

Report on  
PROPOSED OPERATIONS  
COMET COALITION PROPERTY  
1180 0054  
December 21, 1950  
#4 Copy  
*Handwritten signature*



December 30, 1950

Dr. James Boyd, Administrator  
Defense Minerals Administration  
Washington, D.C.

Dear Sir:

The following is an application for a contract at above the current market prices for zinc and manganese ore to make possible the production of substantial quantities of zinc, manganese, and lead from the large developed reserves of low grade ore in the Pan American Mine, located in the Comet Mining District in the Pioche, Nevada, mining area. Detailed information is given in the attached report and in U.S. Bureau of Mines Report of Investigations No. 4541. This information is summarized as follows -

1. <u>Ore Reserves</u>	<u>Estimated Dry Tons</u>	<u>Estimated Average Assays</u>				
		<u>Au</u>	<u>Ag</u>	<u>Pb</u>	<u>Zn</u>	<u>Mn</u>
Assured Ore	1,386,310	.005	1.74	1.25	2.50	9.3
Probable Ore	416,700	.005	2.50	0.83	2.56	9.3
Possible Ore	<u>1,102,800</u>	.005	2.46	1.08	2.94	9.2
Total Estimated Ore	2,905,810	.005	2.12	1.14	2.67	9.25

2. Estimated Capital Requirements  
and Time Schedule

(a) Preliminary work, including engineering, road repairs, shaft repair and stope development	\$ 23,100.00	90 Days
(b) Surface plant, including sub-station, hoist, compressor, shaft tipples, etc.	120,000.00	90 "
(c) Underground equipment, including Jumbos, drills, loaders, etc.	<u>116,900.00</u>	180 "
Total Preliminary Expense, Equipment Purchase & Installation	\$260,000.00	180 Days

It is proposed that the necessary capital requirements will be carried by the Combined Metals Reduction Company to be amortized out of earnings on the basis of depreciation over a five year period.

3. Estimated Production

Proposed operations are based on producing 500 tons of ore per day, operating one shift. Monthly production will average 13,000 tons of ore, and

yearly production will amount to 156,000 tons of ore. As mill capacity becomes available, production can be doubled by adding a second shift.

On the basis of the proposed mine production of 156,000 tons of ore per year, annual metal production would be as follows -

- (a) Recoverable zinc, based on 63.6% mill recovery of zinc in zinc concentrates and smelter recovery of 92% 2,282 Tons of Slab Zinc
- (b) Recoverable lead, based on 60.6% mill recovery of lead in lead concentrate and smelter recovery of 98% 1,158 Tons of Pig Lead
- (c) Recoverable manganese, based on a mill recovery of 50% in a commercial manganese product assaying 28% Mn. At least a part of this product will be converted into high grade speigeliessen. Tonnage shown is in either commercial grade sinter or speigeliessen 23,131 Long Tons

Estimated metal production in terms of pounds of recoverable metal per ton of ore mined and pounds of recoverable metal per man-shift worked on mine production, development, transportation and maintenance, is as follows -

<u>Product</u>	<u>Per Ton of Ore Mined</u>	<u>Per Man-Shift Worked</u>
Zinc metal - Pounds slab zinc	29.3	472
Lead metal - Pounds pig lead	14.8	238
Manganese sinter - Long ton units of contained manganese	4.15	67

#### 4. Estimated Earnings and Expense

<u>Product</u>	<u>Dry Tons Per Month</u>	<u>Value Per Ton</u>	<u>Value Per Month</u>	<u>Value Per Ton of Ore</u>
Zinc Concentrate	385	\$111.41	\$42,893	\$3.30
Lead Concentrate	208	158.50	32,968	2.54
Manganese Sinter	1928*	12.96	24,987	1.92
Total Production	2521	\$ 40.00	\$100,848	\$7.76

\*Manganese sinter recorded in long tons

The above product values are based on present smelter contracts and on present metal price of 17¢ per pound of lead, 17 1/2¢ per pound of zinc, and 45¢ per long ton unit of manganese.



December 30, 1950

Dr. James Boyd, Administrator

Total estimated earnings at present metal prices

\$7.76 Per Ton of Ore

Estimated expense based on present wage and supply cost levels is detailed as follows:

Milling and ore treatment	\$3.68
Hauling (18 miles from mine to mill)	.90
Mining expense (including development)	2.34
General expense	.33
Depreciation (\$260,000 over 5 years)	.33
Royalty (as per lease agreement)	.40
Contingency for manganese recovery and processing at 15%	<u>1.20</u>

Total Estimated Expense

\$9.18 Per Ton of Ore

Operating Deficit on

Present Metal Prices

\$1.42 " "

Minimum Margin to Justify Operations

.80

Total Required over

Present Metal Prices

\$2.22 Per Ton of Ore

5. Proposed Contract

Total earnings of \$9.98 per ton of ore are required to meet estimated operating expense and to provide an operating margin of 80¢ per ton. With estimated earnings on present metal prices of \$7.76 per ton of ore, an additional earning of \$2.22 per ton of ore will have to be obtained to make the proposed operations possible.

A contract for the purchase of recoverable zinc and manganese at prices sufficiently above current market prices to provide the required additional earning is proposed as follows -

Pay for recoverable zinc at 4¢ per pound above current market price of 17 1/2¢, for a total price of 21 1/2¢ per pound. Pay for recoverable manganese in a commercial grade sinter at 25¢ per long ton unit above present market price of 45¢ per unit, for a total price of 70¢ per unit.

Based on estimated recoverable metal per ton of ore, the proposed contract prices will provide additional earnings as follows -

Zinc - 29.3# per ton of ore	@ 4¢	\$1.17 Per Ton of Ore
Manganese 4.15 long ton units	25¢	<u>1.04</u>
Total Additional Earnings		\$2.21 Per Ton of Ore

The proposed contract would cover production of recoverable metal from the proposed operations for a period of five years beginning on July 1, 1951. Provision should be made for increasing the contract prices paid for recoverable metal to compensate for any appreciable increase in present wage and supply cost levels.



6. Summary

The proposed operations will result in the production of substantial quantities of zinc, manganese and lead. This production will come from a deposit of too low grade to be mined at present metal prices, but can be obtained at relatively low cost to the government.

The proposed operations will have high labor efficiency in terms of recoverable metal per man-shift worked. This is an important consideration in view of a prospective labor shortage.

The proposed development work to be carried in conjunction with the proposed mining operations has an excellent chance of developing reserves of similar ore and may develop ore of a substantially higher grade.

The proposed operations will be able to draw upon the know-how of the trained technical and supervisory staff of the Combined Metals Caselton operations and will be able to utilize the warehouse, shop and construction and maintenance facilities of the Caselton Plant.

In view of the above, we believe that the proposed operations are in the national interest. We respectfully request your consideration of the proposed operations and of a contract to make them possible.

Very truly yours,

S. S. Arentz  
General Superintendent  
Nevada Operations



December 24, 1950

Mr. E. H. Snyder, General Manager  
Combined Metals Reduction Company  
218 Felt Building  
Salt Lake City, Utah

Dear Mr. Snyder:

Enclosed herewith is a report covering proposed operations at the Pan American Mine of the Comet Coalition Company, together with maps, engineering reports and supplementary data.

As the report indicates, it will be necessary to obtain a price four cents per pound above the current market price for zinc and twenty-five cents per unit per long ton unit of recoverable manganese to sustain an operation that will produce slightly more than two thousand tons per year of recoverable zinc metal, over eleven hundred tons per year of recoverable lead metal and over twenty-three thousand tons per year of commercial grade manganese sinter.

An important consideration of the proposed operation is its labor efficiency in terms of metal produced per man-shift worked. It is estimated that over 700 pounds of recoverable lead and zinc metal and over 60 long ton units of manganese including men employed on overhead and trucking.

Very truly yours,

S. S. Arentz  
General Superintendent  
Nevada Operations

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Proposed Operations - Pan American Mine

December 24, 1950

E. H. Snyder, General Manager

S. S. Arentz

Dear Mr. Snyder:

The following is a supplement to my report dated December 21, 1950, on the above subject.

Assuming a contract can be obtained from the government for the purchase of returnable zinc produced by the proposed Pan American operation at a price of 21 1/2 cents per pound for a period of 5 years, on the basis of our estimates, the financial return to the Company would be as follows:

Capital requirements during first six months	\$260,000.00
Net return on metal sales	\$5.83 per ton
Additional income from zinc contract	+1.04
Total value per ton of ore mined	\$6.87 per ton
(This total can be increased by the production of manganese concentrates)	
Mill operating cost	\$2.00 per ton
Hauling cost (contract)	0.85
Direct mining cost	1.89
Estimated Royalty	0.25
Total estimated direct operating cost	\$4.99 per ton
Net estimated operating profit	\$1.88 per ton

General expense is not included above as a cost item because it is not anticipated that the Pan American operations will result in any material increase of our general expense. The charges to Pan American on a proportionate basis will reduce the general expense charged to other operations.

Based on an annual production of 156,000 tons, (500 tons per day, or 13,000 tons per month) the following outcome would be obtained:

Estimated direct operating profit	\$293,280.00
Less depreciation @ \$0.334 per ton	52,104.00
Less percentage depletion @ \$0.94 per ton	146,640.00
Taxable income per year	\$ 94,536.00
Less probable taxes of 60%	56,722.00
Net after taxes, depreciation, depletion	\$ 37,814.00

Under the terms of our lease agreement we can apply a substantial part of the royalty payments against our past expenditures on the property.



12-24-50

E. H. Snyder

The increased tonnage to the mill should result in lower overall mill costs and the possibility of manganese recovery should add to our income. Considering all the above factors, the proposed operation offers an attractive investment of the required capital expenditure.

Very truly yours,



S. S. Arentz  
General Superintendent

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Proposed Operations - Comet Coalition

December 21, 1950

E. H. Snyder, General Manager

S. S. Arentz

Dear Mr. Snyder:-

The present critical shortage of zinc, and the prospect that the country will be faced with an even more serious shortage of everything, including metals and manpower, for several years to come, warrants our effort to substantially increase our production. We have reviewed our operations at the Pioche plant to determine the best means of increasing our zinc production. The possibility of increasing production from the Caselton mine is poor. The mine has been operating to the limit of our shaft capacity for several years (at about twice the average tonnage maintained during World War II), and although we are adding hoisting equipment to increase our shaft capacity, all of the increase will be required for manganese ore production.

The Caselton mill has sufficient capacity to treat approximately 13,000 tons of lead-zinc ore per month in addition to the ore now being delivered to it. With the addition of a ball mill and classifier and some changes to our flotation circuit this excess capacity can be doubled.

The most readily accessible new ore supply in the district is at the Pan American mine of the Comet Coalition group. The ore is low grade, but mine development has resulted in assured ore reserves of nearly 1 1/2 million tons and total estimated reserves of nearly 3 million tons. Additional development work will undoubtedly increase these tonnage figures appreciably, and there is a strong possibility that higher grade ore of the Caselton type can be developed at the property. The large tonnage of assured ore, and the uniform character of the deposit make it possible to consider fully mechanized mining methods which will give high output per manshift worked, and relatively low cost per ton mined. This will tend to offset the low grade of the deposit as compared with the grade of ore mined at other operations in the district.

We have prepared detailed estimates covering a proposed operation at the Pan American mine. These estimates are based on a production of 500 tons per day, or 13,000 tons per month, operating one shift. On this basis, production could be doubled by adding a second shift whenever mill capacity is available. An analysis of the proposed operation indicates that present metal prices do not provide sufficient margin to warrant the necessarily large expenditure for equipment and plant required to obtain a large production at a low operating cost. If a contract could be obtained whereby the recoverable zinc could be sold at a price of 21 1/2 cents per pound and recoverable manganese could be sold at 70 cents per long ton unit for a period of five years, there would be an opportunity to recover capital with a reasonable profit, and the operation would be attractive.

The following is a summary of various reports on the property giving the history, development, production, and ore reserves of the property, and a detailed discussion of estimates covering a proposed operation. Maps



showing surface and underground geology, plans, sections and assays, and diagrammatic sketches showing proposed installations and mining methods are appended. Also included is a summary of a report by Mr. Earl B. Young, geologist, dated January 18, 1942 and a copy of U. S. Bureau of Mines Report of Investigation #4541 by Mr. Russell B. Trengrove.

#### Property and Location

The Pan American mine is part of the Comet Coalition group located on the west slope of the Highland Range, in the Comet Mining District, Lincoln County, Nevada, about 8 air line miles west of Pioche, Nevada. The property consists of 43 patented and 210 unpatented mining claims forming a compact group covering an area extending nearly six miles north and south along the outcrop of the east dipping Combined Metals limestone, and extending about 1 1/2 miles east over the dip of the limestone formation.

The Comet Coalition group is owned by the Comet Coalition Mines Company, a Nevada Corporation organized in 1934 to consolidate the properties of the Forlorn Hope Mining Company, The Comet Mines Company, Inc., the Pan American Mining Company, and the Pioche Coalition Mines Company. In January, 1947, the property was leased to the Combined Metals Reduction Company for a period of five years with options for three additional five year periods. The original lease expires on December 1, 1951 and the option periods run until December 1, 1966.

Approximately \$650,000.00 have been spent on the property for the acquisition of ground, buildings, machinery, equipment, and mine development.

#### Geology and Mineralization

The general geology of the area is described in the U. S. Geological Survey's Professional Paper #171, "Geology and Ore Deposits of the Pioche District, Nevada".

The Comet Coalition property covers an area of lower and middle Cambrian sediments extending from the basal Prospect Mountain quartzite through the lower section of the Highland Peak formation, a total thickness of several thousand feet. The sediments outcrop on the property and dip east into the Highland range at from 8 to 15 degrees. The section includes the Pioche shale formation which contains several limestone members including the Combined Metals limestone formation from which most of the ore from the Pioche district is mined.

