these deposits only the Frog Pond has been done on the others to determine whether these various replacement deposits are individual deposits or are one large deposit with outcroppings at various points. It has been proved that there is a distinct relationship between the Frog Pond, Wye, and Johnson Deposits, the relationship being that the rocks are identical in all three deposits where uncovered.

The results produced by the workings on the Frog Pond Deposit, are of extreme interest and carry sufficient information to warrant thorough investigation and the expenditure of sufficient monies to explore and develop the property. This statement is based on the evidence as produced in this report, and as indicated by the following summary.

The most important fact brought out by the work on the Frog Pond Deposit extensive width of the ore deposit proved to date. This fact is especially noticable in the Crosscut where 104 feet of ore has been proved which gave an average value of \$4.20 per ton, based alone on the assays made by Mr. Fred J. Bartels.

These assays were made on 4 samples, each of which was taken by stripping the walls their entire length, each original sample weighed over 1500 lbs. crushed to minus 1 inch and quartered to 75 lbs., then crushed to minus 1/4 in. and cut in a Jones sampler to 1 lb. for pulverizing. This explanation is made to give some idea of the care taken in the sampling.

Of importance are the large area exposed in No. 2. Shaft workings:

In the lower tunnel an area of 27 feet wide, on 3 samples gave an average assay of \$2.97 for the entire width, with assays from \$1.40 to \$7.00.

In the open cut an area of 25 feet wide, on 6 samples, gave an average assay of \$4.87, on assays ranging from \$3.30 to \$9.80.

In the Creek, 5 samples over an area of 70 feet wide, gave an



assay average of \$2.35, with assays ranging from \$1.39 to \$4.94.

It is to be noted that in sampling all of these area everything was included in the sample over the distances mentioned regardless as to whether or not the rock contained visible sulphides.

The above averages do not include all of the assayed samples, if these were all included, the averages would be considerably higher. The samples used were only those taken over long lengths and which gave large original samples, The smallest original sample taken at any of these points being 250 pounds.

Another point of interest is the samples taken from the various dumps, which more than substantiates the averages given for the various working places. All dump samples originally weighed over 1000 lbs. and were carefully taken.

Crosscut Dump:-

Assays ranged from \$2.10 to \$10.50 per ton, the average being \$4.10.

No. 2 Shaft Dump:-

Assays from \$3.49 to \$17.85 per ton, with an average of \$6.52.

Assays on Talc from No. 2 Dump: Ranged from \$1.39 to \$117.60 and were not included in the above average of No. 2. Dump.

It will be seen that the areas covered by these assays and averages, as given, is 104 feet wide and 320 feet long, which length is the distance from the crosscut to the Creek exposures. Further, when the first 55 feet of the tunnel is tested I feel positive it will be found equal to the averages of the rest of the crosscut, if this is the case, the total width exposed would be 157 feet.

PROPERTY

The property, which is the subject of this report, is known as the Frog Pond Mine, consisting of 17 quartz mining claims. The individual claims are named as follows:

Apex	Apex No. 1
Addition	Addition No. 1
Extention	Extention No. 1
Annex	Annext No. 1
Quartzite No. 1	Quartzite No. 2
Grouse Nest No. 1	Grouse Nest No. 2
Grouse Nest No. 3	Grouse Nest No. 4
Grouse Nest No. 5	Grouse Nest No. 6
	Grouse Nest No. 7

LOCATION

This property is located in the Kerby Quadrangle, Waldo District, Josephine County, Oregon, in the Althouse Mining District, Sections 10 and 15, T. 41 S., R. 7 W. of the Willamette Meridian, on Johnson Gulch Creek, a tributary of the Althouse. It lies at the top and north slope of the Siskiyou Mountain Range, which forms the boundary between Oregon and California at this point.

TITLES:

The titles as to these claims are clear. The claims are unpatent-



ed and are held under the provisions of the Mining Laws of the United States and the State of Oregon Governing locating and holding of mining claims. All assessment has been completed to date.

### VEGETATION

The hills are thickly wooded. The timber consisting chiefly of white and red fir. There is sufficient red fir for all mining purposes. However timber for mining purposes can be purchased from sawmills in the vicinity at a price of \$18.00 per thousand feet delivered at the Mine.

### WATER

Sufficient water can be obtained at all times of the year for mining purposes. There are some 15 springs on the property and Johnson Gulch which carries off the flow from these springs, has a flow at or during the dry season of about 3 sec. feet. Water could be easily stored either at the dam or at a point midway between the dam and Silver Gulch, also at the Frog Ponds.

### CLIMATE

Climatic conditions are not severe. The snowfall varies, but the property is usually covered with snow during the months of January to June. The depth of snow lying on the ground at any time varying from 5 to 10 feet. This snow blocks the road for a distance of about 5 miles from the property. The road could for this short distance be kept open by use of a bulldozer tractor equipment. The actual snow fall is usually confined to the months of January and February.

