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Pay roll mine File

NORTH GEORGIA CLAIM

Chloride District Mohave County, Arizona

The North Georgia claim is owned by John Ware of Chloride. It covers a vein that appears to be the faulted-off portion of the Pay Roll vein.

The NOrth Georgia surface was mapped in connection with the work on the Pay Roll-Mary Bell vein. Opportunity to go underground in the North Georgia did not arise.

The surface shows a prominent quartz vein carrying pyrite in varying amount. A minor parallel split vein is shown on the surface map as well.

Study of dumps does not indicate much valuable sulfide vein matter though some zinc and lead can be seen. The vein shows no prominent swings in strike which are associated with ore-bodies elsewhere. Reopening may locally cut across the early quartz and give some ore but nothing big is indicated by surface study.

The vein is developed by several shallow shafts and a 200 foot shaft. The main shaft has a drift on the100 level but little lateral work below.

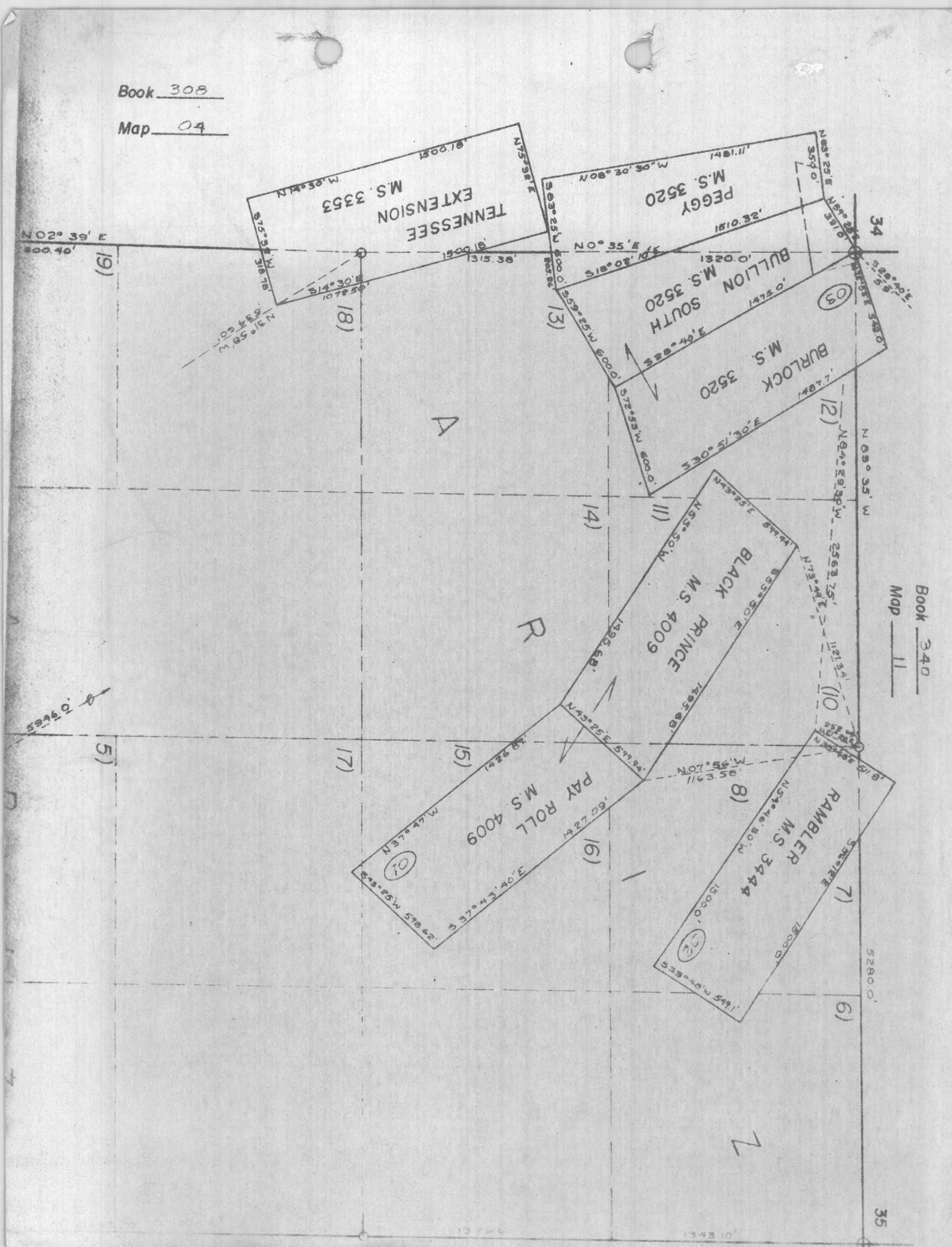
The strong quartz vein does not look promising but the underground workings should be examined.

The claim is held by location. It was optioned to a Salt Lake Co. in 1917 but was dropped presumably due to a bank failure.

The property is not considered to be of much value at this writing.

Examined: Feb. 11. 1938 Robert M. Hernon

Robert M. Hernon June 18, 1938


Book 308
Map 04
TENNESSEE EXTENSION M.S. 3353
PEGGY M.S. 3520
BULLION SOUTH M.S. 3520
BURLOCK M.S. 3520
BLACK PRINCE M.S. 4009
PAY ROLL M.S. 4009
RAMBLER M.S. 3444
N 02° 39' E
300.40'
1500.18'
1315.38'
1481.11'
1320.0'
1510.32'
1475.0'
1487.7'
1495.68'
1426.67'
1427.09'
1500.0'
5280.0'
Book 340
Map 11
34
35

George M. Colvocoresses
Mining and Metallurgical Engineer
1103 Luhrs Tower
Phoenix, Arizona

August 5, 1930.

Clin, Clark & Phelps,
149 Broadway
New York, N. Y. Attn: Mr. Murphy.

Gentlemen:

REPORT ON PAY ROLL MINE

Pursuant to your letter of instructions, dated New York, June 25th, 1930, I have examined and sampled the PAY ROLL MINE, near Chloride, Mohave County, Arizona, property of the Thomas B. Scott Estate, and herewith beg to submit my report in duplicate, together with blue-print of assay map and tabulated analysis of samples.

PROSPECTS

The field work on which this report is based was conducted from July 17th to 24th, inclusive, when I was assisted by George J. Harbauer, a Mining Engineer of long experience, and by two miners who cut, cobbed and quartered the samples under our direction. The analysis of samples was made by H. C. Smoot, Custom Assayer, of Prescott, Arizona, whose work is accurate and reliable.

Every assistance and courtesy was extended us by your representative, Dr. Blackwell, to whom I am indebted for much information regarding the history of the mine and surrounding properties.

On the fourth level (600' level) we ran a survey with a Brunton Transit. The map of the other levels was traced from a blue-print furnished us by Dr. Blackwell and said to have been taken from a mining survey. In some details this print did not appear to be altogether accurate but the discrep-

ancies would not be sufficient to change any essential results or conclusions.

All underground samples were chipped with moils representing roughly a 2" groove across the width of ore. In the better portions of the vein these grooves were made at 10' intervals, elsewhere at 20' intervals. No samples were taken in material which appeared to be waste or almost barren of commercial minerals, and some portions of the mine were inaccessible due to caving of the old workings. Also it should be noted that the vein or stringers of ore at times appeared to run off into the walls of the drifts, so that sampling ore at these points was not feasible, but I believe that our sampling was sufficiently thorough and complete for all practical purposes.

PROPERTY AND LOCATION

There are two patented mining claims, namely, Pay Roll and Black Prince, aggregating forty acres. These are located on the southwest slope of Rainbow Mountain, in the Cerbat Range, Mohave County, Arizona, and near the head of Pay Roll Gulch. They are one and one-half miles northeast from the town of Chloride, and 1.9 mile by auto road, which is in fair condition. The elevation of the collar of the shaft is about 4400' above sea level, that is, 400' above the town of Chloride. Chloride is twenty miles from Kingman by road, and is served by a branch of the Santa Fe Railway on which a train runs once a week, the main line passes through Kingman.

The climate is very dry with average annual rainfall about 6", and it is hot in summer but pleasant during the balance of the year and surface work can be carried

on continuously. The country is rough, rocky and barren with little vegetation, so that it might be classed as "near desert".

GEOLOGY

The formation of this district is pre-Cambrian granite and hornblende schist with intrusive dikes of pegmatite, diorite and aplite. The veins may be classed as intrusive vein-dikes of granite porphyry or pegmatite, and since the original surface has been eroded for a great distance, it is assumed that the minerals were deposited from gases or highly heated waters at considerable depth below the original surface, and that they probably extend to horizons much below those which have been worked to date.