The sedimentary formation are cut by a series of northeast to east-west fissures and dikes. Several of these fissures have produced high grade silver-lead ore from the higher formation and they are probably



The source of extensive replacement mineralization in the lower limestone horizons. The Comet fissure, about one mile north of the Pan American mine, has produced a substantial tonnage of zinc-lead-silver ore containing appreciable quantities of wolframite tungsten from the basal quartzite formation. Where the fissures cut the outcrop of the Combined Metals limestone, they produce massive replacement of the limestone by manganese, iron and silica with lesser amounts of zinc, lead and silver.

The ore deposit at the Pan American mine is a replacement of the Combined Metals limestone along the Stella fissure. The mineralization is low grade but has been developed down the dip of the bed for 2300 feet with an average width along the strike of 400 feet. The thickness of the mineralization varies from a maximum of 55 feet along the fissure to a minimum mining thickness of 7 feet along the edges of the ore body. The ore is a complex mixture of sphalerite, silver bearing galena, pyrite, manganese and iron carbonate, silica, limestone, and carbon. The replacement is massive and the ore is uniform in grade over wide areas.

Similar deposits occur at the Log Cabin and Forlorn Hope mines, and at other locations along the outcrop of the Combined Metals limestone on the Comet Coalition property, but these deposits are not as fully developed as the Pan American mine.

Detailed ore reserve estimates at the Pan American mine are contained in the attached report from Paul Gemmill, geologist, Combined Metals Reduction Company.

#### Development Work

The Comet Coalition property has been developed by over 10,000 feet of underground workings and by a great many open pits and trenches, and by quite a few diamond drill and churn drill holes. This discussion will be confined to a description of the development in the area of the Pan American mine.

During the early history of the property several adits were driven along the Stella fissure system where the fissure is exposed in the Pioche shale above the Combined Metals limestone. This resulted in a limited production of high grade ore from stopes along the fissure. Some work was also done on a mineralized showing in the higher Chisholm shale in the Schodde area some distance to the north. During the early 1930's an incline shaft was driven down the dip of the Combined Metals limestone and along the axis of the ore body for a slope distance of 2300 feet. The incline shaft has an average slope of 12° and generally follows the footwall of the Combined Metals formation. The first 500 feet from the surface exposes oxidized ore from which the zinc has been nearly all leached, but the remaining 1800 feet of shaft is through low grade sulphide ore typical of the ore body. Several hundred feet of drifts and crosscuts were driven laterally from the shaft along the strike of the ore deposit, and several hundred feet of raises were driven through the deposit. Work was stopped in 1935 and was not resumed until the Combined Metals Reduction Company



leased the property in 1947. The work of the Combined Metals Company since 1947 has consisted of unwatering the shaft and driving additional drifts, crosscuts and raises through the orebody in addition to several thousand feet of diamond drill and churn drill holes. This work was supplemented by a U. S. Bureau of Mines project which consisted of drilling three diamond drill holes on the property for a total of 2967 feet. The Combined Metals and the Bureau of Mines expenditures on the development of the property since 1947 have amounted to about \$175,000.00.

Development work to date has blocked out sufficient ore to maintain a large operation for several years. Proposed development work will consist of advancing the shaft an additional 1200 feet and driving the necessary laterals and raises through the ore. More drill holes to the east of present mine workings would be desirable.

#### Production

The early production from the property has been mentioned. No detailed information is available, but it is known that the tonnage was limited, although of fairly high grade.

In 1947, the Combined Metals Reduction Company produced 2315 tons of ore from development headings. Lessors produced an additional 671 tons in 1947 and 2014 tons in 1949. Total production shipped from the property since 1947 is as follows:

5,000.4 tons assaying 0.007 au - 2.16 ag - 1.55 pb - 3.46 zn.

This ore was hauled to the Caselton mill for treatment.

#### Plant Installation and Equipment

There are two mine camps on the Comet Coalition property; one at the Forlorn Hope mine, and one at the Pan American mine. The Pan American camp includes two bunkhouses, a boarding house, a hoist and compressor house, a small change house, and a small shop. Additional buildings could be moved from the Forlorn camp should it be necessary, but with present day roads, it is probable that crews could be housed at Caselton or Picche to advantage as compared with maintaining a camp at the property.

The Pan American shaft is equipped with a light electric driven shaft hoist, a compressor, pumps, water tanks, a light headframe and ore bin, and a 3 ton skip operating on 36" gauge, 30% rail track in the incline. This equipment can be utilized for mine development, but will have to be replaced with larger capacity equipment for mine operation.

The mine workings are in good shape and the property can be placed in operation without undue delay. Delivery of needed equipment will largely



determine the production schedule.

#### Power

Power lines of the Lincoln County Power District #1 service the Comet area from the main substation located near the Caselton Plant of the Combined Metals Reduction Company. Power is delivered at 22,000 KVA and a substation reducing the voltage to 2200 and 440 volts is now in service at Comet delivering power to the Pan American and Comet mines. Additional transformers are available in the district should greater mine substation capacity be required.

Lincoln County power is received from generators at Hoover Dam over a 69,000 KVA transmission line, and is available to mine operations in the district at rates averaging about 7 mills per kilowatt hour.

#### Roads

The state and federal government have just completed construction of a secondary highway from Caselton toward Comet. The highway was constructed to service mines in the area and will undoubtedly be completed to the Pan American mine during the coming year. The present highway covers 11.8 of the 17 miles between the Pan American mine and the Caselton mill. The remaining 5 miles is semi-improved county road which will not stand up under heavy hauling, such as would be required by a 500 ton per day operation. The remaining five miles of highway has been located and is reportedly being designed by the state highway department for construction this year.

#### Milling and Processing

As stated previously, the Caselton mill currently has capacity for treating an additional 13,000 tons of ore per month. This capacity will be available for treating that tonnage of ore from the proposed Pan American operation and by the addition of some milling equipment, a substantial additional capacity can be obtained.

The Caselton mill is a modern selective flotation plant. It is now treating an average of 23,000 tons of ore per month from the Caselton and Ely Valley mines. Lead concentrates are shipped to the International Smelter at Tootle, Utah, and zinc concentrates are shipped to the Anaconda refinery where they are smelted on toll and the slab zinc is returned to the Combined Metals Reduction Company.

Laboratory tests on Pan American ore, and actual mill runs on the 5,000 tons of ore produced during 1947 to 1949, indicate that good recoveries can be made, considering the low grade and complex nature of the ore.



Proposed Operations

Proposed operations are based on equipping and operating the Pan American mine to produce 500 tons of ore per shift, or 13,000 tons of ore per month on a one shift basis. Production could be increased to 26,000 tons per month by operating two shifts, and to an estimated 40,000 tons of ore per month by operating two shifts with two sets of mining equipment, should additional mill capacity be made available.

The following estimates are based on a one shift operation producing 13,000 tons of ore per month.

The time required to attain scheduled production is estimated at 6 months from the start of operations to allow for completion of preliminary work, surface plant installations, and equipment delivery. Total cost to complete preliminary work and to equip the mine for scheduled production is estimated at \$260,000.00. It is proposed to start on preliminary work immediately after January 1, 1950.

The time schedule and cost estimates covering preliminary work, plant installations and equipment are as follows: -

1. Preliminary Work

- |   |         |            |
|---|---------|------------|
| a) Detailed engineering of new hoisting, dumping, storage, and loading facilities as indicated on diagrammatic sketch C-1083 - attached   | 60 days | \$2,000.00 |
| b) Repair five miles of road between Pan American mine and end of new highway to allow for hauling until new highway is completed to the mine. Road contractors equipment now in district will be used on a rental basis  | 30 days | 5,000.00   |
| c) Replace track in shaft with heavier rail layed on improved road bed and blast out tight sections in the shaft to allow room for bigger equipment. While the job will have to be done for the entire shaft, only first 900' of shaft will have to be included in preliminary work to allow mining on 800' level | 15 days | 5,000.00   |
| d) Unwater shaft from 1100 level to face to allow start of proposed development work including shaft sinking. This job can be fitted in with other preliminary work and will not delay start of mining operations   | 90 days | 1,600.00   |
| e) It is proposed to drill a series of 25 short diamond drill holes from present mine workings through  |         |            |



the beds to accurately determine ore thickness and condition of the back to facilitate laying out mine entries. This work can be done while other work is in progress

45 days \$2,500.00

- f) The present 800' level of the shaft is curved, of small cross section, and, on the north side, it is above the bottom of the bed. We propose to start mining operations in the block of ore extending up the dip of the beds from the 800' level on the north side of the shaft. This will require driving a new heading along the footwall of the bed and of sufficient cross section to allow use of the proposed mining equipment. The proposed heading will be driven with slushers for 200' from the shaft with a minimum cross section of 7' high by 10' wide. The heading will then be driven 20' wide and full ore height (15 to 20') for at least 50' in length to provide a test of the proposed mining and roof bolting technique. This work will have to be completed before the proposed mining operations can be started. It will result in the production of an estimated 3,000 tons of ore. Work on shaft and tippie will have to be scheduled so that it will not interfere with this development operation. 90 days 7,000.00
- Total Preliminary Work 90 days \$23,100.00

## 2. Surface Plant-Construction and Installation

- a) A substation and switch gear will have to be installed to provide the increased power required for the operation. Transformers are available in the district. Job consists of assembly and installation 20 days \$5,000.00
- b) A larger hoist will have to be installed on the shaft. A used hoist meeting the specifications is reportedly available. Job includes purchase of hoist and auxiliary equipment and installation, including foundations and building 90 days 35,000.00
- c) An additional compressor will be required for the proposed mining operations. Spare compressors are reportedly available at the Bauer and Butterfield Company operations, and the small Caselton compressor could be used if necessary.

The estimate includes cost of moving a compressor and installing it at the mine

45 days \$10,000.00

- d) A new shaft tippie complete with dumping, storage, and loading facilities is required at the Pan American shaft. A proposed tippie is shown on attached sketch C-1033. This includes a rotary dump, head frame, stockpiles, and conveyors for stockpiling and truck loading. Estimated construction time

90 days 70,000.00

Total Surface Plant and Equipment

90 days \$120,000.00

### 3. Underground Equipment

- a) The proposed hoisting system uses five 5 ton cars attached to the hoist cable. The cars will be of solid construction and will be dumped in a rotary dump at the collar of the shaft. Spare cars are needed for supplies and maintenance - 8 cars @ \$700.00

5,600.00

- b) The proposed mining method contemplates the use of self-propelled, cat-mounted loader and jumbos and shuttle cars for tramming to the shaft. A discussion with a field representative of the Joy Manufacturing Company indicates that the proposed equipment will cost approximately as follows:

Two - 3 drum slushers, mounted on self-propelled units	\$30,000.-
Two - 10 ton capacity shuttle cars	41,000.-
Two - cat-mounted jumbos complete	21,000.-
One power supply unit	6,500.-
Auxillary equipment including drills, slusher hoists, tools, etc.	10,300.-
Installation of equipment	2,500.-

Sub Total - mining equipment

\$111,300.00

Total Estimated Mine Equipment

\$116,900.00

Total estimated cost of preliminary work, plant installation and equipment

\$260,000.00



### Mining Method

The proposed mining method is illustrated diagrammatically on attached drawing A-1546. It consists of advancing large headings (20 to 25' wide and 7 to 25' high, depending upon ore thickness and the type of back) up the dip of the ore body, leaving large pillars (20 to 25' wide) between headings. These pillars will later be cut into square blocks as indicated, but no attempt will be made to recover ore in pillars needed to support ground. Drilling will be done from cat-mounted, self-propelled jumbos. Between pillars the ground will be scaled down and roof bolted. Loading, or mucking will be done by a cat-mounted, high capacity loader, and tramping will be done with heavy duty shuttle cars.

Levels will be established at two hundred to three hundred foot intervals along the shaft, beginning with the present 800' level. Level development will be carried on in advance of mining operations by crews equipped with jumbos and slusher hoists. Level development by this means will continue until sufficient room is excavated for installation of the above proposed mining equipment. Level development will be in ore and it is estimated that an average production of 50 tons per day will come from this source.

The proposed mining cycle will consist of operating a series of headings on one level with the equipment described. In average ore the headings will be carried 25' wide with a 15' back. A twelve foot round in such a heading will produce 450 tons of ore. This tonnage with the additional 50 tons production from slope development headings will make the daily production of 500 tons. A drill crew will drill out one heading, a scaling and roof bolting crew will work off the blasted ore pile in a second heading, and a loading and tramping crew will cleanup the broken ore in a third heading. All three operations will proceed simultaneously.

In thinner ore near the edges of the orebody it will be necessary to drill shorter rounds in two or more headings, but the same cycle will be maintained.

### Development

Proposed mine development in waste will consist of sinking the Pan American shaft an additional 1,000 feet to develop the block on the hanging wall of the north-south fault zone in the area of the U. S. Bureau of Mines holes #1 and #2. This development is indicated on attached longitudinal section C-1082.

Shaft sinking operations will be carried out without interfering with ore production by the installation of the present shaft hoisting equipment in a station to be excavated at the present bottom of the shaft. This installation is shown diagrammatically on attached drawing #A-1547. The proposed waste pocket will hold sufficient waste rock to allow shaft work to proceed without regard to the availability of the main shaft hoist.



Additional development will consist of drill holes from the surface and level development from proposed shaft extension.

Estimated Production and Earnings:

Proposed mine production of 500 tons of ore per day, or 13,000 tons of ore per month, will be trucked to the Caselton mill for treatment. The following are estimated mill results:

Product	Dry Tons	Average Analysis						
		Au	Ag	Pb	Zn	Mn	Fe	Insol.
Mill heads	13,000	.005	1.74	1.25	2.50	9.3		
Lead Concentrates	208	.120	47.53	47.02	7.00		12.4	1.0
Zinc Concentrates	335	.030	14.57	1.50	53.60		6.0	5.0
Manganese Sinter	2,159	Tr	Tr	Tr	Tr	28.0	12.0	
Mill Tailings	10,243	Tr	0.60	0.40	0.30	4.8	12.0	

It is estimated that the crude ore will assay 0.1% non-sulphide lead and 0.1% non-sulphide zinc.

Estimated metal recoveries are 60.6% lead in lead concentrate, 63.6% zinc in zinc concentrate and 50.0% manganese in the manganese sinter.