### ROADS AND TRANSPORTATION

The mine lies some 56 miles from Grants Pass, Oregon, a city on the Southern Pacific Railway and the Pacific Highway, which would be the shipping point from and to the mine. The road from Grants Pass to the mine is by way of the paved Redwoods Highway to Cave Junction a distance of 32 miles, thence along the Caves Highway to the County Road, which is a full width gravelled road, thence 8 miles along the County road to the Junction of the Bolan Lake-Happy Camp Road, a point 1 mile east of Takilma. The Bolan Lake Road was built by the Forest Service in 1935 and is maintained in excellent condition by them. It is a 12 foot mountain road with an average grade of 6%. This road traverses the south boundary of the property and from it the present owners have built a 10 foot road on to the property and to the main workings, it has a maximum grade of 11% and is also maintained by the Forest Service. The Distance from the mine to Takilma being 16 miles.

### TOPOGRAPHY

The mine is situated at the head of Johnson Gulch a tributary of the Althouse Creek, and located midway between the East and West Forks, and on the north slope of the Siskiyou Mountain Range. This range forms the divide between Althouse Creek in Oregon and Indian Creek in California.

The Bolan Lake Road and the California-Oregon Boundary run along the top of the divide between mile posts 177 and 179 $\frac{1}{2}$  which are included the south side line of Sections 15 and 16. The south end of the Frog Pond Property coincides with the south side line of Section 15, and the Boundary.

The main Siskiyou Range runs east and west and from this ridge spurs branch out striking in a general northerly direction. These northerly spurs or ridges form the divides for the three principal creeks on the property known as the Frog Pond Gulch, Silver Gulch and Johnson Gulch. Midway in the property these Gulches converge to form the main Johnson Gulch.



The country is extremely rugged with elevation on the divide or the south end of the property of 4750 to 4790 feet and at the main mine workings of 4273 feet and at the north end of the property the elevation is about 3900 feet. West Fork which is on the west of the property has an elevation about opposite the mine workings of about 3600 feet.

### GEOLOGY

The geology of the property is similar to that of the Waldo District, being chiefly occupied by the old sedimentary rocks of Paleozoic age, including argillities, quartzites, limestones some amphibole and chlorite schists, with small areas of shale. The igneous rocks outcropping include granodiorite, andesitic greenstones and serpentine.

The rocks as a whole strike east of north and dip about 45 degrees to the eastward. The whole sedimentary series has undergone considerable fracturing and faulting.

Instances occur in the mine workings of what appears to be aplite, but no thin sections have been made to definitely determine the rock as aplite. It occurs in dikes which have been practically replaced by quartz, calcite and sulphides.

Considerable fracturing and faulting has occurred since mineralization as is noticed in the workings. Considerable Talc is found between the various bedding planes.

### ORE DEPOSITION

The ores of the main Siskiyou Range along the Oregon California Boundary belong to the same series as that of Northern California. This is evidenced by the presence of sericite, a common mineral in the wall rocks in northern California, and also by the absence of abelite which is common to the rocks of southwestern Oregon.

The ore deposits occur as replacement bodies in the limestones, schists, aplite and other rocks, in places the older rocks are entirely replaced, at other points the rocks are only partially replaced. Of the replacement minerals quartz, calcite and sulphides predominate. In places the quartz and sulphides have entirely replaced the older rocks, at others the sulphides are sparsely distributed. The sulphides occur not only disseminated through the rock itself but also in veinlets in the cleavages and fractures, forming a net work in all directions. The principal sulphide being Pyrite. Quartz is usually of a dark color, but it also occurs in white quartz in small veins usually parallel to the foliation. Calcite is found in small veinlets in the various fractures. Gold occurs both as free and also associated with the sulphides, chiefly with pyrite. Mercury has been found on the property disseminated in the surface soil. Primary tourmaline has also been noticed.

The mineralization of the deposits occurred in two successive intrusions, the first being quartz and pyrite, and after later fracturing a second intrusion of quartz occurred carrying with it pyrite, pyrhotite, minute amounts of chalcopyrite, arsenic, antimony and mercury. These occurred in an overlapping series probably in the order named.



The mineralized zone is definitely known by assay to be 104 feet wide, based by the ores opened by the main crosscut. The present face of the crosscut shows mineralization, without any appreciable difference from other portions of the crosscut. The actual definite width of the ore body has not been determined, but, opencuts to the south of this crosscut have exposed mineralized rock similar to that of the crosscut. Insufficient work has been done towards the top of the hill to give any definite idea as to the extent of the width of the deposit.