The Pay Roll is one of three large parallel veins striking NW and SE and lying to the east of the town of Chloride. It can be traced on the surface for over two miles and has been made the basis of mining operations at various points, as will be noted later.

The vein is nearly vertical, dipping slightly to the NE, the strike averaging N-30°-W. The footwall country shows considerable schist mixed with the granite. The hangingwall is practically all granite. Along the footwall of the vein there is a gouge of talcose material which seems to separate the ore from the wall rock. On the hangingwall of the ore there is a band of dike rock which has been classed as aplite or alaskite, and beyond this is found shattered and largely barren quartz with narrow seams of ore gradually shading into the granite proper.

Oxidation has taken place in the vein to a considerabel distance below the surface, extending in parts of the mine down to the 400' level. The valuable minerals in

the oxidized portion are principally lead carbonate, zinc carbonate and iron oxide. In spots they are substantially enriched by gold and silver residual no doubt from the eroded upper portions of the original vein. In the lower and unoxidized portions the minerals are principally zinc blende (sulphide), galena (lead sulphide), chalcopyrite (copper iron sulphide) associated with iron sulphide. Along the second and third levels substantial quantities of the gouge material along the footwall have slipped down into the drifts and in places have made it difficult to pass thru into the workings beyond.

HISTORY

Discoveries of ore in this district date from the early 1860's when prospectors and miners, working east from California, found high grade surface gold ores near Catman. In the 1870's mining was quite active, silver ores also received attention, and the base metals came into prominence after the main line of railroad was constructed thru this country in 1882.

The Pay Roll Claim was located in 1887 and some high grade ore was mined and shipped from points near the surface. It is said that much of this material had a gold value of $30, or thereabouts, per ton, but no reliable records appear to have been kept, nor is it now possible to determine from exactly what points the ore was taken, although apparently most of it came from small pockets in the oxidized portion of the main Pay Roll vein where gold and silver would have had an opportunity to concentrate.

The main shaft at the Pay Roll was sunk to a depth of over 200' prior to 1900, and two other shafts had been put down in the vein as noted on the map. It does not

appear that any large quantity of ore had then been taken from those shafts or from any workings excepting those near the surface.

After Mr. Scott acquired this property, in about 1910, he deepened the main shaft, which is in the footwall of the vein, to 400', crosscut to the vein and extended the drifts on this level.

About 1916 the mine was leased to a man named Martin, who shipped some ore from the 200' and 400' levels, but apparently this proved too low grade to warrant continued operations.

In 1924 the Pay Roll Consolidated Company took a lease on the property and sunk the shaft to the 600' level, after which Mr. Scott resumed control and ran the crosscut on the 600' to the intersection of the vein. The last work done (1927-29) was by the Pay Roll Mines, Inc., operating under a lease and bond, and consisted principally in extending the 600' drift along the vein to its present limits as shown on the map. A little ore was mined from the stopes on the 400' and 600' and from the drifts, raises and winzes, and some was shipped crude, the balance sent to the concentrating mill which was built in 1929.

OTHER WORKINGS ON PAY ROLL VEIN

Aside from the shafts mentioned, there are several trenches and shallow pits along the surface of the Pay Roll Claim developing the outcrop of the vein and showing in places oxidized ore. Apparently several other pits were sunk but have now been covered by waste dumps. The Black Prince Claim, which lies to the northwest, does not show any promising outcrops and has not been developed to any substantial extent.

To the southeast of the Pay Roll Claim is located the Mary Bollo, owned by Dr. Blackwell, who has also worked near to the north end of the Pay Roll where some lead ore was found near the surface, but apparently did not extend to any depth.

On the Mary Bollo Claim there are two tunnels driven in opposite converging directions from the slopes of a ridge which runs at right angles to the Pay Roll vein. The tunnels are in the vein but quite close to the surface, and from both of them a little high grade ore has been taken. Here the vein is fairly strong but either narrow or split up into several stringers. The values are higher in lead than on the Pay Roll Claim, and also said to be richer in gold and silver.

The Rankin Tunnel starts on the Mary Bollo millsite and runs due east 775' from the portal to a point where it cuts the Pay Roll vein with a back of 210'. From this point a drift was run along the vein for about 100', but this is now caved and could not be visited. Where the vein was originally cut by the Rankin Tunnel it shows stringers of lead and zinc ore scattered through quartz and does not appear to be commercial.

All of these workings are within a comparatively short distance of the surface and the ore shows considerable oxidization. They give some encouragement toward further development at depth provided that similar development in the Pay Roll Mine itself should give satisfactory results.

About a mile southeast from the Mary Bollo are the workings of the Mayflower Mine from which some good ore has been taken from pockets but where no continuous pay ore

bodies have yet been found. I did not visit this property which has been idle for some time and where I understand that most of the workings are inaccessible.

At a short distance northwest of the main Pay Roll shaft the vein intersects Pay Roll Gulch which appears to be a line of faulting and to cut off the vein altogether. Surface indications lead one to assume that the vein has been thrown a considerable distance to the southwest and the outcrop of a similar vein on the North Georgia property is very probably a continuation of the Pay Roll, although this could not be positively determined from data now available.

It is my opinion that, while the entire Pay Roll vein may be classed as an ore-bearing zone, commercial values are confined to comparatively short and nearly vertical shoots or lenses such as the one developed near the main shaft and the more important shoot at the southeast end of the 600' level. A similar shoot is developed on the Mary Belle and undoubtedly there are many others along the strike of the vein, but their exact location is not indicated by the outcrop and they could only be proved by systematic drifting at a deep level where the oxidization would have disappeared. This would obviously involve a very heavy expenditure which at the present time does not seem justified.

MINE LAYOUT AND EQUIPMENT

The mine is developed by one vertical two-compartment shaft, each compartment being 4' 6" inside timbers with sets of 8 x 10s, spaced 6' apart, and generally lagged solid. There are four levels located respectively at 50', 200', 400' and 600' below the collar of the shaft. The sump extends 25'

below the fourth level.

Two other shafts were sunk in the vein many years ago; one is about 100' east of the main shaft and connects with this through an intermediate level and a raise from the 50' level. This connection is now impassable, although it serves to some extent for ventilation. The second shaft, at a considerably higher elevation, is about 300' to the SE and cannot be descended at the present time. It is not connected with any of the other underground workings. All the above can be best understood by reference to the Blue-print attached.

The equipment in the main shaft consists of a good headframe with sheave-wheel and cable, to which is attached a 1¼ cu. ft. mining bucket which can be replaced as desired by a 200 gallon baling bucket. At one time a cage was provided but it is said that the hoist was not sufficiently powerful to lift this, together with a loaded ore car, from the fourth level. The mine makes some 3500 to 4000 gallons of water per day, which is baled out to below the fourth level by daily operation of the hoist and baler for about two hours.

The power-house is built of frame timber covered with corrugated iron. There is one 40 H.P. Fairbanks-Morse oil hoisting engine, one 60 H.P. Fairbanks-Morse engine driving a Chicago-Pneumatic 12 x 10 compressor. At the collar of the shaft there is a 4 H.P. Novo oil engine driving a blower for ventilation underground and a centrifugal pump to put water into the tanks. South of the shaft is located a framing shed and blacksmith shop equipped with a forge, hand-driven blower, and Waugh drill sharpener. There is on hand a 75 Cameron sinking pump, also several drills and a considerable quantity of drill steel and fittings.

Other buildings comprise a change-room with shower bath, two small store houses, and across Pay Roll Gulch a combined office building and dwelling house with four comfortable rooms and porch. Buildings and equipment are in good shape excepting the power house which needs some repair. The hoisting engine is of an old type and said to be wasteful of fuel, and, if operations were to be resumed, the engines would probably need a thorough overhauling, re-babbitting of bearings and some other repair work.

CONCENTRATING MILL

The mill, built in 1929 by the Pay Roll Mines, Inc., has a capacity of 50 tons of ore per day. It is located 200' south of the main shaft to which it is connected by a narrow gauge mine track. The crude ore bin and coarse-crushing-plant are on the Pay Roll Claim, the line of which cuts across the belt conveyor which is an offset from the coarse-crushing plant to the main-building. The main-building is on the Millsite Claim belonging to the Pay Roll Mines, Inc., but now encumbered, together with all its equipment, by various liens filed by creditors of the Pay Roll Mines, Inc.

The mill buildings are of frame timber covered with corrugated iron and are well constructed and in excellent shape. The mechanical design of the mill is good and the flow-sheet and treatment of the ore are correct from the metallurgical standpoint involving the separate production of a lead and a zinc concentrate through the application of selective-flotation. In a larger mill it might prove advantageous to make a third product, namely, a copper-iron concentrate, but this would not be economical in such a small plant and, judging from the assays of the concentrates, the copper and gold values in the ore are principally contained in the lead concentrate, which is advantageous from a financial standpoint.