The estimated value of the concentrate production based on present smelter contracts and present metal prices of 17 cents per pound for lead, 17 1/2 cents per pound for zinc and 45 cents per long ton unit for manganese contained in the manganese sinter, is as follows:

Product	Dry Tons Per Month	Value Per Ton	Value Per Month	Value Per Ton of Ore
Zinc Concentrate	335	111.41	42,892	3.30
Lead Concentrate	208	158.50	32,968	2.54
Manganese Sinter	1,923*	12.96	24,987	1.92
	3,521	40.00	100,843	7.76

\*Manganese sinter reported here in long tons.

Estimated Milling and Transportation Costs

The estimated milling costs include crushing, grinding, sulphide flotation, manganese recovery and treatment, and mill overhead costs. Estimated transportation costs are based on loading and trucking the ore from the mine to the Caselton mill, a distance of 18 miles by road.

Estimated Milling and Treatment Cost	\$3.63 per ton of ore
Estimated Trucking Cost	.90 " " " "
Total estimated cost of milling and transport	\$4.53 per ton of ore
Net mine value on present metal prices	\$3.18 per ton of ore



Estimated Mining Costs

The estimated costs are based on a proposed operation producing 500 tons of ore per day operating one shift. Costs are based on the wage schedule effective November 20, 1950, and include allowance for regular overtime pay and the various fringe payments called for in our union contract. The various cost items are described as follows:

1. Drilling and Blasting - Includes cost of labor and supplies for breaking ground in stope headings. Average production from stope headings is estimated at 450 tons per shift with balance of production coming from stope development work. Supplies include explosives, drill steel, air and water pipe and hose, drilling bits, and small tools.
2. Sealing and Roof Bolting - Includes cost of labor for sealing down headings after blasts and for drilling holes and placing roof bolts. Supplies include cost of roof bolts, plates, and small tools.
3. Loading and Tramping - Includes cost of labor for operating a loader and two shuttle cars and for cleaning up broken ore in heading. Supplies include estimated cost of equipment replacement parts.
4. Hoisting and Dumping - Includes cost of labor for operating hoisting and dumping equipment including a hoistman and a topman. Supplies include hoisting rope and hoist and car repair parts.
5. Stope Development - Includes cost of labor and supplies for level development in ore. This work is estimated to result in a daily production of 50 tons of ore in addition to preparing levels for mining operations. Supplies include explosives, drill steel, pipe and hoses, slusher cable, etc.
6. Mine Development - Includes average estimated cost of shaft sinking, churn and diamond drilling, and level development in waste. Work will be carried on one shift. The present large tonnages of developed ore do not require that this work be pushed to the point that it interferes with mine operation.
7. Equipment Maintenance - Includes the cost of keeping an electrician, a top mechanic and a helper on the job to maintain equipment to prevent production delays, and the estimated cost of repair parts and supplies for general maintenance. Additional men will be available from the Caselton mechanical department in the event of major breakdowns or changes.
8. Mine Maintenance - Includes cost of pump operation and maintenance, track and roadway repair, ventilation and pipe line repair and replacement.



9. Mine Power - Includes cost of power from Lincoln County Power District #1.
10. Sundry Expense - Includes cost of assaying, blacksmithing, change house, engineering, supervision, vacations, shop expense, tractor rental for waste disposal, etc.
11. General Expense - Includes a proportionate share of plant and general office expense for camp and building maintenance, warehouse and accounting office operation, general supervision and engineering, safety, insurance, and state and county taxes.
12. Depreciation - Initial expense for establishing proposed operation is estimated at \$280,000.00. This amount is depreciated in five years against an estimated production of 780,000 tons of ore.
13. Royalty - Under the agreement between Combined Metals Reduction Company and the Comet Coalition Mines Company, the royalty amounts to 1/3 the net operating profit on all ores produced from the property.

Estimated Mining Costs are detailed as follows:

No.	Cost Account	Est. No. of Men	Estimated Cost Per Ton of Ore		
			Labor	Supplies	Total
1	Drilling and Blasting	5	\$0.22	\$ 0.26	\$ 0.48
2	Scaling and Roof Bolting	3	0.09	0.10	0.19
3	Loading and Tramping	4	0.11	0.08	0.19
4	Hoisting and Dumping	2	0.07	0.04	0.11
5	Slope Development	3	0.10	0.07	0.17
6	Mine Development	5	0.24	0.12	0.36
7	Equipment Maintenance	3	0.12	0.12	0.24
8	Mine Maintenance	2	0.09	0.05	0.14
9	Mine Power	0	-	0.10	0.10
10	Sundry Expense	4	0.28	0.08	0.36
	Total Estimated Mine Expense	33	\$1.32	\$1.02	\$2.34

Total Estimated Cost

Milling and Ore Treatment	3.68 per ton of ore
Hauling - mine to mill	0.90
Mining and Development	2.34
General Expense	0.33
Depreciation	0.33
Royalty	0.40
Total Operating Expense	7.98
Reserve for contingency for manganese recovery and treatment	1.20
Minimum operating margin	0.80
Total required earnings	9.98 per ton of ore
Less Value on present metal prices	7.76
Additional earnings required	\$2.22 per ton of ore



The total value received from zinc concentrate, lead concentrate and manganese products on the basis of present metal prices is \$2.22 per ton of less than the total required by the proposed operations. The present short supply of zinc and manganese, and the critical nature of these products would justify the government in making a contract for the purchase of the metals recovered from the proposed operations at prices sufficiently over the current market prices to provide the required \$2.22 per ton of ore. On the basis of recoverable metal as calculated earlier in this report, such a contract could be established on the following over market prices: -

Zinc	29.3 pound recoverable per ton of ore @ 4 cents	\$1.47 per ton
Manganese	4.15 long ton units @ 25 cents per unit	1.04 " "
Total additional income over present prices		\$2.21 per ton

Such a proposal contract would have to be of sufficient duration (a minimum of 5 years) to allow for the return of the sizeable capital expenditure required to start the operation.

The proposed operations offer the following advantages:

1. An assured ore reserve of relatively large tonnage.
2. A large output of recoverable metal in terms of manshifts worked.
3. Utilization of existing facilities including: mill capacity, maintenance equipment and crews, trained technical and supervisory staff, warehouse stocks, mine camp, etc.
4. A large output of recoverable metal at relatively low cost over present market prices.
5. An excellent chance of developing a large additional tonnage of similar ore and a good possibility of developing higher grade ore.

The proposed operations offer the following disadvantages:

1. The low grade of the ore will require prices above present market prices for lead-zinc or manganese.
2. To achieve the necessary low mining costs will require a fairly large capital investment in equipment.
3. The equipment, supply, and manpower requirements of the proposed operations will place additional burdens on our management, particularly during periods of short supply.

After considering the above factors, I believe that the project should be undertaken by the Company providing a five year contract can be obtained for the purchase of the metal produced at prices sufficiently above present market prices to return our costs with a reasonable margin. Since the cost estimates contained in this report are based on our present wage schedule and on present supply and equipment prices, provision would have to be made for increasing earnings in proportion to our increased expense should there be an appreciable increase in wage or supply cost levels.

Very truly yours,

S. S. Arentz  
General Superintendent



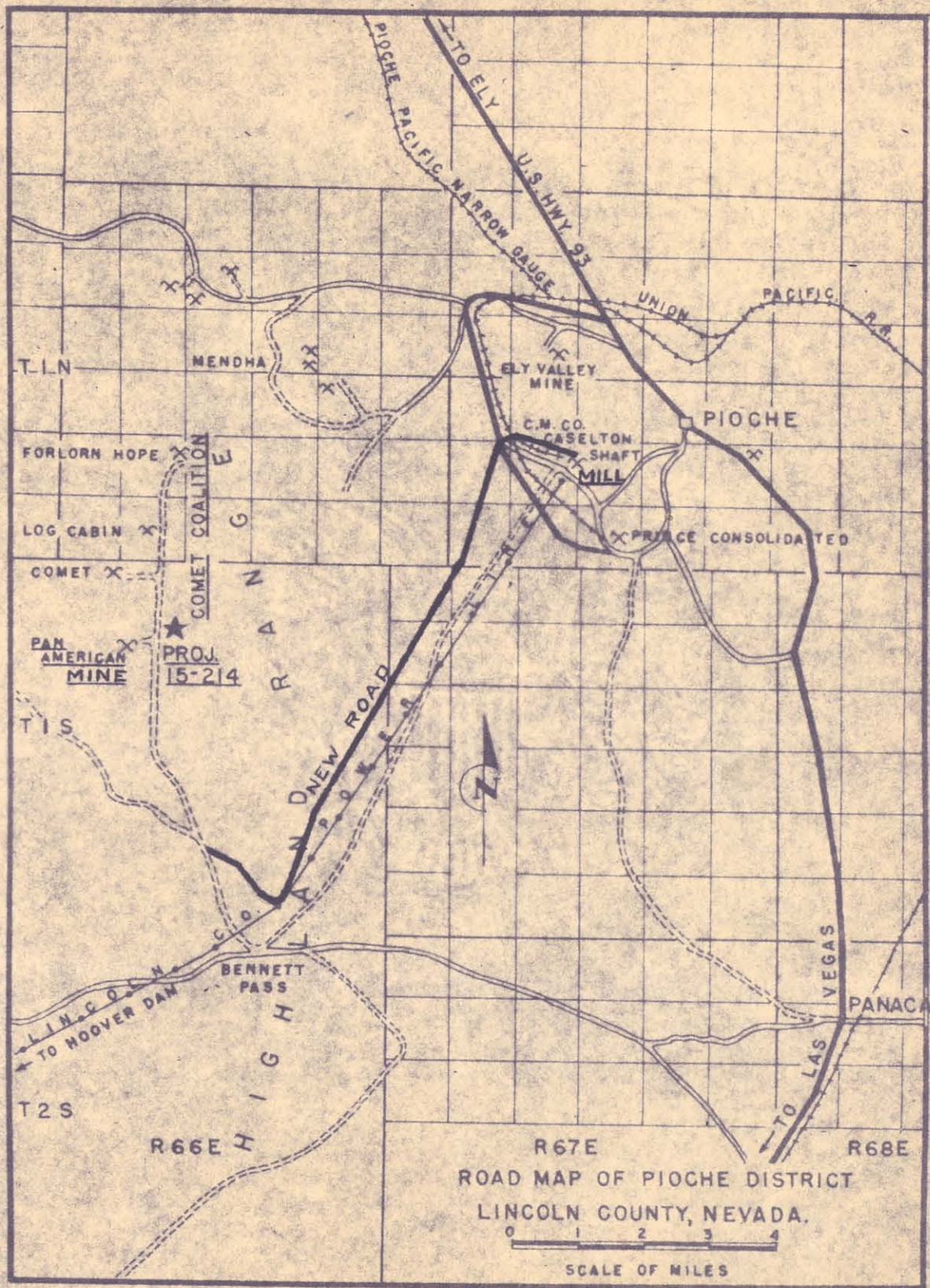
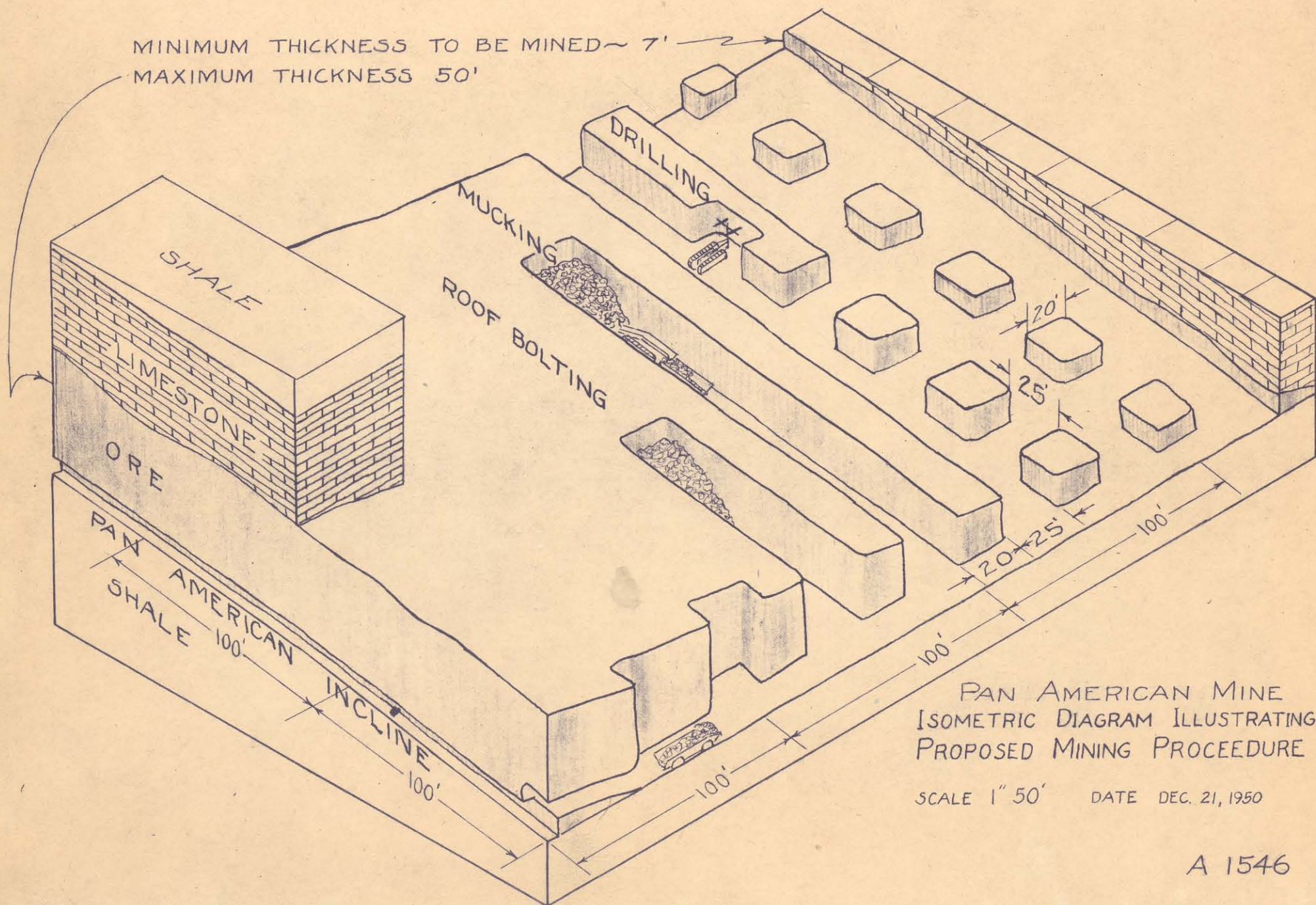


Figure 1. - Road map of Pioche district, Lincoln County, Nev.