#### MINERAL DEPOSIT And VEIN SYSTEM

There are only three, what might be called well defined, veins opened on the property to date as follows:

West Ridge Ledge  
Shale Ledge  
Blue Ledge

**West Ridge Ledge:** This ledge has been opened at two points about 150 feet apart, in the Addition Claim. The actual width has not yet been determined but it is known to be 10 feet wide. The footwall is shale. Strike N. 10 W. Dip 60 degrees eastward. Assays from \$.83 to \$4.90.

**Shale Ledge:** This ledge is exposed in the road between Stations 28 and 29, in the Addition Claim and consists of a series of three parallel quartz veins each about 3 feet wide and about 10 feet apart. Hanging and footwalls are shale. Strike N 60 E dip 60° S. & E. Only 1 sample has been taken, which was across the entire series including the shale between the veins, distance 29 feet assay \$0.97.

**BLUE LEDGE:** This ledge is exposed in a race at the Lost Chinaman Placer pit on Quartzite No. 2. Claim. The vein is 3 feet wide and has quartzite for both walls. The vein is only exposed for a distance of 4 feet. It is a light blue quartz heavily mineralized. Strike N 60 W Dip 42° N.E., One sample assayed \$0.75.

**Deposits** The deposits exposed to date consist of Wye Ledge, Cross Ledge, Johnson Ledge, Lost Chinaman Placer, Ditch Ledge, Talc Hole, Apex Ledge, Mac Cauley Tunnel and Frog Pond Deposits.

Of these a brief outline will be given first of those lying at some distance from the Main or Frog Pond Deposit.

**WYE LEDGE** This ledge outcrops on the banks of Wye Creek at two points (only one of which has been assayed) on Grouse Nest No. 3. Claim. The main exposure occurs opposite the Wye Placer Pit. It consists of a series of three different formations, the lower a schist entirely replaced with quartz, calcite and talc with sulphides but no free gold. Assays from \$1.40 to \$2.76. The middle formation of what appears to be a replace aplite, heavy in quartz, with fine stringers of calcite, and with sulphides disseminated thru the



rock and also as veinlets, pyrite is also found in the stringers of calcite. It is about 6 feet thick assays from \$0.86 to \$6.07. The upper formation is a re-placement of limestone by quartz, calcite and sulphides. This rock carries some free gold. Assays from \$0.92 to \$2.10, thickness about 5 feet. Strike of ledge S 40 W, Dip 54 S.E.

**Cross Ledge** It is exposed on the west side line of Grouse Nest No. 3 Claim. It is a dark colored quartz with numerous stringers of white quartz, small amount of calcite, the entire rock is mineralized. This ledge Strikes N 8 E, Dip 60 eastward. It should intersect the Wye Ledge at about the S.W. Corner of Grouse Nest No. 3. A sample taken by chipping the exposed rock over a distance of 25 feet assayed \$1.56.

**Johnson Ledge** This deposit outcrops in Johnson Gulch about 450 feet south of the Wye Ledge and in the same claim. The formation are identical with the Wye Ledge Formations, except that they are thicker, total width being about 40 feet exposed. Strike N 5 E. Dip 40 E. Assay of exposed rock for 29 feet is \$2.76.

**Lost Chinaman** In this pit is exposed two large deposits of quartzite, which in the placer pit are separated by the Blue Ledge. It is cut at numerous places by quartz stringers not only in the pit but also to the north where 4 prominent stringers were found between station 68 and the S.E. Corner of Grouse Nest No. 4. The quartzite immediate to the surface in and around the placer put pans coarse gold, some pieces being as large as 6 mesh, one pan taken by digging into the quartzite gave 10 colors of 10 mesh with a string of fine colors. No attempt has as yet been made to trace the source of this gold, but it apparently comes from the quartz stringers in the quartzite. Three samples were taken of the quartzite over lengths of 10, 25, and 75 feet, with assays of \$0.80, \$1.01, and \$0.87.

**DITCH LEDGE** This ledge is exposed in the banks of the ditch which runs from Silver to Wye gulches on Grouse Nest No. 2 Claim. The exposure consists of white and brown talc about 50 inches thick and assayed from \$21.00 to \$35.00. The exposure appears to be part of the surface slide.

**TALC HOLE** This hole was opened by following up a trace near the head of Wye Gulch on Annex No. 1 Claim. It consists of brown and white talc lying on top of an amphibole schist. Strike N 60 E. Dip 35 S.E. Assays from \$0.54 to \$18.20.

**Apex Ledge** It lies in the S.E. Part of the Apex. Very little is known of this deposit, one small opencut is its only exposure. Strike N 55 W. Dip 45 S. & W. Assays from \$0.90 to \$1.13.