The machinery in the mill was mostly purchased new and is in good condition. Some of it was not skillfully erected but adjustments could be made without difficulty or great expense. The principal items of equipment are as follows:

(A) - In Coarse-Crushing Plant

1 - crude ore bin with capacity of 50 tons, covered by a grizzly.

1 - 7" x 10" Hendrie & Bolthoff jaw crusher

1 - 5" x 9" Joshua Hendy jaw crusher

1 - 25 H.P. motor

The conveyor from the coarse-crushing-plant to the main building is housed in a substantial shed and consists of a conveying belt 20" wide and 120' long, equipped with runners and idlers and driven by a 5 H.P. motor.

(B) - In Main Mill Building

Storage bin for fine ore
(crushed to pass 1" ring)
Capacity 50 tons.

Automatic feeder and ball mill 5' x 4'
(no name plate)(Above driven by belt from 50 H.P. Motor)

Dorr Duplex Classifier 16' x 5'
The above driven by a belt from the same 50 H.P. Motor.

Mineral Separation Company Flotation Machine
(sub-aeration type)
12 cells, each 30" x 42"
Equipped with Link Belt silent chain drive
also Roots blower
This machine built by Joshua Hendy Iron Wks.

40 H.P. Motor to drive flotation machine

1 - 30' diameter thickener tank with Dorr mechanism and small motor

1 - 10' thickener tank with Dorr mechanism and small motor.

1 - Wilfley Table used as a pilot.

2 - Dorrco pumps for the thickened pulp feeding the filters

1 - Oliver filter 30" x 36" for zinc concentrates.

1 - Filter (no name plate) 28" x 24" for lead concentrates.

2 - concentrate bins, respectively for lead and zinc concentrates. Each with capacity of about 30 tons.

NOTE:- (In the zinc concentrate bin there are approximately twenty tons which may be fairly represented by my sample, showing Gold - .12 ozs. per ton; silver - 5.6 ozs.; copper - 1%; lead - 2.5%; zinc 35%.

In the lead concentrate bin there was only a small amount of material which according to my sample contains; Gold - 1.41 ozs. per ton; silver - 63 ozs. per ton; copper - 11.6%; lead - 50.2%; zinc - 5.2%.

Should the concentrating mill be acquired by your clients it is recommended that both lead and zinc concentrates be sold and also any pay material that could be cleaned up in the thickener tanks and other protions of the mill.)

All motors in the mill are A.C., 60 cycle, 3-phase, 440 volts.

About 100' west of the mill is located a transformer house with transformers for reducing the primary current, which comes in at 44,000 volts, to that of the mill circuit, i.e. 440 volts. I was told that these transformers are the property of the Pay Roll Mines, Inc., but am not certain on this point.

The power line of the Desert Power and Light Company terminates in the transformer house mentioned and I understand that power was sold to the Mining Company at 2.75¢ per KW Hour. Undoubtedly this rate could be improved upon if regular operations were undertaken and a good load factor maintained. Under such conditions it might be advantageous to consider scrapping the gas engines in the power-house at the mine and utilising electric current for the operation of all the mining machinery as this would result in a substantial operating economy.

RELATION OF MILL TO MINE

It is obvious that the mine in its present partially developed condition does not and never has justified the erection of a concentrator since steady operations of the mill could not be forecast until say 30,000 tons of ore were definitely assured and the mine workings properly advanced to permit the economical production of 50 tons per day.

Since, however, the mill has been erected and is actually on the property, the instant question is to decide whether this is worth acquiring at a comparatively low price on the chance of its proving of much greater value to any parties who might operate the mine in the future, or whether the owners of the mine should merely stand on their rights and allow the holders of the liens to remove and sell the buildings and equipment. I am informed that the total of the liens other than your own now filed against the Pay Roll Mines, Inc., and the property on their Millsite Claim amounts to $6,447.76. These liens could probably be purchased for cash with a discount of about 25%, and there seems to be little chance that the Pay Roll Mines, Inc., will be in a position to redeem this property, and to do so they would have to pay the full amount of the liens, plus accrued interest and costs. I should judge that the mill building and machinery actually cost over $30,000, and it should be worth from $12,000 to $15,000 to any company in need of a similar mill, but in the event that no such purchaser could be found and that operations are not resumed at the Pay Roll, it might have to be sold to secondhand machinery houses, in which case the net price that might be realized would probably not exceed $6,000 or $7,000, considering the great surplus of secondhand machinery which is now on the market.

QUANTITY AND QUALITY OF ORE

The blue-print attached shows the plan and section of the Pay Roll Mine and also the location by number of the samples taken in the course of my examination. The tabulation of assays gives the respective width and analysis of each of these samples. No analysis for copper was made on samples taken in the upper levels where this metal was noted only in negligible quantity, and the percentage of both lead and copper in the samples from the lower level is disappointing. The character and width of the vein varies to a considerable extent in different parts of the mine and in sampling we aimed to cover only the width of pay ore which should be mined as clean as possible in order to keep up the grade. In places where the ore is wide - for example in the southeast end of the fourth level - a certain amount of sorting could be advantageously done, decreasing the tonnage by probably 25% and increasing the average grade of the material mined by from 15% to 20%.

I have not placed any value upon the various samples for the reason that the prices of all the metals contained (excepting gold) have varied so widely during the last few months and are now at such an abnormally low level that any such valuation might become wholly meaningless within the course of the next few months. As an example, consider the ore developed along the southeast section of the 4th level, represented by samples #7 to #55, inclusive. This oreshoot has a length of 360' and an average width of about 5', the maximum width being in excess of 10' at the winze, but decreasing to the northwest. The grade of this ore is:

Gold	-	.1 oz. per ton
Silver	-	3.0 ozs. " "
Copper	-	.4%
Lead	-	.3%
Zinc	-	7.6%

For comparison with this average I took a sample of the ore in the mine bin which was said to have been taken largely from this section of the mine, the analysis of which was as follows:

Gold	-	.03 ozs. per ton
Silver	-	3.40 ozs. " "
Copper	-	.7%
Lead	-	2.3%
Zinc	-	6.1%

The metal contents being slightly above the average of the nine samples above quoted.

Now the gross value of the ore which might be mined from this section of the fourth level without sorting is $11.00 per ton, based on present metal prices, whereas it would have been $16.45 per ton in July, 1929. These figures are merely quoted for purposes of comparison since the gross value of any ore means but little to the producer and real importance attaches only to the net value which must be figured out by very complicated calculations.

Considering that the Pay Roll ore, (except in a few scattered pockets), is not sufficiently rich to be shipped crude to a smelter, calculations must be made on the basis of concentrating the ore and shipping the two classes of concentrates produced with due allowance for tailing and other losses in concentration, for the fact that some of the precious metals will be contained in the zinc concentrates where they have little or no value, that some of the zinc will be contained in the lead concentrates, and some of the lead in the zinc concentrates, and that the concentrates must stand the cost of trucking, railroad freight, treatment, refining and marketing charges, and smelter deductions and penalties. Considering then the character of the concentrates produced in the Pay Roll mill, as indicated roughly by the samples taken and making due allowance as above, it is apparent that the net value of the

ore of the east end of the fourth level is about $6.40 per ton on the basis of present metal prices and would have been about $9.50 on the basis of the prices which prevailed a year ago.

The best grade of ore in the mine was found on the third level and in the stope above it (samples #36 to #45, inclusive), but the width of this ore was only about 2', the length of the sheet being figured at 150'. The net value of this material is at present $15.00 per ton, and would have been $22.50 per ton a year ago.

To figure the operating costs I estimate the expense of normal development and mining, considering the average width and character of the vein, at $4.50 per ton, and the cost of milling at $2.50, with general expense, overhead and supervision estimated at $1.00, aggregating a total operating cost of $8.00 per ton of ore, which figure should be increased to about $9.00 per ton, if sorting were carried out as suggested. It therefore appears that under present conditions, or even under those which prevailed a year ago, only the ore in the vicinity of the stope on the 3rd level could be mined and milled with profit, but, since the tonnage available at this point is entirely problematic and the width of the vein so narrow as to increase the average mining cost, it would not be advisable to make any optimistic forecast regarding the possibility of handling even this ore with advantage.

Considering then the actual present condition of the mine, I should say that on the two upper levels there is no pay ore developed except at one or two points where small pockets or chimneys occur and where the gold or lead values are sufficiently good, as at the location of sample #43 and #34, to make it possible for small operations to be conducted with advantage, preferably by lessees.