MINIMUM THICKNESS TO BE MINED ~ 7'  
MAXIMUM THICKNESS 50'



PAN AMERICAN MINE  
ISOMETRIC DIAGRAM ILLUSTRATING  
PROPOSED MINING PROCEEDURE

SCALE 1" = 50'      DATE DEC. 21, 1950

A 1546



A-1547

COMBINED METALS REDUCTION CO.

Dec. 23

19 50

REFERENCES

PAN AMERICAN MINE

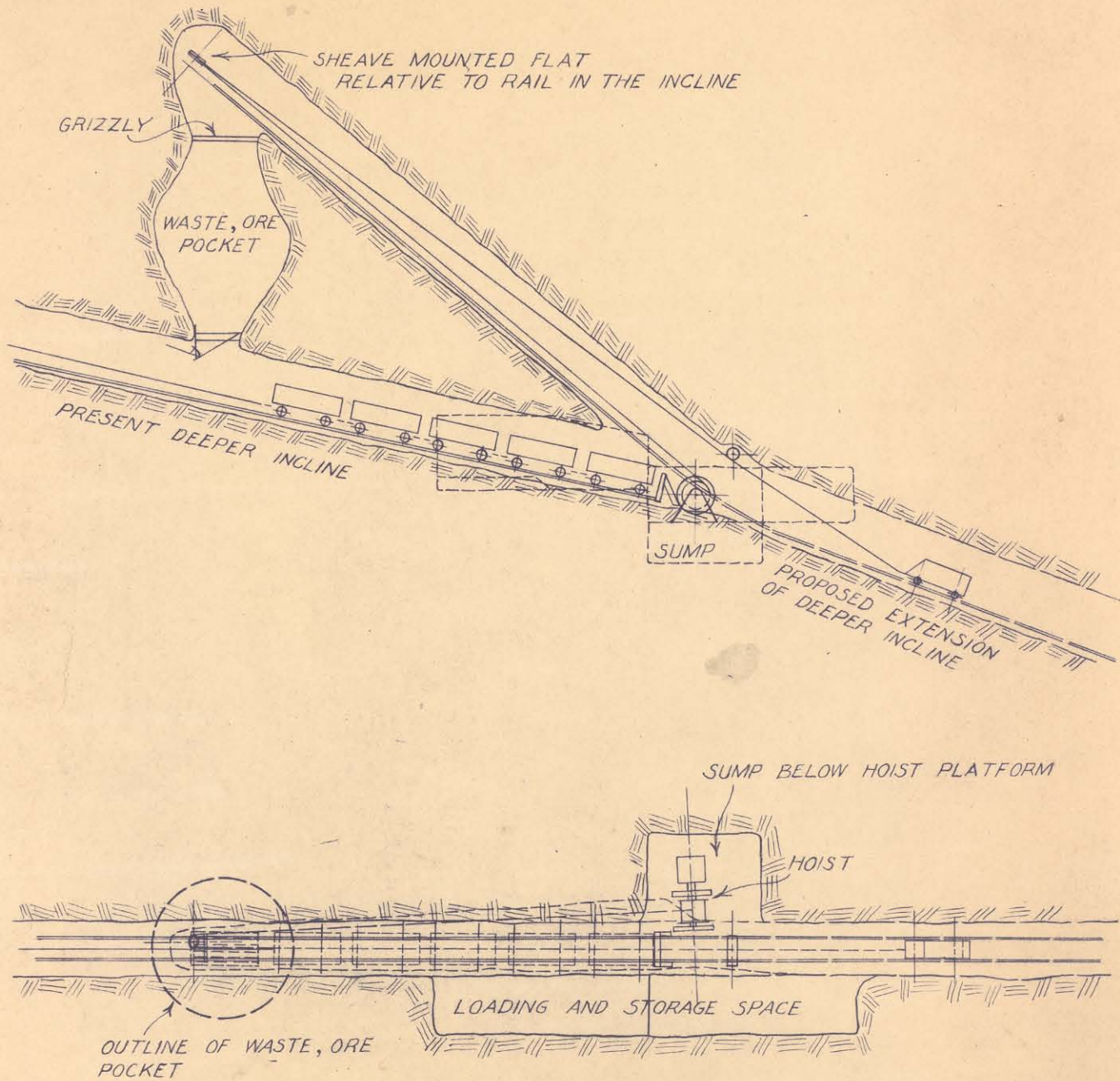
PROPOSED METHOD OF EXTENDING THE DEEPER  
INCLINE TO HANGINGWALL ORE BLOCK

MADE BY *Harry S. Poller*

TRACED BY

CHECKED BY

SCALE





COMET COALITION MINES COMPANY  
Summary of Report By  
Earl B. Young, Mining Geologist  
January 18, 1942

Introduction

This report is intended to summarize earlier reports by J. C. Ingersoll and myself, to mention such changes as have occurred since those reports were written and to emphasize the outstanding features of the property as related to the present emergency.

The 252 claims, at present held by this Company, lie on the Western slope of the Highland Peak Range, about ten miles, airline, west of Pioche, Lincoln County, Nevada, and cover the outcrops of the mineralized beds and fissures for nearly six miles. A fair road leaves Highway 93 about ten miles South of Pioche and leads over Bennett Pass to the property, a distance of about twenty miles.

Property

The property represents a consolidation of claims belonging to the Forlorn Hope Mining Company, the Pan American Mining Company, and the Pioche Coalition Mines Company. The Comet Coalition Mines Company was incorporated May 12, 1934, in Nevada, for 2,000,000 shares of stock at 25 cents. There are 1,500,000 shares outstanding. Control is held by the International Smelting & Refining Company, a subsidiary of the Anaconda Copper Mining Company. Fifty-six claims embracing 1108.994 acres have been surveyed for patent with Nos. 4731, 4732, 4734, 4738 and 4741 assigned to the surveys. The remaining 196 locations contain approximately 3,920 acres; all contiguous and located to protect the mineral rights to best advantage.

The following items are taken from the Balance Sheet of December 31, 1939: Mines and Mining Claims are carried at \$420,122.32, Buildings, Machinery and Equipment \$90,571.35, Development \$77,123.84 - Total assets \$499,494.47.

Workings

The principal workings consist of the Deeper Incline on the Romanow Claim, the Log Cabin Incline on the Log Cabin Claim and the Forlorn Hope Shaft on the Hub No. 1. There are a large number of smaller tunnels, pits and trenches that show many important geological features.

There is approximately 10,000 feet of development as follows:



Deeper Incline (including Stella Workings)	3,800 Ft.
Schodde workings on the Mt. Comet No. 1	1,200 "
Comet Chief Shafts, tunnels and drifts	200 "
Log Cabin Incline	300 "
Buckaroo Tunnels	250 "
Jones Tunnel Hope Shaft drifts and raises	2,500 "
Miscellaneous surface cuts, shafts & tunnels	1,250 "
	10,000 Ft.

#### Deeper Incline

Starting near the base of the C. M. Beds on the Ronnow Claim, this incline has been driven N 72° E following the bedding on an inclination of 10° - 12° from the horizontal for a slope distance of approximately 2,300 feet. It is 7' X 10' in section with additional room for pump stations, raises, etc. Hoisting is done by electric hoist and three ton skip. In addition to the incline, drifts totaling 360 feet and raises totaling 230 feet have been driven. As exposed by the incline, drifts and raises, the bed is well mineralized. For the first 500 feet the bed is oxidized and shows substantial amounts of manganese and iron oxides with some silver, lead and zinc minerals. Beyond this point the limestone bed became a silicified deposit of manganese-siderite impregnated with silver-bearing galena and sphalerite. Thickness of the bed is about 55 feet, rather uniformly mineralized. 123 grab samples taken from the cars as mucked from 947 feet to 2,012 feet averaged 2.7 oz. silver, 1.9% lead and 2.8% zinc.

The average of 16 samples taken in 1936 from the upper bed was silver 3.23 oz., lead 0.8% and zinc 1.7%. From the lower bed was silver 1.90 oz., lead 0.5% and zinc 1.6%. A high grade streak, 4" to 18" thick, which was followed down the incline for several hundred feet, gave an average of four samples of gold .06 oz., silver 99.9 oz., lead 24%, copper 0.18%, zinc 17.7%. The object of the incline is to develop the C. M. bed and especially prospect its intersection with a strong N 10° W fissure zone which was productive in upper limes near the surface and which is still several hundred feet East of the present face.

#### Schodde Workings

This is also known as the Lyndon Mine. It consists of several tunnels, shafts, drifts and stopes in the upper part of the Prince limestones on the Comet No. 1 claim. The workings show the importance of the North 10° West fractures. It is credited with a production of \$125,000 in silver-lead ore.

#### Comet Chief Workings

These are located on the Comet Chief Claim along a



strong S 80° E vertical fissure. The shafts, tunnels and drifts are in the basal quartzite, the C. M. Beds and the Susan Duster bed. Good gold values were reported in the quartzite, while iron oxide with galena was found in the C. M. Bed.

#### Log Cabin Workings

The strong iron stained outcrop on the Log Cabin was prospected at shallow depth by early day miners and some high grade silver lead was discovered. Under the management of the International Smelting Company, an incline was sunk 800 feet on the beds to explore mineralization associated with a strong N 70° East fracture. Assays ranged about 1 - 3 oz. silver, 0.5 to 1% lead and 1 to 1 1/2% zinc.

#### Buckaroo Workings

Some lead ore has been exposed in several hundred feet of workings along a North South fissure in a small limestone bed on the Juniper No. 1 claim.

#### Jones Tunnel, Hope Shaft and Workings

On the Hub No. 1 Claim the Jones Tunnel was driven 580 feet. The Hope Shaft, vertical, three compartment, was sunk 630 feet and raised 150 feet to the surface from the Jones Tunnel. On the 586 level a station was cut and 576 feet of drifting, 30 feet of raising and 20 feet of sinking was completed - all in the C. M. Bed.

The shaft was sunk on or near a strong N 70° E fissure. It bottoms just below the C. M. Bed. The East West fissure contained a streak of silver, lead zinc ore of shipping grade and is 4" to 13" wide from the surface to a point several hundred feet below the Jones Tunnel. In the drifts and other workings in the C. M. Bed samples were frequently taken that assayed well in gold, silver, lead, copper and zinc, but ore in commercial quantities was not developed before the property was closed down.

#### Miscellaneous

Some of the latest work was on the large iron outcrop in the C. M. Bed on the Murphy No. 4. It has not been carried far enough to justify further comment at this time. There are many cuts and pits on the property which show promising fissures and prominent outcrops. Some seem fully as good as those already partially developed.



### Geology

Attention was called to this district in 1927, because of its similarity with the Pioche district which is only a few miles distant and which has produced nearly \$30,000,000 in recoverable metals. The Cambrian rocks involved in this section begin with the basal quartzite which outcrops along the Western edge of the property. As the beddings dip at a low angle 10° - 20° to the East and the mountain rises to the East, the outcrops of the various shale and limestone beds can be traced for miles across the property in a North South direction. Numerous canyons cut the beds and produce abrupt cliffs. Hence, an outcrop map shows a scallop pattern with the older beds at the West and younger beds occurring at fairly regular intervals, toward the East.

The most important bed is the C. M. Bed, which in recent years has been the largest producer in the Pioche area. Other productive beds are the Susan Duster, which is 100 feet above the C. M., the 14 ft. bed, the 25 ft. bed at the top of the Prince limestone series and the Davidson limestone.

The Cambrian Columnar section as measured by myself in this area is as follows, beginning at the Eastern or highest part of the property:

Davidson Black Limestone	240 Ft.
Davidson Dolomite	310
Davidson Blue Limestone	150
Chisholm Shale	135
Prince or Lyndon Limestone	390
Pioche Shale - A B and C Beds (Shales with interbedded limes)	665
C. M. Limestone	65
Lower Pioche Shale - "D"	230
Basal Quartzite	2000 -

### Fissuring

As in the Pioche area, both East-West and North-South fissuring is important. Beginning with the "One Wheel" fissure, which is an East-West mineralizer and measuring Southward we have the following mineralized areas:

- 3,700 feet to the Comet Chief Fissures
- 5,400 feet to the Log Cabin Fissures
- 6,800 feet to the Murphy Outcrop
- 9,800 feet to the Comet Tungsten Outcrop (not owned by the Comet Coalition)
- 11,600 feet to the Mt. Comet Fissure
- 13,700 feet to the Central Fissure
- 14,200 feet to the Schedde Fissure
- 15,100 feet to the Stella Fissure



16,600 feet to the Ronnow or Deeper Incline  
Fissure

19,700 feet to the Iron Cap Fissure

20,700 feet to the Silver Star Fissure

The North South fractures are more important in the central and Eastern part of the area. Not a great deal is known of them except they are persistent, have dropped the Eastern sides and are believed to be of the Prince type of fissure found in the Prince Mine of the Pioche area where an enormous deposit of manganese ore was mined in the Prince bed. They should be very important at their intersection with the C. M. Beds.

### Porphyry

Several exposures of small porphyry dikes, usually with East West strike, are found in the area. They are considered to be favorable indications. Andesites and rhyolites occur in the low ranges about four miles West of the property.