**MAC CAULEY TUNNEL** This tunnel, in the S.E. part of the Additon Claim, was driven years ago in the rock lying between the west ridge ledge and the Frog Pond Ledge. It was reopened this year. The rock consists of a dark colored quartz with considerable sulphides, a change in the formation shows in the last few feet of the tunnel. Judging from the strike of the Frog Pond Ledge this tunnel would have



to be driven some 100 feet to intersect the Frog Pond. Strike of formations N 65 E, Dip 45 S & E. The walls were sampled from the face outward a distance of 53 feet, assays from \$0.69 to \$1.08.

#### THE FROG POND LEDGE OR DEPOSIT

It is up on this ledge that the main work on the property has been done. This deposit has been traced over a distance of over 1500 feet on the surface. It has a general strike of N 45 E and Dip of 45 S & E. It outcrops near the S.W. Corner of the Apex Claim along the banks of the creek flowing out of the Frog Pond No. 2, while the present mine workings are near the N.W. Corner of the same claim. The most northerly workings in the crosscut tunnel, S.W. of the crosscut is No. 1 Shaft and further south that of No. 2 Shaft, also the exposures in the Creek near No. 2 Shaft.

The various workings will be described under the following headings:-CROSSCUT? No. 1 SHAFT, No.2. SHAFT, and CREEK EXPOSURE.

CROSSCUT TUNNEL This tunnel is 127 feet and crosses the formations at about 60°. The rocks in the crosscut clearly show the fracturing and local faulting. There are three distinct formations disclosed, also others that grade from one to the other. The rocks are all badly altered and in most cases practically or wholly replaced by quartz, calcite and sulphide. No clear distinction can be made by hand glass, and the rocks should be studied by thin sections to determine type, character and minerology.

Prior to the mouth of the tunnel there is an open cut 30 feet long (which has been timbered for protection and is not considered part of the tunnel). The rock of this cut is similar in character and mineralization to that of the first part of the crosscut. This cut together with the first 25 feet of the tunnel has not been assayed. But due to the similarity of the mineralization and the character of the rock I feel sure that on testing this total of 55 feet it will assay close to that of the rest of the tunnel. If this is so, it will add 55 feet to the width of that body in the first part of the tunnel.

The open cut and the first 59 feet of the tunnel, that is, up to station 61 - 59 feet, appears to be a schist completely replaced by quartz, calcite and sulphides with numerous layers of talc. The quartz is usually of a dark color but numerous stringers of white quartz parallel the foliation of the formations. Calcite occurs in stringers and veinlets. The Sulphide of which pyrite predominates occurs in veinlets, bunches and disseminated throughout the mass. Of this body that area from station 71 x 25 to 71 x 59 has been thoroughly assayed, the distance being 34 feet. The first assays being taken as the tunnel was driven, the second, by taking samples along the walls for every five feet, third, by taking one sample, the entire 34 feet by stripping the walls, which gave an original sample of 1500 pounds. Sampling (first and second) gave assays ranging from \$2.10 to \$16.80 with an average of \$5.60. While the third sample assayed \$4.67.

From station 71 x 59 to 72 x 00, occurs an intrusion of green colored quartz, which is hard and dense, with stringers of calcite in the fractures. This rock assayed from \$2.80 to \$11.90.



The balance of the crosscut station 72 to 73 a distance of 59 feet can be considered as one formation, as it is difficult without microscopic analysis to readily distinguish the badly altered and replaced rocks. Quartz and calcite predominate, with numerous stringers of white quartz and calcite. The sulphide occurrence is similar to that of the first part of the crosscut. In sampling this area it was divided into three sections. All samples were taken by stripping the walls from roof to floor the entire distances given, each sample originally weighed over 1500 pounds. The assays were \$2.07, \$5.27 and \$4.57. Giving an average for the 59 feet of \$3.86.

The total crosscut assayed for a distance of 104 feet gave a total average of \$4.20.

No. 1. SHAFT WORKINGS This shaft is about 17 feet deep and from it a drift was turned along a seam for 26 feet. It is in this shaft that the porphyry was first noted. This porphyry shows a value of \$3.10. The hard dark quartz also appears in the shaft and showed values from \$5.60 to \$10.60. The right wall of the drift shows rock that appears to contain aplite, partially replaced, (this rock has been called igneous for want of a real determined name), this may have at one time been an aplite which has been replaced, it is about 8 feet thick and assays from \$2.10 to \$8.40. On the left wall is a brecciated area of talc, quartz and calcite, which assayed from \$1.00 to \$19.60.