On the third level there is a small shoot of ore which justifies some further development particularly the upward extension of the raise which was inaccessible for sampling, and it is possible that some ore might be profitably taken from this point provided sufficient additional ore could be developed in other sections of the mine to permit the operation of the concentrator.

The south end of the third level is too low grade to be commercial but a further extension of the drift is justified on the chance of developing a somewhat better grade of material and for the purpose of extending at least to the point where the raise from the fourth level would intersect the third level drift.

The showing on the fourth level is the most interesting in the mine, for, while the grade is not sufficiently good to permit profitable mining, there are indications that the ore is both widening and improving in grade with depth and the values in copper and zinc appear to be increasing. This showing justifies development, preferably the sinking of the winze for an additional 100' and further if the expected improvement is then apparent. It is my opinion that the further value of the property will depend almost entirely upon the results of this development and no definite estimate regarding this value can be made at the present time. It will be noted that this ore-shoot is fairly continuous for a length of 360', having an average width of 5' and being 10' wide in the vicinity of the winze, therefore, the winze itself could be sunk entirely in ore. The quantity of ore which might be developed in this shoot figures at 200 tons per vertical foot, so that there is a probability of proving up 20,000 tons by deepening the winze 100' and running a drift for the length of the ore at this level, or double this tonnage by going down 200' and repeating the

drifting, always assuming that conditions do not change adversely while such work is in progress. Obviously it would be of no advantage to develop a large tonnage of non-commercial ore, but I am strongly of the opinion that the mine workings are just beginning to enter the pay zone and that during the next 100' the ore value will substantially improve. Should this prove not to be the case, the work could be stopped at any time that such action appeared justified.

DEVELOPMENT WORK RECOMMENDED AND ESTIMATED COST

Should the owners of the property or other parties decide to proceed with operations at the Pay Roll Mine, the following work is recommended both for the purpose of complying with the State Mining Laws in reference to escapement ways and with the object of developing additional ore reserves.

Overhauling mine plant and building, and minor repairs. Estimated cost.....	$ 675.00
Extending 400' level about 50' southeast and cleaning out drift. Estimated cost.....	1,000.00
Completing raise from 600' to 400' level. Distance 105'. Estimated cost.....	1,575.00
Completing raise from 400' to 200' level. Distance 200' Estimated cost.....	1,500.00
Driving raise from 200' to 50' level Distance 150'. Estimated cost....	2,250.00
Cleaning raise from 50' level to intermediate level and intermediate level to old shaft. Retimbering the above and providing same with proper ladders. Estimated cost.....	1,000.00
Deepening winze at east end of 600' level for 100' Estimated cost.....	5,000.00

Crosscuts on 600' level.....	$ 500.00
Crosscuts and drifts from winze 100' below 600' level.....	2,000.00
Deepening winze an additional 100' and crosscuts and drifts at bottom.....	3,000.00
Overhead, engineering and incidentals.....	1,500.00
TOTAL.....	$25,000.00

This development work might reasonably be expected to bring the positive and probable ore reserves of the mine to from 40,000 to 50,000 tons in which event, assuming that the grade of the newly developed ore improves as expected, stoping and milling operations would be justified with a resultant profit dependent on the average grade of material produced and the market prices of the metals, - neither of which factors can be forecast at present.

CONCLUSION

The Pay Roll Mine in its present condition must be considered as only a partially developed property with practically no reserve of commercial ore that can be classed as either positive or highly probable. The general conditions indicate that the upper workings of the mine are in a portion of the vein which was never highly mineralized or where oxidation and leaching have robbed the vein of its original values, excepting those in gold and silver which have been increased by concentration at certain specific points. The geology of the deposit and the showings in the lower levels of the mine indicate that the true ore zone is being approached and encourage the belief that a more substantial mineralization

and higher values, particularly in copper and zinc, will be found at greater depth. The showings at the southeast end of the fourth level should be made the basis of additional development in depth and this development appears justified and is recommended subject to an improvement in the metal markets and particularly the price of zinc which constitutes the principal content of the ore and is likely to increase as greater depth is gained.

(Signed) G. M. Calvecoresses

RALPH R. LANGLEY
1045 SOUTH BEDFORD STREET
LOS ANGELES, CALIFORNIA

P. O. BOX 455
KINGMAN, ARIZONA

Los Angeles California.
February 26th,1943.

Mr. W. B. Gohring,
Supervising Engineer,
Reconstruction Finance Corporation,
325 Heard Building,
Phoenix,Arizona.

Re- Payroll Mine.

Dear Mr. Gohring;

I would like your advice on the following at your early convenience.

For some weeks I have been negotiating with the Attorneys for the owner (the owner being in the Service in Africa) of the Payroll mine at Chloride,for a lease on the property. We have agreed upon terms and conditions but at the last minute the Attorneys object to subordination of the cash minimum payments to the loan of the RFC.

The lease has not yet been made out and executed and it is not desirable to have it executed until all terms are agreed upon for the reason that in the absence of the owner it is necessary to have trustees and other representatives execute--which is quite a task to get around to all of them.

I feel very sure that the owner would very readily subordinate, particularly since the whole matter is primarily a war necessity matter,but his New York Attorneys do not want to assume that resppnsibility. I think the RFC might waive the subordination if we put the commencing of the cash minimum monthly payments off until we have plenty of time to unwater and do some developing and thus either get into production or,decide to gêve the property up if the examination and sampling do not warrent proceeding.

Here is the situation. The Payroll appears to be one of the most potent zinc and lead properties in the district. It is developed six hundred feet in depth, by vertical shaft and drifts. Very little stoping has been done. The ore runs probavly 9% zinc and 3% lead with about I% copper and about $2.50 in gold and silver. About 20,000 tins of ore are opened up on three sides. The workings are orderly and well done. The property and workings were thoroughly examined and sampled by Mr. George M. Colvocoresses whom you no doubt know,for the owners,before it filled with water. The figures and statements just given are taken from his assay map and report and from his conversations. It seems to be a property which will really produce zinc and lead--and at better than a sustaining profit.

I figure it will take thirty days to unwater and sample the mine, after RFC funds are available,then another thirty days to increase the loan for development and to start development and production. Four months from now we should either be in production to such

of the discoverers of Pioche, and was worked by lessees with good profit. Later E. F. Thompson sank the shaft to greater depth and shipped ore of good grade.

PAY ROLL MINE.

The Pay Roll mine is about 1½ miles east of Chloride, near the middle of the west slope of the Cerbat Range. It is situated on Pay Roll Gulch near its head, at an elevation of about 4,400 feet, whence the surface rises steeply to about 5,200 feet in Rainbow Mountain on the northeast. The mine is approached by a good wagon road of easy grade.

The property, aggregating 40 acres, consists of two claims, known as the Pay Roll and Black Prince quartz. It is owned by Mrs. Mary Murphy, of Kingman, and Judge J. J. Hawkins, of Prescott. It was located in March, 1887, by J. W. Murphy.

The country rock consists of the usual pre-Cambrian crystalline schists, with granitoid rock predominating in the hanging wall and schist on the foot-wall side. A diabase dike is locally associated with the vein, which is cut off on the northwest by a raised fault block of black hornblende schist. In the gulch just below the mine the schists are cut by dikes of relatively young light-colored garnet-bearing aplitic granite.

The principal development work, all on the Pay Roll claim, consists of three shafts, aggregating about 500 feet in depth, over 600 feet of tunnels, about 400 feet of drifts, and some crosscuts and stopes. Shaft No. 1, the main working shaft, sunk off the vein, is 225 feet deep, and contains water in the sump. Shafts Nos. 2 and 3 are sunk on the vein to depths of 100 and 60 feet, respectively. The main drift is about 500 feet in length and the main crosscut tunnel about 130 feet. Where the latter intersects the vein a winze about 50 feet deep is sunk on the vein.

The mine is situated on the Pay Roll vein or lode, which strikes about N. 30° W. and dips steeply to the northeast; the structure in the adjacent rocks trends about N. 40° W., with the dip approximately vertical. The Pay Roll is one of the large veins in the Chloride region. As shown by its persistent croppings it has a horizontal extent of nearly a mile, but is reported to be somewhat broken in the bottom of the mine. It varies from 6 to nearly 100 feet in thickness, 10 feet being perhaps a fair average, and contains in places a fair grade of concentrating ore. The gangue is mainly quartz, and the vein is in places separated from the wall rock by a thick sheet of argillaceous or talcose gouge.

Near the mine, as shown in figure 4, the vein is joined by the Redemption Clyde vein, which probably enriches the Pay Roll ore shoots.