### Ore Bodies

Ore bodies are largely of the replacement type. The large areas of silicified and mineralized limestone that occur in the Combined Metals bed seem to owe their position to East West fracturing. It is believed that the North South fractures will have similar attendant areas of mineralization of commercial grade. This belief is based on the ore occurrence in the Pioche district which is only a few miles away, and which resembles the Comet in many respects.

In the Comet district there are a number of ore occurrences which should be classed as true fissures, and while the ore has been of high grade, the tonnage is small in comparison with that of the enormous replacement ore bodies.

### Ore Reserve

(See 1949 Ore Reserve Report)

### Power

Electric Power is available from Boulder Dam through the substation at Caselton in the Pioche district. At present a 44,000 volt transmission line connects the Caselton substation with transformers at Forlorn Hope. An 11,000 volt line extends for three miles from Forlorn Hope to the Log Cabin and Deeper Incline.

Electric power can be secured from the Lincoln County Power District at the very favorable rate of 6 1/2 mills per kilowatt hour measured at the substation. Changes and additions to these electric facilities to make them adequate are placed at not over \$10,000.00.



Proposed Development

1. The Deeper Incline should be extended an additional 600-800 feet and laterals should be driven with raises at suitable intervals to further explore the ore body and to serve as preparatory work for the economical mining of the ore. Mr. Ingersoll in his report of February 21, 1934, placed the cost at \$100,000.00. As wages are higher today, this estimate should be raised somewhat.

2. An oiled highway should be constructed from the Deeper Incline, over Bennett Pass to Caselton, a distance of twelve miles. It is probable that a large part of this expense will be taken by the State of Nevada.

3. Development of other ore channels on the property should be undertaken at a later date.

Respectfully submitted,

(Earl B. Young)  
Mining Geologist



# COMBINED METALS REDUCTION CO.

## INTER-OFFICE CORRESPONDENCE

**Subject** Comet Coalition Ore Reserves  
**Date** April 25, 1950  
**To** S. S. Arentz, General Superintendent  
**From** Paul Gemmill

Dear Sam:

Accompanying this letter you will find my estimate of ore reserves in the Pan American area of Comet Coalition property. The estimate is supported with complete detail of ore blocks consisting of an assay map showing all cut samples (D-1166) and a 200 scale plan of CM Bed footwall showing ore blocks (C-1076). Production assays covering the 1500 level and 2000 level crosscuts were used in grade calculations. Muck samples are tabulated in the appendix where you will note on page 1 the following comparison:

		Au	Ag	Pb	Zn
Surface ore trammed	3448 cars	.006	2.15	1.31	2.91
Ore milled (Total Company)	2315 tons	.004	2.06	1.36	3.11

As of June 1, 1947, the 1500 north heading dropped in grade and muck was mixed with the 1500 west incline which was started at one of the better-looking locations on the 1500. Therefore, no muck samples were used on production after June 1st. Later lease production was, of course, selectively mined and production figures have not been used in the estimate.

Weighted average assay was determined for lateral development in the ore bed and this was averaged arithmetically with weighted average of full bed sections in each block as determined from raises and winzes exposing the full mineralized cross-section. Except for the fact that more raises or drill holes would be desirable to prove thickness, I consider this a satisfactory method of averaging grade because bed sections average nearly the same as the average determined from lateral work.

Regarding other mineralized outcrops on Comet Coalition ground outside the Pan American area, I have not attempted to calculate ore blocks since the sampling we have done does not indicate exposed ore of commercial grade. Following is a tabulation of our recent sampling of surface outcrops:

Description	Cut	Ag	Pb	Zn	Mn
Log Cabin Portal N. side	8.0'	1.4	0.5	1.6	18.0
" " " S "	4.0'	1.5	Tr	1.2	13.9
OC 350' S of Comet Well	UB 7.0'	Tr	0.2	2.2	9.5
" " " " "	LB, FW 6.0'	Tr	0.3	1.8	8.6



# COMBINED METALS REDUCTION COMPANY

SHEET #2

DATE 4-25-50

TO S. S. Arentz


<u>Description</u>	<u>Cut</u>	<u>Ag</u>	<u>Pb</u>	<u>Zn</u>	<u>Mn</u>
OC 1200' E of Comet					
30' S of trench #1	9.0'	0.8	0.7	1.4	5.7
50' " " " Lower	6.0'	Tr	0.6	1.8	7.2
50' " " " Upper	6.0'	0.9	2.0	2.5	11.8
OC by Trench #3 SE of Comet Mine	6.0'	0.8	1.5	1.8	10.9

Good values in the Log Cabin outcrop were checked by two samples taken in the incline shaft. These samples represent four or five cuts each taken between points indicated to determine manganese values.

<u>Description</u>	<u>Cut</u>	<u>Ag</u>	<u>Pb</u>	<u>Zn</u>	<u>Mn</u>
Incline between Spad #2 plus 32 and plus 67'	5'	1.5	0.5	2.2	8.6
Incline between Spad #2 plus 67 and plus 125'	5'	2.4	0.7	1.7	7.2

Of course, any of the outcrops are likely to develop into commercial grade ore but our present information is not sufficient to definitely indicate ore blocks.

Sincerely yours,

  
Paul Gemmill



# COMBINED METALS REDUCTION COMPANY

CASELTON PLANT

PIOCHE, NEVADA

## COMET COALITION - PAN AMERICAN AREA

### ORE TONNAGE ESTIMATE

Paul Gemmill

April - 1950

#### SUMMARY OF ESTIMATE:

The following ore blocks include only blocked or indicated ore in the vicinity of the Pan American Mine as shown on drawing C-1076.

#### Sulphide:

<u>Block</u>	<u>Tonnage</u>	<u>Thickness</u>	<u>Au</u>	<u>Ag</u>	<u>Pb</u>	<u>Zn</u>	<u>Mn</u>
<u>Developed Ore:</u>							
Pan S-1	370,730	30.0	.005	1.58	1.24	2.52	9.3
Pan S-2	822,380	27.7	.005	1.75	1.28	2.47	9.3
Pan S-3	<u>193,200</u>	<u>13.6</u>	<u>.005</u>	<u>1.98</u>	<u>1.12</u>	<u>2.55</u>	<u>9.1</u>
Total Developed	1,386,310	26.4	.005	1.74	1.25	2.50	9.3
<u>Probable Ore:</u>							
DD #3 - 1	32,700	15.5	.007	2.3	2.4	4.5	8.4
DD #2	192,000	12.0	.005	2.23	0.3	2.4	9.6
DD #1	<u>192,000</u>	<u>12.0</u>	<u>.005</u>	<u>2.8</u>	<u>1.3</u>	<u>2.9</u>	<u>9.1</u>
Total Probable	416,700	12.3	.005	2.50	0.93	2.56	9.3
<u>Possible Ore:</u>							
DD #1 - 2	904,800	12.0	.005	2.5	0.8	2.6	9.4
DD #3 - N	18,000	15.5	.005	2.3	2.4	4.5	8.4
DD #3 - S	<u>180,000</u>	<u>15.5</u>	<u>.007</u>	<u>2.3</u>	<u>2.4</u>	<u>4.5</u>	<u>8.4</u>
Total Possible	1,102,800	12.6	.005	2.46	1.08	2.94	9.2
<u>Total Estimated Sulphide:</u>							
	2,905,810	19.1	.005	2.12	1.14	2.67	9.25

#### Oxide and Semioxide:

##### Probable Ore:

Pan O - 1	528,000	20.0	.01	1.5	1.4	1.7	11.0
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#### Data Used:

Map D-1166 shows all cut samples posted on a 50 - scale plan map of Pan American shaft workings. It will be noted that the 1500 and 2000' levels do not show many cut samples and values for these headings are taken from the daily muck samples as listed in the appendix to this estimate where muck pile samples are reconciled with hoisted samples and mill lots.



# COMBINED METALS REDUCTION COMPANY

SHEET # 2

DATE April - 1950

TO CC-PAA Ore Tonnage Estimate

Also shown in the appendix is the list of muck samples taken by George E. Coxe as taken from Mr. E. B. Young's reports. These muck samples have not been used in calculations since they have not been reconciled with production and average somewhat higher than cut samples.

The appendix also shows a tabulation of composite samples by Paul Murphy of the International Smelting Company which was used for manganese grade in Blocks Pan S - 1 and Pan S - 2.

## BLOCK PAN S - 1

### Average Grade

Grade has been determined using IS&R cut samples as follows:

	Ag	Pb	Zn
No. 4 raise 50' ore	1.7	1.1	2.5
800S #1 raise 31' ore	1.84	1.2	2.5
800N #1 raise and wnz. 20' ore	1.9	1.3	2.25
Weighted Average Raises	1.8	1.17	2.48
Average cut samples N X-cut 365'	1.51	1.5	2.5
" " " S " 190'	1.4	1.1	2.8
Weighted Average X-cuts 555'	1.47	1.36	2.60
Average cut samples incline 255'	1.16	1.20	2.51
Weighted Average all cut samples along bedding	1.37	1.31	2.57
Weighted Average cut samples in raises as shown above	1.80	1.17	2.48
Arithmetical average of raises and headings			
Block S - 1	1.58	1.24	2.52

Using gold values estimated from mill lots and manganese assay from Paul Murphy composite, average grade of block is:

	Au	Ag	Pb	Zn	Mn
Block S - 1	.005	1.58	1.24	2.52	9.3

### Tonnage Block S - 1

Thickness of ore is determined as follows starting with the north edge of the ore channel, using offset between raises at right angles to channel:

Thickness at north edge	5'
" 800N #1 rs. & N#1 Wnz.	20'
Average thickness for 140'	12.5'
Thickness times width north section	1750



# COMBINED METALS REDUCTION COMPANY

SHEET # 3

DATE April - 1950 TO CC-PAA Ore Tonnage Estimate

Thickness at 800N #1 Rs. and N#1 Wnz.	20'	
" at #4 raise	50'	
Average thickness for 205'	35'	
Thickness times width middle section		7175
Thickness at #4 raise	50'	
" at 800S #1 raise	31'	
Average thickness for 150'	40.5'	
Thickness times width south section		<u>6075</u>
Total thickness times 495'		15000
Average thickness 15000/495 =		30.3'
Thickness used for Block S - 1		30.0'
Cross-section area, west end Block S - 1, 500X30 =	15000 sq. ft.	
" " " east " " " 480X30 =	<u>14400</u>	
Average cross-section Block S - 1	14700 sq. ft.	
Length of Block S - 1	<u>255'</u>	
Volume of Block S - 1	3,748,500 cu. ft.	
Tonnage at 10 cu. ft./ton	374,850 tons	
Less tonnage mined		
Inclined shaft 255'X5.6 tons/ft. =	1430 tons	
Crosscuts 620'X3.5 tons/ft. =	2170 "	
Raises, winzes, etc., 120'X3.5 tons/ft. =	<u>420 "</u>	
	<u>4,120</u>	
Remaining tonnage Block S - 1		370,730 tons

## BLOCK PAN 5 - 2

### Average Grade

Grade has been determined for this block in the following manner:

Raises: In addition to 800N #1 raise and #1 winze, #6 raise in the Pan American incline and N#1 raise on the 1500 level are used. The 1500 N#2 raise shows ore 43' above LPUB and better than average values. However, there is evidence that this raise followed a fissure zone and one wall showed considerable barren limestone.

### No. 6 Raise:

Values for bed section at #6 raise are as follows:

<u>IS&amp;R Cut Samples</u>	<u>Ag</u>	<u>Pb</u>	<u>Zn</u>
Floor of incline to bottom of bed - not exposed			
6.0' average cut samples in incline each side of raise	2.5	2.5	2.9
6.0 to 18.0 - 12.0' No assay	.	.	.
18.0 to 28 - 10.0'	1.1	0.5	1.5
28 to 35 - 7.0'	1.4	0.6	2.3
35 to 40 - 5.0'	2.4	0.4	2.9



# COMBINED METALS REDUCTION COMPANY

SHEET #4

DATE April - 1950

TO CC-PAA Ore Tonnage Estimate

## Muck Samples - G. E. Cox

	Ag	Pb	Zn
12 to 16' up raise	(2.3)	1.7	1.6)
16 to 19 " "	(2.0)	1.8	3.0)
19 to 22 " "	3.0	2.3	3.8
22 to 26 " "	3.0	2.0	3.5

In order to use cut samples as far as possible, which average considerably less than the muck samples, I have filled in the gap from 6.0' to 18.0' of cut samples with the average 12' to 19' muck samples shown above and disregard the better muck samples above that point. Since the assay is lower than the bottom 6' cut samples, it is assumed the muck sample can be safely used for the entire interval 6.0' to 18.0', producing overall average as follows:

0.0 - 6.0	6.0'	2.5	2.5	2.9
6.0 - 18.0	12.0'	2.2	1.7	2.2
18.0 - 28.0	10.0'	1.1	0.5	1.5
28.0 - 35.0	7.0'	1.4	0.6	2.3
35.0 - 40.0	5.0'	2.4	0.4	2.9
Weighted Avg.	40.0'	1.85	1.16	2.18

## 1500N No. 1 Raise:

The 1500N #1 raise was driven by the Leavitt lease and exposed 20' of mineralized bed. Muck from the raise was included in lease shipments. Samples taken included one muck pile sample and a 7' cut sample above the heading. Cut samples on the 1500 level adjacent to the raise were as follows:

Cut	Ag	Pb	Zn	Mn
1.3 IPUE	2.8	1.5	2.6	11.7
4.8 UB	1.8	1.3	2.5	9.9
6.1 Total	2.1	1.34	2.53	10.3

Combining this assay with the two raise assays above mentioned we have a bed section assay at 1500N #1 raise as follows:

Cut	Ag	Pb	Zn
6.1	2.1	1.34	2.53
Muck (Assumed 6.9')	1.6	1.7	2.4
7.0	1.4	.8	2.2
20.0 Total	1.68	1.27	2.37

Combining the above raise assays with the 800N #1 raise and #1 winze shown in block S - 1, we have combined assays for full bed sections in block S - 2 as follows:

Location	Thickness	Ag	Pb	Zn
800N #1 Rse. & Wnz.	20'	1.9	1.3	2.25
Incline #5 Raise	40'	1.85	1.16	2.18
1500N #1 Raise	20'	1.68	1.27	2.37
Weighted average raises		1.82	1.22	2.24