No. 2. SHAFT WORKINGS This shaft is some 260 feet south west of the crosscut and consists of a series of workings. First an opencut was made about 70 feet long and from the face two crosscuts were driven, one (tunnel B) at nearly  $85^{\circ}$  to the strike, the other (tunnel A) about  $60^{\circ}$  and from tunnel A, a short tunnel was turned at right angles. Tunnels A & B are both about 25 feet long. Later a shaft was sunk 10 feet, near the mouth of these tunnels, and a crosscut driven about 30 feet from the bottom of the shaft, known as (tunnel C). Various opencuts were driven into the banks of the cut. Also two other shafts were sunk which are now filled.

The rocks exposed in these various workings are similar to that of the crosscut and No. 1. Shaft except that the replaced limestone is exposed. Of importance is the porphyry exposed in the cut for a distance of over 50 feet, lying above the rock called "igneous" which is about 18 feet thick. On top of this formation is a reddish colored limestone almost completely replaced by quartz, calcite and sulphides, in the last 9 feet of tunnel C is a body of quartz, varying in color from dark blue to white containing considerable limestone. Numerous layers of talc separate the various bodies, talc varying from white to brown.

The porphyry assayed from \$1.70 to \$5.60. The igneous rock from \$2.10 to \$9.80 with an average of \$5.10. The red quartz from \$4.20 to \$16.30. The quartz in the lower tunnel C, from \$1.40 to \$7.00; assays of talc range from \$1.20 to \$117.60.

It will be noted from the assay map that all of these formations have been sampled from various points and in the different workings.



CREEK EXPOSURE

Some 25 feet west of No. 2. Shaft, an area some 80 feet in length has been exposed by cutting the bank of the creek. The creek cuts the formations at about 60°. After careful cleaning the banks were sampled.

The lowest exposure is 40 feet of porphyry, one sample was cut the length of this exposure and assayed \$2.03. On this lies 24 feet of igneous rock, which was sampled in two samples of 12 feet each, and assayed \$4.90 and \$1.42. Above this was an exposure of talc some 6 feet thick which assayed \$1.39 and \$2.10.

CUBE AND IRON LEDGES

Two opencuts were made in the hill some 190 feet south of the mouth of the crosscut and at an elevation of about 230 feet above it. Rocks were exposed similar to that found in the crosscut. Four samples assayed \$1.05, \$1.55, \$0.90 and \$1.50.

EXPOSURE AT FROG POND

An exposure of red quartz-limestone occurs near the S.E. Corner of the Apex Claim which assayed \$5.60 and \$3.45. This exposure is some 1300 feet south west of the crosscut and about 290 feet higher in elevation. Some 25 feet north of this exposure a cut was made which exposed 12 feet of quartzite and 8 feet of blue quartz with talc.

METALLURGICAL TESTS

All of the ores of the Frog Pond Mine appear to be of a simple nature. Tests made to date shows minute amounts of copper, arsenic and antimony.

That the ores are amenable to the cyanide process is evidenced by the following leaching test. One important fact brought out is that no lime is required to alkalize the solutions, sufficient being found in the ore itself.

TEST

A sample of 10 pounds of ore obtained by combining numerous sample rejects, was ground to pass 80 mesh this was leached in a 0.1% KCN solution for 24 hours, then 1/4 pound (per ton of ore) of sodium bromide was added to the solution, and leaching continued a further 24 hours. Solution then filtered and the gold and silver precipitated with zinc.

RESULTS	Head Assay Gold	0.25 oz.	\$8.75
	Gold recovered	0.238 oz.	8.35
	Tailing loss in gold	0.01 oz.	0.35
	Extraction percent in gold	95.16%	
	Silver recovered	2.88 oz.	1.86
	Total value recovered		\$10.19



ASSAYS

Assays will be listed according to the working places giving sample number, location in working place, description, and value. Where station numbers are used to designate location ( x ) will stand for plus sign as 71 x 24 (reading station 71 plus 24 feet).