The ore in the persistent pay shoots consists of lead carbonates and galena, with some pyrite and chalcopyrite; it contains both gold and silver. The total production of the mine was not learned, but it is reported to include many carloads of rich shipping ore that run about $80 a ton, mostly in gold, derived principally from the surface workings, excellent values being found in the south shaft. So far as can be judged at present the deposit is a good-sized body of low-grade ore.

REDEMPTION MINE.

The Redemption mine, also known as the Ferguson, is a new property situated 2 miles east of Chloride and half a mile east of the Pay Roll mine. It is working on the Redemption Clyde vein, which lies east of the Pay Roll vein and joins that vein at the Pay Roll mine. The Redemption Clyde vein strikes N. 60° W. and dips 85° NE., and is known to have an extent on the surface equal to the length of at least four claims. Where opened on the Redemption property it attains an elevation of about 5,000 feet. Like the Pay Roll vein, it lies in the pre-Cambrian crystalline schists. It is opened by tunnels and winzes. The vein is about 4 feet thick, and the ore shoot is about 18 inches thick. The ore contains chalcopyrite in quartz and carries about 8 per cent of copper, 1 to 2 ounces of silver to the ton, and some gold. The production amounts to 200 tons of ore.

LUCKY BOY MINE.

The Lucky Boy mine is about 3 miles east of Chloride and about a mile east of the Redemption mine. It is near the crest of the Cerbat Range, at an elevation of about 5,750 feet, in the head of a gulch which is tributary to Windmill Wash. The property embraces four claims, the Lucky Boy, Brighter Days, Queen, and Baldwin. The total output is said to have had a value of about $150,000.

The Lucky Boy mine is an old property, located in 1892. It has been producing more or less all along and has been operated steadily for the last seven years. For some time it was owned by the Scott Lucky Boy Consolidated Mining Company, of Norfolk, Va., and was leased and worked by a company composed of Kingman men, Fred Stull being superintendent. Early in 1907 it was reported that the property had just been sold to an English company. In 1908 it was worked only on a small scale by lessees.

The principal rock is a medium-grained biotite granite, in which biotite, quartz, orthoclase, and much oligoclase are the essential minerals. This rock may possibly be of post-Cambrian age. It is included by a light-colored, fine-grained granite porphyry.

The mine is worked by shafts, crosscuts, tunnels, drifts, and stopes, the underground workings aggregating somewhat more than 4,000

Chloride and the Wallapai Mining District

(By PROF. F. C. SMITH, Chloride, Ariz.)

Despite the great war; despite the frivolity of metal prices; despite the countless burdens of cost laid upon the shoulders of the everyday man by the political gymnastics of the most remarkable administration with which this country has ever been—blessed; despite the chronic pessimism of omnipresent homunculi, whose sum-total of aspiration and vision may be limited by the portentious functions of the next pay-day; despite all these handicaps, and "the flu," and woman suffrage, and national prohibition (with no caps) and all of the eevryday trials and tribulations, Chloride keeps moving. She has a continually increasing number of mines in process of development in the immediate and tributary districts, with many indications today of a more solid and business-like procedure than ever before; this condition doubtless being caused not only by the fortunate development of good ore chutes, but also by a more comprehensive knowledge of the value of the ores mined. In the past, aside from the wasteful operations of a number of old-style concentrating mills, all ores from this district were shipped; sometimes to very great distances and even to Europe; and this fact had, to a certain extent, fixed the idea in the minds of the population that no different or less costly procedure would ever be possible. That the small gleanings of the "chlorider" as well as the larger tonnage of the deep mines must all be shipped—somewhere outside—and must thus stand the constantly increasing items of freight and immoderate smelter deductions and treatment charges. Today, glimmerings of the possibility of other and less expensive procedure pierce "the brick wall of prejudice," and the vast advantage attendant upon the erection of local mills—and mills erected in strict compliance with the startling advances in metallurgical knowledge—will serve as a sound basis for a system of operations which will very profitably replace that of the old days.

For these favorable conditions, and for the ultimate importance of Chloride—on a big scale—it may be as truly said of this mining area as of a certain notorious coffee-substitute—"there's a reason!" and this reason (supplemented by the certain promise of sensible milling) is becoming firmly fixed in the minds of a number of men who are both mentally and financially equipped to profit by it. The "reason" is this: That the Cerbat Range has the ore, and in vast amount! Only during the past week this reason has been enthusiastically expressed by two different mining operators of wide experience, and independently of each other; each of whom made substantially the following statement: "I have loked over practically all of the mining districts in North America, and I have come here to stay, for I have never seen a section of the earth of similar size so well mineralized." "Why man! even if you want to cut out the properties offered for sale, there are thousands of prospects which are opened to location which have been superficially opened twenty years ago and abandoned, which show conditions and values which, if they were—say in Tonopah, would be gobbled up at big prices." "The ore-chutes, as found in the main veins at least, go down; as shown in the only two deep mines you have, the Tennessee and the Golconda; what better do you want?" These ideas are not exaggerations; they are facts. If this be the case, the query arises as to just why these conditions have not been more largely exploited to profit. The answer is easy, although it is a function of several varieties:

(1) Strictly local milling of these complex ores (containing lead, zinc, copper, silver and gold in varying percentages) was the only economic procedure thirty years ago, as it is today. A very superficial consideration proves this axiomatic; since it is difficult to conceive a situation warranting the expense of wagon and railroad freights on waste. For many years (we might say even up to a year ago) the milling of complex ores has been in a very weak condition to say the least; the main function of the machinery supply houses being to sell the machinery, and let the buyer take his chances as to its adaptability. As a matter of fact, until the advent of flotation, no milling methods have been available which afforded more than a very rough and incomplete saving on such ores. Hence, many deposits of complex ores have hitherto been of only problematic value; since complete milling was impossible in many cases, and only the richest portions of the ore would pay for shipment.

(2) Minds unacquainted with the recent discoveries in the metallurgy of these ores have no recourse but to base their opinions as to their commercial value (and unfortunately, to broad-cast these opinions) upon past history, which includes the record of some salient mistakes and of higher costs than are necessary today; and it must be confessed that this category includes many visiting engineers, who camouflage a lack of the necessary technical knowledge to cover the situation wisely, by such deductions from the past; fortifying their adverse conclusions by the use of maximum mining costs for the district (whether logical or not) together with maximum treatment and selling costs, backed up by minimum saving as obtained in some operating mill, whether the latter is properly efficient or not. These conditions unjustly, but quite frequently, befog the situation.

(3) The fallacy of the attempted exploitation of the complex ores of the district by laymen, profoundly ignorant of the enforced nicety of technical detail required, has strewn the district with pitiful wrecks which cannot fail to render observers skeptical of success. A few years ago there was some excuse for this condition; but today there is none.

Here, then, are a few of the reasons for the interrupted progress of Chloride, whereby it has evidenced repeated periods of great activity, with alternate periods of depression; explaining very fully why many promising ore-deposits have been abandoned before fruition, and why many investors have been afraid to proceed, or to properly finish what they have begun. Notwithstanding this limping progress, a real progress is being accomplished, simply as the natural result of the occurrence so many ore-deposits which simply can be neglected; and there is a practical certainty of the early erection of a strictly modern and efficient mill for the treatment of the ores from the Schuylkill-Tennessee mines. The erection of this mill should absolutely solve the problem of Chloride's future; ridding it of the further incubus of the installations of procrastinating cranks and visionary dreamers, and affording a proper pattern for business-like operators.

The fact must not be omitted that there are already two small flotation mills built in this section; the Washington and the Keystone. Neither of these has yet come into active operation, but there is no reason to doubt their entire efficiency when they do.

Among the mines, the Schuylkill-Tennessee carries out a steady improvement and development policy; operating two shifts and opening up new ore-reserves against the day of production. Connection has recently been made with the 800-foot shaft on the Schuylkill end-line, by a raise from the Tennessee 900-foot level north, thus establishing the entity of the one vein, draining the Schuylkill and giving better general ventilation.

The Cerbat Silver Mining Company is actively operating the old Elkhart property, northward on the same vein; using the Schuylkill shaft and surface plant and continuing the drift on the 800-level northward into Elkhart ground. This will bring the exploration some 300 feet beyond the old Elkhart shaft, and in these new workings good ore has been already encountered. There are two parallel veins, one carrying silver-lead ores, the other pyritic gold ores.

Still to the northward, the Chloride Queen Company is drifting on the 250-foot level, and producing some very fine ruby silver ore. This property covers the intersection of some East-West silver veins which have produced a quantity of high grade ore, with the North-South vein upon which are the mines above-mentioned.