# COMBINED METALS REDUCTION COMPANY

SHEET #5

DATE April - 1950

TO CC-PAA Ore Tonnage Estimate

## Crosscuts:

Daily muck pile samples were taken on the 1500' level under company operation as listed in appendix, where the summary sheet shows the close comparison of settlement assays with weighted average muck pile assays. Therefore, average muck assays for progress include no selective mining. Average assay is as follows:

	Ag	Pb	Zn
1500 Average muck 325'	1.67	1.25	2.89

The 1150 crosscut was driven by Wilkins lease and separate muck pile samples were not kept. In the 100' of work on this level three split cuts were taken which average to full cuts as follows:

Location	Cut	Ag	Pb	Zn
1150S face	6.0'	1.80	1.4	3.4
1150N / 50'	6.8	1.34	1.52	2.64
1150N face	4.7	1.12	1.07	2.49
100' Hdg.	5.8'	1.44	1.35	2.86

Averaging the above crosscuts with 800N crosscut and 680' of IS&R cut samples in the incline we have:

		Ag	Pb	Zn
Average cut samples 800N X-cut	365'	1.51	1.5	2.5
Average cut samples in Incline	680'	1.81	1.31	2.67
Average cut samples 1150 level	100'	1.44	1.35	2.86
Average muck 1500N hdg.	325'	1.67	1.25	2.89

Weighted average cut samples and muck along bedding

	1.68	1.35	2.70
--	------	------	------

Weighted average cut samples in raises as shown above

	1.82	1.22	2.24
--	------	------	------

Arithmetical average of raises and headings  
Block S - 2

	1.75	1.28	2.47
--	------	------	------

Using gold values estimated from mill lots and manganese assay from Paul Murphy composite samples, average grade of block is:

	Au	Ag	Pb	Zn	Mn
Block S - 2	.005	1.75	1.28	2.47	9.3



# COMBINED METALS REDUCTION COMPANY

SHEET #6

DATE April - 1950

TO CC-PAA Ore Tonnage Estimate

## Tonnage Block S - 2

Where block S - 2 joins block S - 1 thickness of 30' is used as explained in block S - 1 estimate. The #5 raise in the incline shows 40' thickness of ore at the 1150 level but must be assumed to be in the thickest part of the ore channel. The 1500N #1 raise shows 20' of ore and did not reach the top of mineralization. Judging by this information average thickness for the cross-section on the east end is assumed to be 25'. Tonnage is calculated as follows:

Cross-section area, west end Block S - 2 (See S - 1)	14,400 sq. ft.
" " " east " " " 400X25	10,000
Average cross-section Block S - 2	12,200 " "
Length of Block S - 2	680'
Volume of " "	8,296,000
Tonnage at 10 cu. ft./ton	829,600 ton
Less tonnage mined	
Incline shaft 680' X 5.6 tons/ft. =	3,808
Crosscuts 1500 level, 325';	
1150 level, 100'; Lease workings	
equivalent of 450' or total of	
875' X 3.5 tons/ft. =	3,062
Raises - total of 100' X 3.5 tons/ft. =	350
Remaining tonnage Block S - 2	7,220
	822,380

## BLOCK PAN S - 3

### Average Grade:

Grade has been determined for this block in the following manner.

Raises and Drill holes: The only raise adjacent to this block is 1500N #1 raise. Diamond drill holes drilled up and down on the 2000 level, as well as a short distance above the 2000 level disclosed that ore thickness in the east end of this block is limited to the height of the headings.

Grade has been determined by averaging the 1500 level grade with 1500N #1 raise and applying the resultant grade in proportion to the cross-section area on the west end of the block as compared to cross-section area at the 2000 level. This grade is then averaged with the incline cut samples in proportion of 2 to 1.

	Ag	Pb	Zn
Average muck 1500 N Hdg.	1.67	1.25	2.89
Average 1500 N #1 Raise	1.68	1.27	2.37
Arithmetical average applying to cross-section area of 400X25 = 10,000 sq. ft.	1.67	1.26	2.63
Average of ore on 2000 level (31 skips from south hdg, 279 skips from north hdg.) applying to area of 210' X 7' = 1,470 sq. ft.	2.37	1.44	2.27
Weighted average	1.76	1.28	2.58



# COMBINED METALS REDUCTION COMPANY

SHEET #7

DATE April - 1950

TO CC-PAA Ore Tonnage Estimate

	<u>Ag</u>	<u>Pb</u>	<u>Zn</u>
Average of IS&R cut samples for 500' of incline	2.42	0.3	2.50
Average - using weight of 2 for assay derived from muck production to 1 for cut samples in incline	1.98	1.12	2.55

Using gold values estimated from mill lots and manganese from assay of mill lot #1, average grade of block is:

	<u>Au</u>	<u>Ag</u>	<u>Pb</u>	<u>Zn</u>	<u>Mn</u>
Block S - 3	.005	1.98	1.12	2.55	9.1

## Tonnage - Block S - 3

Where block S - 3 joins block S - 2, thickness of 25' is used as explained in block S - 2. From diamond drill holes #3 and #4 thickness of ore is shown to be limited to 6' at coordinate 11700 east. Therefore, the block is divided into two sections for volume calculation as follows:

### West Part of Block S - 3

Cross-section area west end block S - 3 (See S - 2)	10,000 Sq. ft.
" " " 300' east, near DDH #3 & #4 = 260'X6' high	<u>1,440</u>
Average cross-section west portion S - 3	5,720 " "
Length of west portion S - 3	<u>300'</u>
Volume west portion S - 3	1,716,000

### East Part of Block S - 3

Cross-section area east end block S - 3, 180'X6'	1,080 Sq. ft.
" " " at joining west portion as above	<u>1,440</u>
Average cross-section east portion	1,260 " "
Length of east portion S - 3	<u>200'</u>
Volume east portion S - 3	252,000

### Total volume Block S - 3

Tonnage at 10 cu. ft./ton	1,968,000
Less tonnage mined	196,800 tons
Less tonnage mined	
Incline shaft 500'X5.6 tons/ft. = 2800	
Crosscut 2000 level, 230'X3.5 tons/ft. = 800	<u>3,600 tons</u>
Remaining tonnage Block S - 3	193,200 tons



## COMBINED METALS REDUCTION COMPANY

SHEET #8

DATE April - 1950

TO CC-PAA Ore Tonnage Estimate

BLOCK PAN 0 - 1 (Oxide and Semioxide Block)Grade of Ore

At the incline shaft collar, mineralization is mostly confined to the thin-bedded CM UB and the underlying massive limestone is quite barren. Insinking the shaft, the lower massive section was followed leaving the mineralized bed section above the incline. Therefore, the only places that can be sampled for grade of oxidized ore are in raises and on the outcrop at the shaft collar.

Following is a description of oxidized ore exposures in block 0 - 1:

1. Shaft Collar:

Black oxidized mineralization shows in thin bedded portion of CM bed above massive. The top of replacement cannot be seen due to being covered by talus. Two samples were taken by Walker and Gemmill, one on the north side and the other on the south side at the collar as follows:

Bed	Cut	Au	Ag	Pb	Zn	Mn	Fe
UB	5.0' V.	.015	1.79	2.3	3.5	11.4	17.3
UB	4.5' V.	.01	1.59	1.4	1.2	9.0	21.8

2. No. 1 Raise:

This raise is 120' from the collar and consists of a small hole just to the top of the nearly barren, massive limestone. It does not penetrate far enough into the replaced UB to obtain a satisfactory sample.

3. No. 2 Raise:

This raise is 440' from the collar and exposes oxidized LPUB. The back of this raise is in heavy oxide mineralization. One sample was taken by Walker and Gemmill as follows:

Bed	Cut	Au	Ag	Pb	Zn	Mn	Fe
LPUB	2.5' V.	.005	1.60	1.1	0.9	13.2	30.0

4. No. 3 Raise:

This raise is 490' from the collar and exposes partly oxidized ore in LPUB and UB for a thickness of about 12' including boot-leg holes, the back being still in mineralized UB. One sample was taken by Walker and Gemmill as follows:

Bed	Cut	Au	Ag	Pb	Zn	Mn	Fe
LPUB&UB	10.0' V.	.01	1.09	0.9	1.1	10.3	22.5

The arithmetical average of the above samples gives the following



# COMBINED METALS REDUCTION COMPANY

SHEET #9

DATE April - 1950 TO CC-PAA Ore Tonnage Estimate

assay:

<u>Au</u>	<u>Ag</u>	<u>Pb</u>	<u>Zn</u>	<u>Mn</u>	<u>Fe</u>
.01	1.51	1.42	1.68	11.0	22.9

Since the above sampling is meagre information for the size of the block, it is desirable to investigate the theoretical effect of oxidation on the grade of ore. The following discussion shows an approximate result of oxidation only, since the minerals in the oxidized ore are numerous. However, I believe the approximation is close enough for practical use.

Manganese in the primary ore, whether in the form of mangano-dolomite, manganosiderite or rhodochrosite is considered for practical purposes to be in the form of  $MnCO_3$ . Percentages manganese in the carbonate, together with probable oxidation products are as follows:

$MnCO_3$	47.8 % Mn	
Manganite $Mn_2O_3 \cdot H_2O$	62.4 " "	Average 67.8%
Pyrolusite $MnO_2$	78.0 " "	
Psilomelane $MnO_2 \cdot MnO \cdot H_2O$	63.0 " "	

Iron in the primary ore is assumed to be in the form of sulphide accounting for 2% Fe assay and as carbonate for the balance. Percentages applying to iron minerals is as follows:

$FeS_2$	46.6 % Fe	
$FeCO_3$	48.2 " "	Average 63.0%
Limonite $2 Fe_2O_3 \cdot 3H_2O$	59.8 " "	
Turgite $2 Fe_2O_3 \cdot H_2O$	66.4 " "	
Goethite $Fe_2O_3 \cdot H_2O$	62.9 " "	

Using average grade of block S - 1 and filling in the analysis from IS&R (Murphy's) composites we have the following percentage assays:

<u>Pb</u>	<u>Zn</u>	<u>Mn</u>	<u>Fe</u>	<u>CaO</u>	<u>Insol</u>
1.24	2.52	9.3	22.1	4.9	17.6

Assuming 2% of the iron is in the form of pyrite and the balance carbonate, all of the manganese as carbonate and all Pb-Zn as sulphide, the analysis builds up to:



# COMBINED METALS REDUCTION COMPANY

SHEET #10

DATE April - 1950

TO CC-PAA Ore Tonnage Estimate

Pb	1.24% X 100/86.6 as PbS	=	1.4
Zn	2.52% X 100/67 as ZnS	=	3.8
Fe	2.0 % X 100/46.6 as FeS <sub>2</sub>	=	4.4
Fe	20.1 % X 100/48.2 as FeCO <sub>3</sub>	=	41.8
Mn	9.3% X 100/47.8 as MnCO <sub>3</sub>	=	19.5
CaO	4.7% X 100/56 as CaCO <sub>3</sub>	=	8.4
Insol	17.6% as Insol	=	17.6
Total			96.9
MgCO <sub>3</sub>	assumed		3.1
			100.0

Assuming 1 ton to be isolated and allowed to oxidize, the end products would be approximately as shown in the first column below. After leaching of soluble salts, the remaining units are shown in the second column. (Iron and manganese are assumed to be average of oxides previously mentioned.)

	End Product	Leached
Pb 1.24 X 100/83.5 as PbCO <sub>3</sub>	1.5	1.5
Zn 2.52 X 100/51.8 as ZnCO <sub>3</sub>	4.9	4.9
Fe 22.1 X 100/63.0 as Fe <sub>2</sub> O <sub>3</sub> · xH <sub>2</sub> O (Avg.)	35.1	35.1
Mn 9.3 X 100/67.8 as Mn <sub>2</sub> O <sub>3</sub> · xH <sub>2</sub> O (Avg.)	13.7	13.7
CaO 2.0 X 100/32.6 as Ca SO <sub>4</sub> · 2H <sub>2</sub> O	6.1	0.0
CaO 2.7 X 100/56.0 as CaCO <sub>3</sub>	4.8	4.8
MgCO <sub>3</sub> 1.0 X 100/14.4 as MgSO <sub>4</sub> · 7H <sub>2</sub> O	7.0	0.0
MgCO <sub>3</sub> 2.1 as MgCO <sub>3</sub>	2.1	2.1
Insol 17.6	17.6	17.6
Total Units	92.8	79.7

After oxidation and leaching, the metallic content in percentages of the remaining total would be raised by the factor 100/79.7 or to 125% of the original assay.

Since leaching of soluble salts would probably not be complete, a lesser percentage increase would be indicated. On the other hand, any combined water that is driven off as "moisture" in drying the ore pulp for assay would increase the percentage factor.

From the above, I assume that a factor of 20% increase would be safe to use. On this basis, oxidation of the adjoining block S - 1 would result in the following grade ore:

Au	Ag	Pb	Zn	Mn	Fe
.006	1.90	1.49	3.1	11.2	26.5

This assay value compares favorably with the average of oxide ore samples



# COMBINED METALS REDUCTION COMPANY

SHEET #11

DATE April - 1950

TO CC-PAA Ore Tonnage Estimate

taken except that the zinc content as calculated is 3.1% compared with 1.7% in cut samples. Oxidation of the carbonate ore is not likely to allow zinc to leach out. Experience at the Prince Mine strongly indicates that all the zinc in the low grade carbonate type ore remains in the oxidized product. Therefore, the oxide block will probably average higher than the cut sample average in zinc although the cut sample average has been used for the block.

## Tonnage - Block Pan O - 1:

Thickness of ore at the outcrop is assumed to be 7.0'. At the shaft collar, lower massive limestone (FWB, LB, Rib, etc.) is almost barren and exposure of UB ore is 5.0' thick with surface soil covering UB above the sample. Since no barren limestone can be seen above, and much thicker ore is known on the east part of this block, the 7' thickness looks conservative.