Sample No.	Location	Description	Length	Gold	Silver	Total
CROSSCUT TUNNEL						
26	71 x 34	Face	60"	\$ 5.50	--	\$ 5.50
28	x 34	"	60"	8.50	--	8.50
29	x 29 to x34"		120"	16.80	--	16.80
30	x 34 to x36"		84"	6.80	--	6.80
31	Re run sample 30			12.80	--	12.80
32	71 x 36	"	60"	22.60	--	22.60
33	x 36 to 41 "	& walls	120"	8.40	\$1.65	10.05
34	x 36 to 41 "	"	120"	14.50	--	14.50
35	x 36 to 41 "	"	120"	10.85	2.38	13.23
36	x 45	"	60"	11.90	2.40	14.30
37	x 45	Muck pile		8.75	1.85	10.60
38	x 45	" "		8.75	2.15	10.90
39	x 51	Face	60"	11.65	2.54	14.09
40	x 55	"	60"	14.00	2.55	16.55
41	x 50	"	60"	7.70	0.87	8.57
42	x 59 to 62	muck pile		11.90	----	11.90
42 A	x 63	Wall	24"	2.80	----	2.80
43	x 54 to 59	Dump		10.50	----	10.50
44	x 50 to 54	both walls	48"	5.60	2.95	8.55
44	x 50 to 54	check run		3.50	1.07	4.57
45	x 45 to 50	both walls	60"	7.00	3.69	10.69
46	x 41 to 45	" "	48"	7.70	1.37	9.07
47	x 36 to 41	" "	60"	9.80	1.70	11.50
47	x 36 to 41	check run		5.60	----	5.60
48	x 32 to 36	both walls	48"	4.20	1.30	5.50
49	x 27 to 32	" "	60"	8.40	1.82	10.22
50	x 34 to 54	Dump sample		17.50	1.54	19.04
50	x 34 to 54	Check run		7.00	0.67	7.67
59	Same as sample 43 later date			11.90	----	11.90
58	" " "	43 still later		10.50	----	10.50
104	72 to 72 x 22	both walls	22'	1.40	0.67	2.07
105	72 x 22 to 42	" "	20'	4.20	0.67	4.87
106	72 x 42 to 73	" "	17'	4.20	0.37	4.57
71	71 x 25 to 59	" "	34"	2.80	1.80	4.67
72	72 x 23 to 33	" "	10'	4.20	1.83	6.03

No. 1 SHAFT WORKINGS

S 1	End short drift,	talc	8"	7.70	----	7.70
S 2	Left wall shaft	quartz	14"	10.50	----	10.50
S 3	Left wall shaft	"	36"	16.80	----	16.80
S 4	Dump sample of	"		16.10	----	16.10
4	Quartz at face		14"	19.60	----	19.60
5	Quartz, face minys 4'		14"	10.50	----	10.50
6	Quartz in shaft		30"	5.60	----	5.60
7	Talc in drift		18"	7.70	----	7.70



Sample No.	Location	Description	Length	Value		
				Gold	Silver	Total
8	At face	igneous rock	96"	\$ 7.70	----	\$ 7.70
8	"	"	84"	8.40	----	8.40
21	Dump sample	quartz		7.00	----	7.00
23	"	igneous		14.00		14.00
107	Igneous rock		22'	1.40	0.78	2.18
108	At face	quartz	6'	0.35	0.65	1.00

#### No. 2 SHAFT WORKINGS

S 5	Mouth of crosscut	talc	12"	12.60	----	12.60
S 6	Shaft collar	red quartz	96"	4.20	----	4.20
S 7	In cut	igneous rock	96"	9.80	----	9.80
S 8	Dump sample	quartz		7.70	----	7.70
1	Face tunnel C,	quartz	55"	1.40	----	1.40
2	"	"	57"	7.00	----	7.00
3	Wall of tunnel C.	quartz	14'	2.10	----	2.10
10	Top of shaft,	Talc		4.90	----	4.90
11	Above quartz,	green rock	18"	117.16	----	117.16
12	Above No. 11			8.40	----	8.40
16	Composite sample	Igneous		7.00	----	7.00
19	Dump,	igneous rock		7.00	----	7.00
20	Dump,	quartz		17.85	----	17.85
24	Dump,	igneous (Collins Sampler)		7.00	----	7.00
25	Dump,	igneous (Richardson Sampler)		9.80	----	9.80
73	Dump,	igneous (Quinan Sampler)		4.20	2.32	6.52
109	In wall cut,	igneous	18'	2.80	0.52	3.32
110	Face of side cut,	igneous	2'	4.20	0.51	4.71
111	Side cut,	blue quartz	4'	2.80	0.79	3.59
112	Left wall cut,	igneous	3'	2.80	0.71	3.51
113	Composite sample,	igneous-quartz		2.80	0.82	3.62
114	Inside cut,	talc	4'	4.20	0.76	4.96
115	In side cut,	blue talc	18"	0.35	0.85	1.20
116	North wall in "T" tunnel		15'	2.10	0.62	2.72
117	Floor at face T tunnel		4'	2.80	0.53	3.33
118	Face right tunnel	talc	4'	2.80	0.82	3.62
119	Right wall,	green rock	10'	Tr.	0.55	0.55
120	Shaft collar	red quartz	4'	3.50	0.67	4.17
121	Side cut,	blue quartz	2'	2.80	0.69	3.49
122	Shaft collar,	igneous	8'	2.80	0.50	3.30
123	Dump,	talc		9.10	0.82	9.92

#### CREEK EXPOSURE

124	Bed of creek,	porphyry	40'	1.40	0.63	2.03
125	Wall of creek,	igneous	12'	4.20	0.74	4.94
126	"	"	12'	0.70	0.72	1.42
127	"	"	6'	0.70	0.69	1.39
S 9	"	"	4'	2.10	----	2.10