A short distance east of the Tennessee an operation has been undertaken which is of great interest to he whole district. It consists of a double-track cross-cut tunnel, opened near the south end of the Payroll claim, which is to be driven about two miles easterly to intersect and drain the many veins at great depths. The enterprise has been started by Colonel Ralkin, and the tunnel has a depth of something like 300 feet. It is understood that T. B. Scott, the owner of the Payroll has become interested, and that the work will proceed without delay.

The Brunswick property, on the Tennessee vein, has recently begun active operations, and promises to take a prominent part in the ore production of the camp. It is located a few hundred feet south of the Tennessee.

In this immediate vicinity and near the old Altata mine, the Rescue or Dorothy claim has recently jumped into prominence having produced and shipped some of the

be continued to a depth of 500 feet.

Dr. Ray Ferguson and Joe Collie are erecting a building and making other preparations at the Eureka mine preparatory to starting work on this property.

J. C. Miller, in charge of operations for the Morning Glory Mining company near Mowry, is working a force of 16 men, three shifts being employed in developing this property.

Grant Lewis, foreman of the Mowry mine, reports conditions at the mine as being "all to the good." A force of approximately 35 men is now employed at the Mowry.

J. B. Shannon and David Dowd, owners of the Copper Ledge property, located near the World's Fair mine, reports work at their camp as going ahead steadily with the outlook encouraging.

The Consolidated Arizona is making preparations to ship a car of ore from the Olive at Mowry. The shaft at this property is now down 110 feet, while drifting is under way from the 75-foot level, from which the shipping ore is being taken out.

James Layman, head of the Layman Syndicate of Jerome, Arizona, and Richard Kingdon, superintendent of the Verde Extension at Jerome, spent two days in the district this week inspecting various mining properties, among others being the Mowry and Hardshell and, of course, the Blue Nose, now under bond and lease to the Layman Syndicate and being developed under the competent management of B. B. Smith. Both Mr. Layman and Mr. Kingdon are enthusiastic over the outlook at this propertyy and have confidence that this old mine will soon be proven up as a producer of silver on a larger scale than in the early days of mining in this district.

BIG LEDGE BUYS GOOD LUCK

HUMBOLDT—

The Big Ledge Development company is expanding, and by a transaction closed a few days ago it has added another desirable link to its long chain of mineral holdings along Big Bug creek, taking over a few days ago the Good Luck group of six claims from P. E. O'Brien, E. C. Hill and W. J. O'Brien. The group sells for $30,000, but the terms and conditions are not given publicity. The Good Luck, it is stated, belongs to the Henrietta family and in years gone has been thoroughly prospected, the showing being atractive This deal, it is stated, is probably due to the large and successful exploration prevailing in the Henrietta, which is reaching great depth in the territory occupied by the Good Luck, and being appreciative of future determinations of the holdings taken over, the consolidation is a timely one at present.

During the month of June the Blue Bell and De Soto mines shipped a total of 11,300 tons of ore to the Humboldt reduction plaint. The concentrator handled 7600 tons of new metal bearing material. During the month 625,000 pounds of fine copper in buillion, the majority of which was derived from domestic material, was shipped to the east.

The Arizona Mine Supply company has shipped to Yeager canyon a large compressor and power equipment to drive three drills, to be used on the Prescott-Jerome highway. State Division Engineer Wolfe is in charge and while in the city a few days ago stated the new plant will be placed in action at once and expedite the work. He also stated good headway is being made in his section and another big crew will soon be working out of Jerome toward his camp.

Al Croom was in the city yesterday from the Tom Kimbrough silver camp on the summet of the Sierra Prietas, where the J. & J. Mining company is operating, and his report of conditions is satisfactory, as development goes ahead energetically. This property was formerly owned by Mr. Croom, who had brought it into desirable rating until he sold out a short time ago.

So gratifying has been development work on the Big Bug Copper company holdings, situated on Copper mountain, near Mayer, that the installation of new operating equipment has started. The machinery is arriving and grading for foundations has been completed.

A compressor will drive the air drills, and hand work is to end. Sinking will be resumed about July 15.

Frank Thornton, president of the company, and A. E. Rice, treasurer, were in the city yesterday and both reported favorably on mine conditions to the greatest depth reached.

EXTENSIVE WORK ON DIANA

CHLORIDE—

Upon the recommendation of the Western Exploration company, with offices at 910 Higgins Building, Los Angeles, Cal., the Diana mine, located one and one-half miles west of Chloride, has been taken over by W. S. Douglass, and Owen Goldsmith, representing the Security Corporation of New England, with offices at 85 Devonshire Street, Boston, Mass.

Extensive development of this property has been planned and work will begin sometime between July 15th and August 1st. The development provides for immediate work in the main shaft which will be sunk without interruption to a depth of 400 feet, and no doubt to a greater depth later on.

The Diana lies west of Chloride and embraces the ground between the old Merrimac and the Tuckahoe mines. Five well defined veins course through the property of the Diana, all of which at some point expose surface ore of a very good grade.

D. C. Williams has been placed in charge of the development work and H. W. Moore serving as consulting engineer.

A tunnel two miles long near Chloride is planned by a company headed by J. C. Rankin, who has gone east to attend to details of capitalization. The bore is to have an extreme depth of 2000 feet and is to cut the ground of the Payroll, X-Ray, Redemption, Rainbow, Silver Glance, Lucky Boy and Brighter Days mines. It is proposed to establish a mill at the portal, where an ample water supply undoubtedly will be available. Mine owners affected are enthusiastic over the project, as something that will serve to cut their production costs in half, as well as to develop their ground at depth not now attained.

Arizona Butte at Stockton Hill has a plan for tunneling 2000 feet and already has the bore more than 600 feet into the hill. The company is making regular shipments of ore from the upper levels of a property that is to be tapped by the tunnel at the depth of 1200 feet.

The old Treasure Hill group, nine miles north of Kingman, is being revived, with probability of a deep tunnel.

B. P. Bogey of New York has taken over the Moonlight group near Mineral Park, from John F. Gross. A new hoist will be installed and sinking resumed at once on the main shaft.

The Washington-Arizona mill, at Mineral Park is running steadily and is said to be making a splendid concentrate. The ore carries a small amount of copper, iron and high values in silver. The silver values are in ruby and native and these metals respond readily to flotation. The mines is now in shape for outputting and will be able to keep the mill well supplied with ore. A large force of men is at work on the property.

HIGHLAND TO START ON THEIR BIG TUNNEL

KINGMAN—

Members of the Highland Mining company have been in Kingman this week in conference with Charles B. Bell, manager of the property. It is understood that the necessary money wherewith to commence the work on the big tunnel is now available and that the work will soon be under way.

The driving of the big bore under the mines of Todd Basin and other sections of the mineralized area on the west side of the Cerbats, is one of the most important undertakings in the history of the county. Mr. Bell, who is to have charge of the work, is one of the best known mining men of the southwest.

The Standard Minerals is sinking another lift on its new shaft and will probably carry it to the 600 or 700 level. It is the general opinion that this company has a splendid property and that with depth and large developments through the massive vein rich lenzes of ore will be found, aside from those upon which operations are now being conducted. The company is also running its mill regularly on a very good grade of molybdenite-copper ore.

AT UNITED EASTERN

OATMAN—

The crosscut from the 1334 level of the United Eastern is said to have entered 15 feet of well defined vein, although no one appears to know the value therein, except the management. The large pay shoot is to the south of this crosscut and it is probable that some time will elapse before the drifts are carried into the main ore body.

The Big Jim Con. is or was on Friday morning last about 60 feet in the crosscut. They are having considerable trouble with the pumping machinery which delayed them several days. They should be through the ledge, barring accidents, by the 10th of the month. Engineer Keating is expected at the mine from Hackberry in a few days.

The hoist at the United American was raised a few days ago and is now in place. The United American is the one best guess in the Oatman field and the knowing ones are of the opinion that ore will be found within a short time.

The mine workings, which were partly accessible when the mine was visited, include several shafts, three crosscutting adits bearing northeast, and three levels vertically spaced about 50 feet apart. Drifts total about 3,000 feet.

The Hidden Treasure vein, on which the mine is located, has an average strike of about N. 50° W. and dips steeply to the northeast. It is correlated with the vein on which the Emerson mine is located (pl. 18). The vein pinches and swells to thicknesses ranging from 0.5 to 15 feet. Many branches and spur veins are disclosed in the underground workings of the Hidden Treasure mine. Crosscuts indicate several thin veins, some of which are probably branches of the main vein, trending about parallel to it. These smaller veins or branches, with few exceptions, could not be traced on the surface.

The country rock is the pre-Cambrian complex of granite, gneiss, schist, and amphibolite. In numerous places the country rock adjoining the vein is greatly altered to sericite or impregnated with pyrite for distances ranging from a fraction of an inch to several feet. Locally seams or thin zones of gouge an inch or two thick border the quartz veins.