Cross-section area, west end Block O - 1 380X7' =	2,660 sq. ft.
Cross-section area, east end " "	
(Same as calculated for west end of block S - 1)	15,000
Average cross-section area block O - 1	8,830 " "
Length of block O - 1	600'
Volume of block O - 1	5,298,000 cu. ft.
Tonnage at 10 cu. ft./ton	529,800 tons
Less tonnage mined (most of the incline is below the replaced part of the bed in Block O - 1)	1,800
Remaining tonnage Block O - 1	528,000 tons



# COMBINED METALS REDUCTION COMPANY

SHEET #1

DATE April - 1950

TO CC-PAA Ore Tonnage Estimate

## Appendix

### PAN AMERICAN

#### Summary of Ore Produced on Company Operation 1947

	<u>Skips</u>	<u>Au</u>	<u>Ag</u>	<u>Pb</u>	<u>Zn</u>
Underground:					
1500N X-cut / 1 Rd. so.	1016	.005	1.86	1.44	3.10
2000N X-Cut	505	.005	1.76	.89	1.93
2000S	83	.005	1.64	.72	1.69
Total Muck See "X"	1604	.005	1.81	1.23	2.66
This compares with:	<u>Cars</u>				
Surface Ore See*	3448	.006	2.15	1.31	2.91
" Waste	1844	.005	1.00	.38	1.62
Total Muck See "X"	5292	.005	1.75	.99	2.50
Ore Production:	<u>Tons</u>				
See above	*2315	.004	2.06	1.36	3.11

From above - Skip holds  $\frac{5292}{1604} = 3.30$  cars/skip

Tons per car, from surface ore trammed,  
3448 cars, total ore treated 2315 tons  
and assuming 50 tons on ground gives  
2365/3448

0.69 tons/car

Tons per skip  $3.30 \times 0.69$

2.28 tons/skip

#### Manganese Assays on Ore Lots:

CMR	Lot #1	<u>Mn</u>
Leavitt	5	9.1
Wilkins	2	8.5
	3	10.4
	4	10.2
	5	10.0
	6	10.2
		8.9



## COMBINED METALS REDUCTION COMPANY

SHEET #2

DATE April - 1950

TO CC-PAA Ore Tonnage Estimate

AppendixPAN AMERICAN MINE  
Surface Tram -- Ore

Date	Cars	Au	Ag	Pb	Zn
3/14	22	.005	2.3	1.6	2.3
15	42	.005	2.6	1.1	2.6
16	12	.005	2.13	.8	2.0
17	61	.005	3.1	1.1	2.1
18	20	.01	3.29	1.3	4.6
19	30	.005	1.60	.7	2.0
20	34	.005	9.6	4.0	4.0
24	19	.005	1.6	1.2	3.0
26	29	.005	1.6	1.3	5.2
4/1	20	.005	2.6	.6	2.8
2	62	.005	2.8	.9	2.3
3	49	.005	1.9	.5	4.8
4	35	.005	2.2	1.3	2.1
5	48	.005	1.6	Tr	1.6
7	76	.005	3.7	.4	1.7
8	82	.005	.6	.5	1.6
9	66	.005	1.6	.8	1.9
10	55	.005	1.8	1.0	2.3
11	52	.005	1.6	.6	2.3
12	66	.005	2.0	.8	2.3
14	57	.005	1.9	.6	1.8
16	40	.005	2.3	1.0	3.2
17	33	.005	3.8	1.8	2.9
18	69	.005	2.2	2.3	3.9
19	75	.01	2.99	1.3	1.7
21	74	.005	2.7	1.4	2.9
22	44	.005	.9	.9	2.3
23	52	.005	.69	.9	2.0
24	80	.005	1.0	.6	2.8
15	38	.005	1.5	.7	2.0
25	50	.005	1.0	.8	2.4
26	42	.01	.99	1.0	1.8
28	56	.005	.69	.6	1.7
29	74	.005	.9	1.0	3.4
5/13	43	.007	3.1	.5	4.0
14	27	.005	2.1	1.2	3.6
15	32	.005	1.6	1.4	2.4
16	41	.005	2.0	1.9	3.9
17	22	.005	3.3	1.2	3.0
19	50	.005	1.4	1.2	2.7
20	62	.005	1.8	1.2	3.0
22	101	.005	2.0	1.6	3.7
23	40	.005	2.4	1.7	3.2
24	55	.005	2.2	1.6	3.5
25	78	.005	2.1	1.4	3.5



# COMBINED METALS REDUCTION COMPANY

SHEET #3

DATE April - 1950

TO CC-PAA Ore Tonnage Estimate

## Appendix

### Pan American Surface Tram - Ore (Cont)

<u>Date</u>	<u>Cars</u>	<u>Au</u>	<u>Ag</u>	<u>Pb</u>	<u>Zn</u>
26	81	.005	2.0	1.3	3.5
5/27	31	.005	1.9	1.3	3.0
29	45	.005	2.0	1.4	3.5
6/2	75	.005	2.5	1.5	3.8
3	61	.005	2.1	1.2	2.9
4	56	.005	2.3	1.5	3.7
5	81	.005	2.8	1.7	4.4
6	107	.005	3.1	3.5	3.0
7	64	.005	2.3	1.8	4.3
9	112	.005	2.1	1.6	2.8
12	12	.01	1.19	.9	2.4
13	65	.02	1.88	1.2	2.8
16	17	.01	1.09	1.1	2.6
17	13	.01	1.39	.9	3.0
18	75	.005	1.3	1.1	2.2
19	24	.005	2.1	1.5	2.4
20	44	.005	2.1	1.4	3.6
21	36	.005	2.1	1.7	3.4
23	35	.005	2.3	1.6	3.6
25	60	.005	2.0	1.2	3.4
27	60	.006	3.7	1.7	3.3
28	36	.005	4.3	2.1	3.4
30	45	.005	1.2	1.3	2.5
Total Ore	3448	.006	2.15	1.31	2.91
+ Waste	1844	.005	1.0	.38	1.62
Total Rock	5292	.005	1.75	.99	2.50



## COMBINED METALS REDUCTION COMPANY

SHEET #4

DATE April - 1950

TO CC-PAA Ore Tonnage Estimate

Appendix

## Pan American Mine - Surface Waste

Date	Cars	Au	Ag	Pb	Zn
3/12-13-14	30	.005	.9	.7	1.5
27	21	.005	.6	Tr	1.8
28	48	Tr	.3	Tr	1.0
29	13	Tr	.2	.3	.9
31	67	Tr	.3	Tr	Tr
4/10	41	.005	.9	.35	1.4
12	13	.005	.6	.2	1.3
14	24	.005	2.0	1.0	2.4
16	17	.005	.5	.5	1.0
17	30	.005	3.7	1.0	3.6
18	51	Tr	.2	.5	1.4
19	3	.005	1.5	Tr	1.6
21	11	Tr	.3	Tr	1.2
22	88	.005	1.1	.6	1.8
23	66	.005	2.0	.9	1.8
15	11	.005	1.0	.5	1.2
25	62	Tr	.5	Tr	1.3
28	86	.005	1.3	.7	2.2
29	45	Tr	1.4	.8	2.7
30	95	Tr	.8	Tr	1.7
5/1	98	.005	.7	.6	1.5
2	64	.005	.9	Tr	1.9
3	75	.005	1.5	.7	2.1
5	40	.005	.7	.5	1.8
6	35	.005	.5	Tr	Tr
7	36	.005	.7	Tr	1.2
8	75	.005	.5	.5	Tr
9	65	.005	1.5	Tr	2.3
10	76	.005	1.4	.8	2.4
12	50	Tr	.4	Tr	Tr
13	49	Tr	.5	.5	1.6
14	55	.005	1.8	.7	2.5
15	88	.005	.8	Tr	1.7
16	22	.005	1.6	.9	2.8
19	16	.005	.8	.5	1.4
20	12	1.7	1.2	3.1	
27	41	Tr	.6	.5	1.3
28	85	.005	1.3	Tr	1.8
29	40	.005	1.2	Tr	1.8
Total Cars	1844	.005	1.00	.38	1.62



# COMBINED METALS REDUCTION COMPANY

SHEET #5

DATE April - 1950

TO CC-PAA Ore Tonnage Estimate

## Appendix

Pan American  
1500N Crosscut / 1 Rd. 1500S Dr.

Date	Skips	Au	Ag	Pb	Zn
3/25-26/47 1500S Dr.	15	.005	1.3	1.0	3.5
4/8	6	.005	.7	.4	1.8
11	5	.005	1.2	.8	2.5
12	8	.005	1.2	.6	1.7
14	11	.005	2.2	1.2	2.5
16	15	.005	2.6	1.1	3.3
17	12	.005	2.6	1.4	3.1
18	23	.005	2.3	2.1	4.0
19	25	.005	2.1	1.2	3.4
21	26	.02	1.48	.7	2.3
22	15	.01	1.29	1.2	2.7
23	17	.005	1.09	1.0	2.4
24	26	.005	.70	.5	2.4
25	19	.005	1.2	1.2	2.6
26	15	.01	.79	.9	1.8
28	21	.005	.90	1.0	2.1
29	24	.005	2.0	1.6	2.8
30	22	.005	1.5	1.3	2.5
5/1	22	.005	.6	.7	1.7
2	5	.005	.9	Tr	1.9
3	20	.005	.5	Tr	1.5
5	5	.005	1.0	.6	2.4
8	13	.005	1.0	Tr	1.2
9	11	.005	1.6	1.4	2.1
10	15	.005	2.4	1.3	3.2
12	6	.005	2.3	1.4	2.4
13	16	.005	3.5	1.2	3.6
14	10	.005	2.1	1.0	3.3
15	12	.005	1.4	1.5	2.9
16	15	.005	2.0	1.6	3.8
17	8	.005	2.0	.7	3.3
19	15	.005	2.0	1.4	3.8
20	22	.005	2.2	2.0	3.4
22	31	.005	2.0	1.7	3.5
23	14	.005	2.0	1.8	3.4
24	22	.005	2.2	1.7	3.3
25	22	.005	2.0	1.6	3.6
26	21	.005	2.2	1.6	3.9
27	10	.005	1.8	1.6	3.2
29	15	.005	2.8	1.6	3.8
To June 1/47	635	.005	1.67	1.25	2.89
6/2	29	.005	2.4	1.9	4.2
3	19	.005	2.3	1.7	3.0
4	20	.005	2.2	1.3	3.5
5	28	.005	2.9	2.0	6.7
6	32	.005	2.6	2.0	4.5
7	22	.005	2.1	3.0	4.2
9	37	.005	1.3	1.7	3.0



# COMBINED METALS REDUCTION COMPANY

SHEET #6

DATE April - 1950

TO CC-PAA Ore Tonnage Estimate

## Appendix

### Pan American 1500N Crosscut (Cont)

Date	Skips	Au	Ag	Pb	Zn
6/13/47	23	.02	1.48	1.1	1.8
14	1.3	.005	1.29	.7	2.1
16	6	.005	2.0	1.0	2.3
17	9	.005	1.8	1.0	2.6
18	25	.005	1.5	1.2	2.2
19	7	.005	1.7	1.3	2.5
20	15	.01	4.39	4.2	3.9
21	10	.005	1.2	1.3	3.3
23	12	.005	1.2	1.1	2.6
24	8	.005	1.6	1.3	2.8
25	20	.005	2.5	1.6	2.8
27	20	.005	3.9	2.3	4.4
28	12	.005	2.2	1.5	3.2
30	14	.005	1.3	1.5	2.0
June - 1947	381	.005	2.16	1.75	3.45
Total	1016	.005	1.86	1.44	3.10

Note: After June 1, 1947, the 1500N heading dropped in grade and thickness so the north edge of blocked ore was cut off at the face as of June 1st. Later muck production from the 1500 level came largely from the west heading up the bedding dip where an attempt was made to follow better than average grade ore. Therefore, production grade for month of June is not used in calculations for grade of block P - S - 2.



# COMBINED METALS REDUCTION COMPANY

SHEET #7

DATE April - 1950

to CC-PAA Ore Tonnage Estimate

## Appendix

### Pan American 2000N Crosscut

Date	Skips	Au	Ag	Pb	Zn
3/15/47	6	.005	1.7	.8	2.4
14 N&S	8	.005	4.7	1.5	3.4
17	16	.005	3.6	.9	1.6
18 N&S	18	.01	3.89	1.0	2.1
20	15	.005	4.3	1.4	2.2
4/1	13	.005	2.5	.8	2.8
2	12	.005	1.1	.6	1.5
3	19	.005	1.9	.8	2.0
4	14	.005	2.2	1.1	2.2
7	13	.005	.9	.5	1.6
8	10	.005	1.1	.3	1.1
9	13	.005	1.2	.6	1.9
10	12	.005	1.9	.6	2.5
11	12	.03	4.77	.9	2.4
12	11	.005	1.6	.8	1.5
23	19	.01	2.89	1.2	3.6
24	7	.01	4.89	1.8	4.1
25	20	.005	1.4	.8	3.0
28	27	.005	.9	1.0	2.1
30	14	.005	1.79	1.0	2.1
Total to 5/1	279	.006	2.35	1.47	2.29
5/1	11	.005	1.00	Tr	1.2
2	16	.005	2.1	.8	2.4
3	6	.005	.9	.9	2.6
5	8	.005	.9	Tr	2.1
7	6	.005	2.5	Tr	1.1
8	13	.005	.5	.6	1.0
9	12	.005	1.0	Tr	.5
10	18	.005	.7	Tr	1.4
12	12	Tr	.3	Tr	.6
13	16	.005	.6	Tr	1.1
14	18	Tr	.6	Tr	.9
15	22	.005	.8	Tr	1.4
16	10	Tr	.8	.8	1.9
20	4	.005	1.1	.5	1.7
27	15	.005	1.2	Tr	1.4
28	30	.005	1.4	Tr	2.0
29 Total May	9	.005	1.5	Tr	2.5
	226	.004	1.03	0.2	1.49
Total 2000N Crosscut	505	.005	1.76	0.89	1.93



# COMBINED METALS REDUCTION COMPANY

SHEET #8

DATE April - 1950

to CC-PAA Ore Tonnage Estimate

## Appendix

### Pan American 2000S Crosscut

Date	Skips	Au	Ag	Pb	Zn
3/15	11	.005	2.2	.9	2.5
16	8	.005	3.3	1.3	2.0
19	12	.005	2.6	1.4	2.2
Total in ore	31	.005	2.51	1.15	2.14
4/3	9	.005	1.4	.5	1.8
7	13	.005	.8	.4	1.0
8	12	.005	1.2	.3	1.4
10	18	.005	1.0	.5	1.4
Total 2000S	83	.005	1.64	0.72	1.69

### 2000 Level Ore Summary

Date	Skips	Au	Ag	Pb	Zn
Average of Ore 2000 Level					
South Drift to 3/20/47	31	.005	2.51	1.15	2.14
North " " 5/1/47	279	.006	2.35	1.47	2.29
Total in block P - S - 3	310	.006	2.37	1.44	2.27



COPY

## COMBINED METALS REDUCTION COMPANY

## Appendix

SHEET #9

DATE April - 1950

TO CC-PAA Ore Tonnage Estimate

## ASSAYS FROM PAN AMERICAN INCLINE

Beginning 97 feet below cross cut station. 947 feet from portal.