Sample No.	Location	Description	Length	Gold	Value Silver	Total
EXPOSURE AT FROG POND						
17	Outcrop	red quartz	8'	\$5.60	----	\$5.60
85	"	" "	8'	2.45	1.00	3.45
86	"	Talc & Blue Quartz	8'	tr.	0.82	0.82
87	In cut,	quartzite,	10'	0.70	0.79	1.49
88	Across Creek		15'	0.35	tr.	0.35
IRON & CUBE LEDGERS						
79	Open cut,	iron ledge	40"	0.70	0.35	1.05
80	Cube ledge,	cube iron	36"	1.05	0.50	1.55
81	Cube ledge,	brown rock	48"	0.35	0.56	0.91
82	Cube ledge,	gray rock	36"	0.70	0.80	1.50
CROSS LEDGE						
95	Exposure,	quartz	25'	1.40	0.16	1.56
JOHNSON GULCH LEDGE						
101	Exposure all	formations	29'	2.10	0.66	2.76
WYE LEDGE						
65	Middle formation,	Igneous	3'	4.20	1.87	6.07
66	Lower	" , Schist	3'	1.40	----	1.40
67	Upper	" , Quartz	4'	2.10	----	2.10
68	Above #67,	green rock	3'	1.40	----	1.40
96	Lower formation,	Schist	4'	2.10	0.62	2.72
97	Middle	" , Igneous	6'	0.35	0.51	0.86
98	Upper	" , Red quartz	4'	0.35	0.57	0.92
99	Below #96	, Quartzite	25'	tr.	0.70	0.70
100	Below #99	, "	75'	tr.	0.49	0.49
LOST CHINAMAN						
74		Quartzite	25'	0.35	0.66	1.01
76		"	75'	0.35	0.51	0.87
77		"	10'	0.35	0.45	0.80
DITCH LEDGE						
52		Red Talc	12"	35.00	----	35.00
53		Brown "	18"	21.00	----	21.00
TALC HOLE						
18		Brown Talc	18"	7.00	----	7.00
14		Amphibole schist		7.00	----	7.00
15		White Talc	24"	18.20	----	18.20

Sample	Location	Description	Length	Value		Total
				Gold	Silver	
103.	Composite sample	talc	52"	tr.	0.54	0.54
APEX LEDGE						
83		Gray Quartz	30"	0.35	0.55	0.90
84	Below #83		18"	0.35	0.78	1.13
MAC CAULEY TUNNEL						
89	78c x 20 to	78d Wall	33'	0.70	0.35	1.05
90	78c x 12 to	"	8'	0.35	0.73	1.08
91	78c to x 12	"	12'	tr.	0.69	0.69
WEST RIDGE LEDGE						
18	Wall,	quartz	5'	4.90	----	4.90
92	"	, lower portion, quartz	5'	0.70	0.65	1.35
93	"	" " " "	5'	0.35	0.52	0.87
94	"	, Open cut 125 ft. north	4'	0.35	0.48	0.83
SHALE LEDGE						
102	Quartz & shale over		25'	0.35	0.62	0.97
BLUE LEDGE						
75	Blue quartz		36"	0.35	0.40	0.75

NOTE: Gold assays based on gold at \$35.00 per ounce.  
Silver, samples below Number 70 at \$0.77 per ounce.  
" , samples above Number 70 0.44 " "

Where no value is given for silver the dashes indicate that silver was not included in the assays, the sample being assayed for gold only.

#### CAMP AND EQUIPMENT

The property is equipped at present with a cookhouse, bunkhouse, together with Blacksmith shop, compressor room, and mill building.

The equipment consists of the following:

- Compressor 220 ft. Ingersoll-Rand portable.
- 1 - 36 Cochise jackhammer with cradle.
- 1 - C.P. 10 jackhammer.
- A vertical & horizontal column.
- 8 - Sets drill steel, 7/8" - 2' to 7'
- 50 ft. Each water and air hose.
- Track laid in crosscut and to mill.
- Water and air pipe.
- Complete set blacksmith tools and equipment.



MILE BUILDING

- 1 - 9 x 12 Universal crusher driven by Dodge engine.
  - 1 - 6 ft. Huntington mill.
  - 1 - Monarch table.
  - 1 - Set plates.
  - 1 - 6 K.W. D.C. Generator.
- Mill power case 30 HP tractor engine, oil burning.

CAMP

Complete cookhouse equipment and bunkhouse furnished for 6 men.

MINING, MILLING, COSTS.

The mining and milling costs are based on plants now in actual operation and which handles approximately 250 tons per day.