The metallic sulfides, which are in a quartz gangue, include pyrite, sphalerite, galena, and minor quantities of chalcopyrite. Ore shoots that were observed in the underground workings are generally small bodies only a few feet long and a foot or less thick consisting of an intimate mixture of the various metallic sulfides and little or no quartz.

KEYSTONE MINE

The Keystone mine is in Mineral Park at an altitude of about 4,375 feet. Schrader (1909, p. 82) states that it was located in 1870 and that its surface ores were very rich in gold and silver, by reason of which it became the first important producer in the district. The mine, consisting of three patented claims, has changed ownership many times and, when visited, was reported to be owned by the Beach estate. It was then idle, and water filled the underground workings and the shaft to a depth of about 50 feet below the surface. Table 2 indicates that the greatest values have been in silver and gold, although the mine has also produced substantial amounts of copper, lead, and zinc.

The mine was developed by a shaft, reported to be about 400 feet deep, and four levels at 150, 200, 300, and 400 feet. Drifting on the 150-foot level is reported to have reached a distance of 850 feet northwest of the main shaft and 450 feet southeast of it. On the 200-foot level drifts extend about 275 feet both northwest and southeast of the shaft. On the 400-foot level is about 125 feet of drifting, mostly to the northwest. The greater part of the ore above the 300-foot level is reported to have been worked out.

The vein on which the mine is located strikes northwest and dips to the northeast at angles ranging from about 65° to 80°. About 800 feet northwest of the shaft the vein splits into two main branches; the southern branch dips prevailingly to the southwest at a steep angle and near its west end cuts a wide rhyolite dike. Another vein about parallel to the main vein is reported to lie approximately 100 feet northeast of the Keystone shaft, although no evidence could be found of this vein in surface outcroppings northwest of the shaft.

Vein matter on the mine dump is milky quartz with abundant pyrite and lesser amounts of sphalerite, chalcopyrite, and galena. Argentite, although reported to be present in the ore, was not found.

PAYROLL MINE

The Payroll mine is about 1.5 miles east of Chloride, near the head of Payroll Gulch, at an altitude of about 4,500 feet. The property, which includes the patented Payroll and Black Prince claims, is held by the Thomas B. Scott Estate. The property is an old one, having been located in 1887, and much of the early work consisted of shallow diggings along the Payroll vein chiefly for high-grade gold ore. Considerable mining had been done prior to Schrader's (1909, p. 62) visit to the district in 1907, as he reports three shafts, about 400 feet of drifts, over 600 feet of tunnels, and some crosscuts and stopes. The main shaft was 225 feet deep. The mine was idle and the workings were inaccessible when visited by the writer in 1943. The main shaft is now reported to be a little more than 600 feet deep. The mine was developed by four main levels, the 50-, 200-, 400-, and 600-foot levels. Drifting and stoping from these levels has extended chiefly southeastward along the vein, the maximum distance from the shaft being 500 feet on the 600-foot level. The total length of all drifts is reported to be about 2,000 feet.

Production from the mine during the period 1901–48, as given in table 2, shows that during these years the mine was essentially a producer of zinc, although the early, unrecorded production may have been mostly in gold and silver.

The country rock consists of many types of the pre-Cambrian complex, although light-gray, fine-grained granite, dark, medium-grained biotite granite, hornblende schist, and amphibolite predominate. A diabase dike, not shown on the geologic map, is poorly exposed for a short distance along the northeast side of the vein near the main shaft. It could not be found in its projected position on the northwest side of the gulch, and it apparently has been cut off by the northeastward-trending fault shown on plate 18.

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Production from the mine during the period 1901–48, as given in table 2, shows that during these years the mine was essentially a producer of zinc, although the early, unrecorded production may have been mostly in gold and silver.

The country rock consists of many types of the pre-Cambrian complex, although light-gray, fine-grained granite, dark, medium-grained biotite granite, hornblende schist, and amphibolite predominate. A diabase dike, not shown on the geologic map, is poorly exposed for a short distance along the northeast side of the vein near the main shaft. It could not be found in its projected position on the northwest side of the gulch, and it apparently has been cut off by the northeastward-trending fault shown on plate 18.

The Payroll vein strikes N. 30°–35° W. and dips steeply to the northeast. It commonly ranges in thickness from about 4 to 12 feet, though Schrader (1909, p. 62) reports a maximum thickness of nearly 100 feet. The vein can be traced by persistent croppings southeastward to a point about 1,000 feet beyond the Mary Bell mine, but past this point it is poorly exposed and correlations are somewhat questionable. The total length of the vein is about 6,700 feet. Northwest of the main shaft of the Payroll mine the vein has been offset by a fault. (See p. 138.)

The vein filling, as determined chiefly from material on the mine dump, is sphalerite, galena, pyrite, and chalcopyrite in a gangue of quartz. Cerussite, although not observed, has been reported as occurring in moderate amounts in the oxidized parts of the vein.

TENNESSEE-SCHUYLKILL MINE

The Tennessee-Schuylkill mine is 1 mile east of Chloride at the western foot of the Cerbat Mountains, at an altitude of about 4,200 feet. It is an old mine and has been worked intermittently by numerous operators for at least the past 50 to 60 years. During most of World War II the mine was operated by the Tennessee-Schuylkill Corp., and it was the only large mining operation in progress in the district. A mill located near the Tennessee shaft was running at a capacity of about 150 tons of crude ore per day, averaging 6 to 8 percent zinc, 3.5 percent lead, and 17 to 25 ounces of silver per ton.

The mine has been the largest producer of lead and zinc in the district (table 2). It has produced almost as much lead as zinc and, in addition, has yielded substantial values in gold and silver. This and the Golconda are the only two mines that have yielded a total production valued in excess of $1,000,000.

The Tennessee-Schuylkill mine is on the northern part of the Tennessee vein (pl. 18). The main, or Tennessee, shaft is about 1,400 feet deep. The Schuylkill shaft, about 1,450 feet to the north, is about 800 feet deep but is caved, so that the only access to the mine is by the Tennessee shaft. For many years the Schuylkill and Tennessee mines were operated as separate mines. Plate 19 is a longitudinal section along the vein showing the extent of the workings. The section has been compiled from data of various sources and may be inaccurate in part because past records are scanty and underground workings are inaccessible in most of the Schuylkill workings and also in a very large part of the Tennessee workings. It will be noted that only a small amount of stoping and drifting has been done below the 1,400-foot level. Also, very little work has been done south of the Tennessee shaft, although most of the work in progress when the mine was visited in 1943 was confined to stopes off the 900-foot level south of the shaft.

The Tennessee vein is about 6,000 feet long and strikes N. 8° W. Dips are steep, averaging 85° E. in the Tennessee and Schuylkill workings. One reversal of dip, 50 feet north of the Tennessee shaft between the 900- and 1,250-foot levels, is to 87° W. Garrett (1938, p. 118) notes that ore shoots in the mine tend to occur where the vein changes to a more westerly strike. In common with many other veins in the district, the Tennessee vein shows considerable pinching and swelling along both strike and dip. In the Tennessee workings thicknesses range from 1 to 22 feet; the average is about 8 feet. Spurs, irregular branches, and small parallel veins are characteristic. In a few places enrichment is found at the junction of branch and spur veins with the main vein. Other junctions show lower-grade ore than average.

Gouge, locally accompanied by brecciated vein material, is common along the hanging wall and footwall of the vein as well as irregularly traversing the vein. Alteration of the wall rock, with the formation of sericite and pyrite, extends a few inches to several feet from the vein. The composition of the wall rock has not influenced the vein as regards either width or mineral composition. Throughout the entire length of the vein the country rock is a complex of amphibolite, pegmatite, granite, gneiss, and schist.

The hypogene metallic minerals are chiefly sphalerite, galena, and pyrite with minor amounts of arsenopyrite and chalcopyrite. They commonly occur intimately associated in a gangue of milky quartz. In a few places a crude compositional banding of moderately pure sphalerite, galena, or pyrite is present, the bands seldom exceeding a few inches in width.

Supergene minerals are anglesite, cerussite, cerargyrite, native gold, and—rarely—native silver. The supergene ores are now of little importance, although the precious metals were of chief interest in the earlier period of mining in the higher oxidized zone.