MINING COSTS

Mining costs are the actual costs of a plant in northern California, which is, working an openpit mine under difficulties as, narrow ore bodies and the extra cost of sorting ore in the pit by means of the shovel, together with a heavy snow fall and a long winter. Hauling is done by trucks.

Open pit mining costs; including stripping,  
 drilling, blasting, digging, loading and  
 hauling. per ton, costs.....\$0.24

MILLING COSTS

Milling costs are based on average cost of present day operating all cyanide plants of 250 ton per day capacity. Crushing, milling, cyaniding etc.

per ton, costs.....\$0.93

Total - Mining and Milling cost per ton.....\$1.17

RETURNS

Using a value of theore based on the average assays obtained from the results of samples taken only by MacNaughton and Quinan and assayed by Bartells. Which consists of the following samples: Numbers; 71, 72, 104, 105, 106, 109, 110, 111, 112, 121, 122, 123, 1, 2, 3, 124, 125, 126 and 127. We have the following:

<u>Location</u>	<u>Width of sample</u>	<u>Average Value</u>
Crosscut	104 ft.	\$4.20
No. 2 Shaft workings	52 ft.	3.92
Creek exposure	70 ft.	2.35
Average value of the above three averages.....		\$3.56



RETURNS PER TON

Using the figures previously given:

Calculated average assay. . . . .	\$3.56
Estimated cost mining and milling . . . . .	1.17
 ESTIMATED RETURNS PER TON . . . . .	 2.39

In the small area from the crosscut thru the No. 2 Shaft workings to the Creek exposures a distance of 320 feet in length, known to be 104 feet wide at the crosscut and 70 feet wide at the creek exposure, there is about 75,000 tons of ore, above the level of the crosscut floor.

By openpit mining this area and milling by an "all cyanide" method with a recovery equal to that of the known test, that is, 95% and using the calculated average assay as above given for the area, we could expect the following results:

75,000 tons of ore at \$3.56	\$267,000.00
at 95% recovery would be	253,650.00
 At the estimated mine and mill cost per ton of \$1.17	 87,750.00
 Possible returns from above estimate	 165,900.00

RECOMMENDATIONS

Recommendations will embrace chiefly the Frog Pond Ledge or Deposit, and will be made as to exploration and development - mining and milling methods, with some reference to exploring the outside deposits.

EXPLORATION and DEVELOPMENT FROG POND DEPOSIT      The simplest and cheapest method of exploring the property would be by use of a tractor with angle dozer equipment, with such a device a series of opencuts could be made from the present mill location to the Frog ponds at a very low expense. The surface soil will on the whole average 4 feet deep, and as a result these cuts would average about 8 feet deep, on the bank side, to properly expose the ore.

The area from the mill to a point about 100 feet west of No. 2 shaft, a total distance of about 500 feet could be exposed easily by stripping parallel to the strike of formations, further cuts could be made at right angles to the strike at certain designated points over the area. Further stripping could be done from the Frog Ponds, along the hillside towards No. 2 Shaft.

The above work would expose the ore, at a very low cost, and to such an extent that a definite determination could be made of its surface area and value.

In underground work the crosscut could be extended some 250 to 300 feet to intersect the Cube and Iron ledges, which would be from their dip a point about 50 feet south of station 84. This would



give backs of about 300 feet. If the surface stripping warranted further development work, tunnels could be turned to the west from the crosscut and driven towards the creek. Which would determine the area, already proved by the recommended surface stripping at some considerable depth.

Costs of stripping by tractor, with angle dozer, for side hill works, averaging about 8 feet deep, on bank side, is, a cut along side hill 8 feet deep on the bank side and 100 feet long would cost about \$44.00. This cost including, falling timber, blasting stumps, actual fuel and lubricants used, tractor repairs and depreciation and all labor expense, but does not include the cost of the tractor equipment.

In regards to outside deposits such as, West Ridge, Johnson and Wye Ledges, these should be explored. Upon exploring I am sure that it will be found that Johnson and Wye ledges will prove to be one deposit. If this is so, it would give another body equal to that of the Frog Pond.

**MINING METHODS** The most practical and economical method of working the Frog Pond deposit would be by using a diesel shovel, for excavating and loading and the tractor for stripping. Hauling could be by truck or train. Such a method would cost at a maximum of 24 cents per ton.

**MILLING METHODS** It will be seen from the test given that the ore is amenable to the cyanide process. Tests should be made to determine whether the ore should be treated by an All cyanide process or a combination of flotation and cyanide. Actual milling costs should not exceed 93 cents per ton. Which figure is the average of several plants in actual operation.

Respectfully,

E. L. MacNaughton.

Box 800  
AT 1 / G.P.

Note: This is to state that the writer of this report, E. L. Mac Naughton owns an interest in the Frog Pond Mine property

Dec. 20, 1938.