Plate 19 indicates that those ore shoots about which information was obtainable pitch to the north. The ore shoots likewise show an increase of sphalerite over galena southward. The ore shoot south of the Schuylkill shaft has a stope length of about 400 feet along the 800-foot level (pl. 19) and a pitch length of about 1,000 feet between the 300- and 1,000-foot levels. An even larger ore shoot has probably been mined out in the ground a few hundred feet north of the Tennessee shaft, but no records of it are available and the workings are largely inaccessible. The four main ore shoots were projected to the surface, and an attempt was made to determine any special characteristics of outcrops at these places that might aid in predicting ore shoots in the southern part of the vein. However, no special thickness, gossan, brecciation, or other indications of possible ore shoots were evident.

DEPARTMENT OF MINERAL RESOURCES
STATE OF ARIZONA
FIELD ENGINEERS REPORT

Mine PAY ROLL✓ Date October 9, 1942

District Chloride, Mohave Co., Ariz. Engineer Elgin B. Holt

Subject: Production Possibility

OWNER: Thomas B. Scott, Jr., 910 Thompson Bldg., Tulsa, Oklahoma.

METALS: Zinc, Lead, Gold and Silver - Zinc predominating.

LOCATION: This property is located about ½ mile S. E. of the Tennessee-Shcuylkill mine, and 1½ miles east of Chloride, Arizona.

MINE WORKINGS: The property is developed by a timbered shaft, sunk vertically to a depth of 625 feet, with cross-cuts driven to vein each 200 feet depth in shaft. At points where these cross-cuts intersect the vein, drifts have been driven northwest and southeast on the same, for a distance of approximately 600 feet on each level.

ASSAY MAP: An assay map, consisting of a longitudinal section, was prepared in 1919 by C. E. Major of Prescott, Arizona. Dr. J. G. Blackwell, of Chloride, Arizona, has a copy of this map, which I tabulated and averaged the assays thereof; results being as follows:

Widths - ft.	Au, oz.	Ag, oz.	Cu, %	Pb, %	Zn, %
4.1	0.11	2.45	0.37	1.4	8.58

CHARACTER OF ORE: In the upper levels of the property, many car loads of rich shipping ore were mined and shipped per Schrader, that ran around $80.00 per ton in lead, silver and gold. These rich ores consisted of oxidized meaterial encountered in the secondary ore zone. Below the 200-foot level zincy sulphide ores came in, consisting of pyrite, chalcopyrite and sphalerite. In the bottom of the mine, the vein is widening and heavier zinc sulphide ore is coming in.

ORE RESERVES: There are no records available as to the amount of ore now blocked out in the Pay Roll mine. Also considerable ore was stoped and milled from the blocks now developed. However, from a study of the assay map mentioned, it would seem that there are now indicated in the mine, between the 400 and 600 foot levels, approximately 70,000 tons of ore assaying more or less as above set forth.

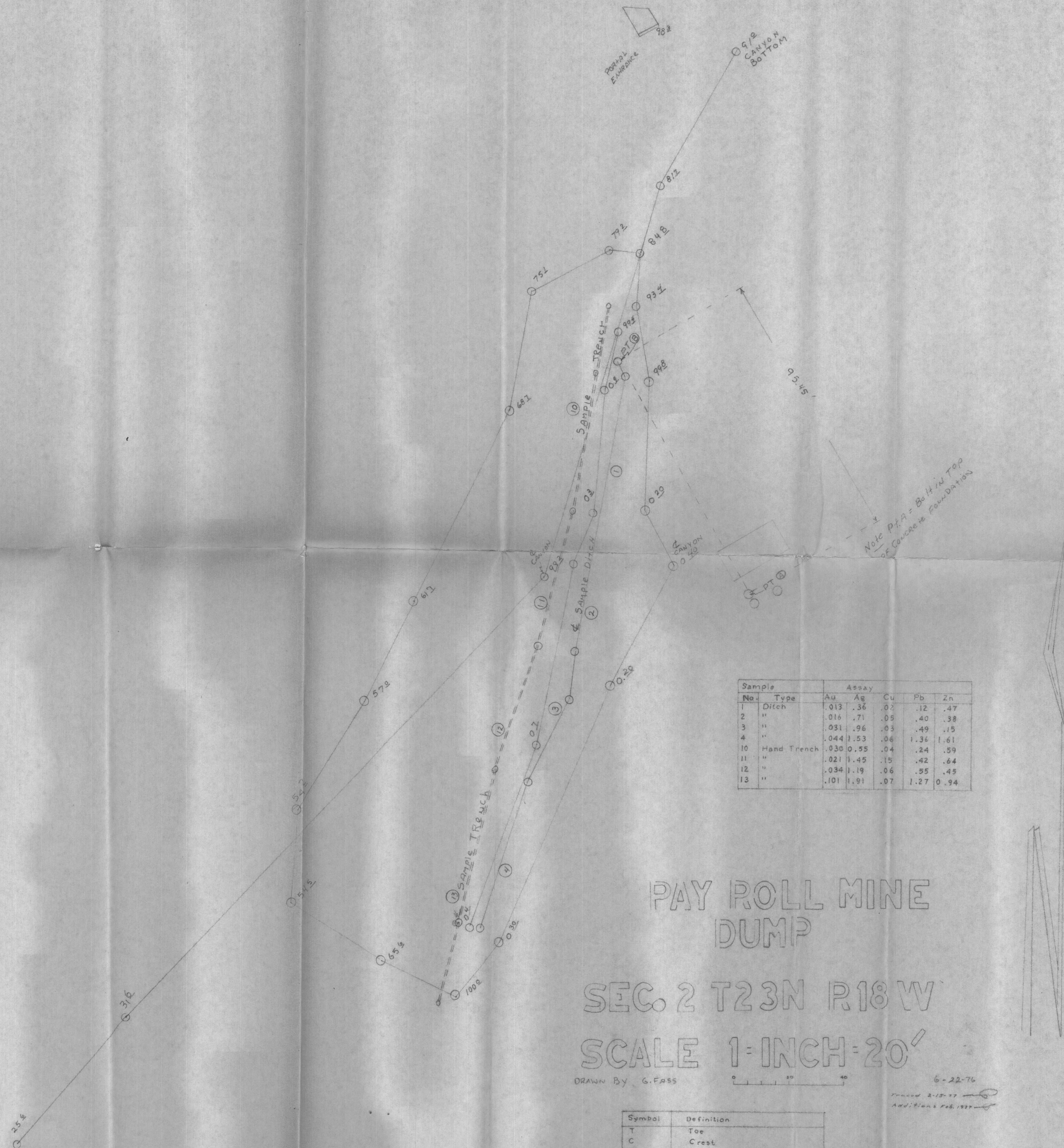
CONDITION OF MINE: The collar of the shaft is caved in and water stands at the 50-foot level in the mine. Hence, it would cost around $15,000 to unwater the mine and recondition the shaft, before new development work on ore could be started.

MILL: There is a 75-ton bulk flotation plant, now idle, located three miles west of the Pay Roll property. I refer to the Arizona-Magma mill, which now belongs to merchants resideing in Kingman. This mill is in first class running order, and is run, when in operation, by power generated at Boulder Dam. The said mill would have to be changed to selective flotation by adding a zinc section, in the event it should be taken over for the purpose of treating Pay

PAY ROLL MINE

Roll ore. I am confident the Arizona-Magma mill could be secured on a rental basis by responsible people. It would probably cost $10,000 to remodel this plant to a selective flotation unit. So it would seem that here is a good set-up for anyone looking for a blocked out mine, containing strategic ores of goodly grade, as well as a milling plant that could be remodeled and put in condition to recover values in the mine mentioned, within short order and at no great expense. All in all, it would probably require $75,000, including operating capital, to recondition the Pay Roll mine, carry out new work in the same, and remodel the mill referred to, or in fact do all that may be necessary to put this property on a paying basis in a modest way, provided only that efficient operatives and management could be secured to carry out the work; and provided also that the Federal government will see fit to peg labor, material and other costs as well as to peg, as has been done already, the market prices of metals needed in winning the war.

Elgin B. Holt



Sample		Assay				
No.	Type	Au	Ag	Cu	Pb	Zn
1	Ditch	.013	.36	.02	.12	.47
2	"	.016	.71	.05	.40	.38
3	"	.031	.96	.03	.49	.15
4	"	.044	1.53	.06	1.36	1.61
10	Hand Trench	.030	0.55	.04	.24	.59
11	"	.021	1.45	.15	.42	.64
12	"	.034	1.19	.06	.55	.45
13	"	.101	1.91	.07	1.27	0.94

PAY ROLL MINE DUMP

SEC. 2 T23N R.18W

SCALE 1 INCH = 20'

DRAWN BY G. FASS

0 20 40

6-22-76

Traced 2-15-77

Additions Feb. 1977

Symbol	Definition
T	Toe
C	Crest
Gi	Dump & Ground Intersection
木	Transit Location
◯	Sample Location