No.						Ag.	Pb.	Zn.
1	947	ft. from portal, grab from cars				3.8	2.4	5.3
2	950	" " " " " "				2.2	1.7	2.7
3	956	" " " " " "				1.7	1.6	5.1
4	960	" " " " " "				.7	1.6	2.5
5	963	" " " " " "				2.2	1.2	2.4
6	967	" " " " " "				2.2	1.7	2.7
7	970	" " " " " "				1.3	0.8	2.0
8	973	" " " " " "				1.7	0.8	2.9
9	976	" " " " " "				1.5	1.0	1.9
10	979	" " " " " "				1.1	1.1	3.5
11	982	" " " " " "				1.4	0.8	3.2
12	985	" " " " " "				1.4	0.8	3.4
13	988	" " " " " "				1.0	1.0	1.6
14	991	" " " " " "				1.4	1.6	1.8
15	994	" " " " " "				1.5	0.8	2.2
16	997	" " " " " "				1.6	1.5	2.6
17	1000	" " " " " "				2.5	2.3	3.1
18	1004	" " " " " "				2.1	2.2	2.8
19	1007	" " " " " "				1.1	1.0	2.2
20	1010	" " " " " "				1.2	1.1	2.0
21	1013	" " " " " "				1.1	0.6	1.8
22	1016	" " " " " "				1.1	0.9	1.7
23	1019	" " " " " "				1.3	1.7	1.4
24	1022	" " " " " "				1.2	0.1	1.4
25	1025	" " " " " "				2.1	2.5	2.5
26	1025	" Upper half face of incline				2.8	3.4	2.4
27	1028	" " " " " "				2.2	3.0	1.5
28	1028	" from portal, grab from cars				1.8	2.3	2.2
29	1031	" " " " " "				3.5	3.6	2.4
30	1034	" " " " " "				1.8	2.2	2.1
31	1037	" " " " " "				2.1	2.0	2.1
32	1040	" " " " " "				2.0	1.3	2.1
33	1043	" " " " " "				3.0	2.3	2.0
34	1043	" sample upper half of face				4.5	4.2	2.1
35	1046	" from portal, grab from cars				1.9	1.2	2.5
36	1049	" " " " " "				2.8	1.0	2.2
37	1052	" " " " " "				2.8	1.2	2.4
38	1056	" " " " " "				2.0	1.6	2.5
39	1061	" " " " " "				2.5	1.9	2.6
40	1065	" " " " " "				2.4	1.7	2.5
41	1070	" " " " " "				3.2	2.7	2.6
42	1074	" " " " " "				2.5	1.6	2.6
43	1078	" " " " " "				2.8	1.3	2.5
44	1082	" " " " " "				3.6	1.2	3.0
45	1086	" " " " " "				2.9	2.7	2.3
46	1090	" " " " " "				2.8	2.0	2.7
47	1094	" " " " " "				2.8	2.0	2.7
48	1098	" " " " " "				2.1	1.6	2.1



C O P Y

## COMBINED METALS REDUCTION COMPANY

## Appendix

SHEET #10

DATE April - 1950

TO CC-PAA Ore Tonnage Estimate

(Assays from Pan American Incline Continued)

No.			Ag.	Pb.	Zn.
49	1102	Ft. from portal, grab from cars	2.2	1.5	2.1
50	1106	" " " " " "	2.8	1.5	2.5

(Above assays from Pioche Assay Office)

Nos. 51 to 58 inclusive lost at Assay Office

59	1136	ft. from portal, grab from cars	3.0	1.2	2.2
60	1140	" " " " " "	2.5	1.5	1.2
61	1145	" " " " " "	4.0	2.3	2.2
62	1155	" " " " " "	2.0	1.3	2.2
63	1155	Average of face of lower incline	2.2	1.5	3.1
63	1160	ft. from portal, grab from cars	1.5	1.4	2.6
64	1164	" " " " " "	3.0	2.5	3.8
65	1168	" " " " " "	2.0	2.9	2.0
66	1172	" " " " " "	3.0	2.5	3.0
67	1176	" " " " " "	5.0	2.9	3.0
68	1180	" " " " " "	4.0	3.8	3.9
69	1185	" " " " " "	4.0	2.2	3.4
70	1190	" " " " " "	1.0	1.3	2.5
71	1195	" " " " " "	2.0	1.5	2.2
72	1200	" " " " " "	3.0	1.9	2.2
73	1206	" " " " " "	1.5	1.0	2.4
74	1214	No. 5 raise 16 feet above track	2.3	1.7	1.6
75	" 5	" 19 " " " "	2.0	1.8	3.0
76	" 5	" 22 " " " "	3.0	2.3	3.8
77	" 5	" 26 " " " "	3.0	2.0	3.5
78	1220	ft. from portal, grab from cars	6.0	3.0	3.0
79	1226	" " " " " "	3.0	2.8	5.0
80	1232	" " " " " "	2.0	3.0	6.0
81	1238	" " " " " "	3.4	1.4	4.0
82	1243	" " " " " "	1.5	2.0	3.0
83	1248	" " " " " "	3.0	2.5	3.0

Eight samples lost in truck

92	1309	ft. from portal, grab from cars	2.0	2.5	7.0
93	1314	" " " " " "	3.2	2.2	4.6
94	1320	" " " " " "	4.0	1.8	4.7
95	1326	" " " " " "	3.0	2.2	2.8
96	1332	" " " " " "	3.2	1.9	3.1
97	1338	" " " " " "	4.0	1.5	3.0
98	1344	" " " " " "	4.3	2.5	6.3
99	1349	" " " " " "	3.0	2.5	3.2
100	1354	" " " " " "	3.0	1.4	3.3

Five samples lost

106	1381	ft. from portal, grab from cars	2.0	1.5	3.5
107	1387	" " " " " "	3.0	2.4	2.9
108	1393	" " " " " "	1.5	2.0	3.9
109	1400	" " " " " "	3.2	2.0	4.0
110	1407	" " " " " "	1.6	2.2	3.0
111	1412	" " " " " "	3.4	1.9	5.3
112	1417	" " " " " "	1.6	1.9	5.2
113	1422	" " " " " "	3.9	3.2	6.0
114	1430	" " " " " "	2.0	2.0	3.0



C O P Y

## COMBINED METALS REDUCTION COMPANY

## Appendix

SHEET #11

DATE April - 1950

TO CC-PAA Ore Tonnage Estimate

(Assays from Pan American Incline Continued)

No.							Ag.	Pb.	Zn.
		ft. from portal, grab from cars							
115	1436	"	"	"	"	"	3.0	2.8	3.7
116	1442	"	"	"	"	"	20.4	4.0	3.7
117	1448	"	"	"	"	"	2.6	3.1	3.5
118	1454	"	"	"	"	"	2.8	0.8	2.9
119	1461	"	"	"	"	"	1.2	2.5	2.5
120	1467	"	"	"	"	"	6.2	2.5	2.0
121	1474	"	"	"	"	"	2.8	1.0	2.9
122	1482	"	"	"	"	"	2.2	1.8	4.3
123	1489	"	"	"	"	"	3.2	1.5	3.5
124	1496	"	"	"	"	"	2.4	2.0	3.0
125	1506	"	"	"	"	"	3.8	1.9	2.9
126	1512	"	"	"	"	"	2.8	0.7	2.2
No assaying for three weeks office closed.									
127	1644	ft. from portal, grab from cars					3.2	1.9	2.3
128	1652	"	"	"	"	"	2.8	1.6	2.3
129	1661	"	"	"	"	"	2.8	1.1	2.1
130	1670	"	"	"	"	"	2.6	1.1	2.7
131	1681	"	"	"	"	"	5.6	13.4	7.4
(No. 131 taken at face by Mr. Buehler)									
132	1690	"	"	"	"	"	2.6	1.8	1.8
133	1700	"	"	"	"	"	0.3	4.2	5.4

Bristol Assay office closed.

Assays taken May 7, 1931, from muck from grab samples from dump and cars while driving through mixed porphyritic material.

162	1960	ft. from portal, grab from cars & dumps					4.2	0.5	2.9
163	1966	"	"	"	"	"	3.5	0.4	5.0
164	1972	"	"	"	"	"	2.4	0.4	1.1
165	1978	"	"	"	"	"	0.9	0.5	0.5
166	1983	"	"	"	"	"	1.3	0.7	0.7
167	1988	"	"	"	"	"	3.6	3.2	1.3
168	1993	"	"	"	"	"	2.8	0.4	0.6
169	1998	"	"	"	"	"	2.0	0.0	0.7
170	2000	"	"	"	"	"	3.9	0.0	0.6
171	2012	"	"	"	"	"	1.8	0.0	0.6

Arithmetical Average of 123 Samples      2.7    1.9    2.8

Total depth at May 31, 1931, when we closed down was 2118 feet, the last samples were not assayed.

The above data submitted by George E. Cox, Superintendent of Pan American Mine.



C O P Y

## COMBINED METALS REDUCTION COMPANY

## Appendix

SHEET #12

DATE April - 1950

TO CG-PAA Ore Tonnage Estimate

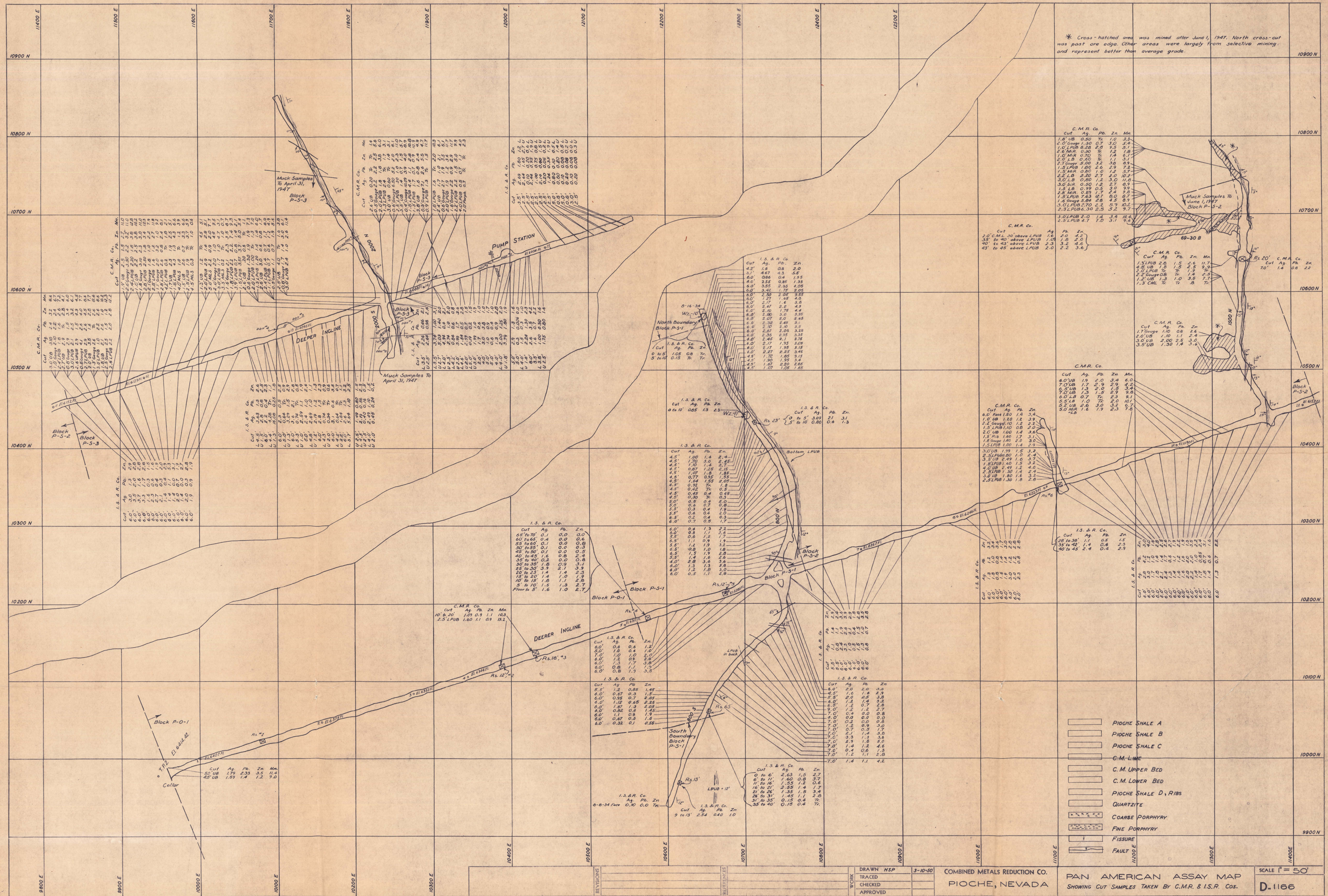
COMPOSITE OF SAMPLES BY P. R. MURPHY OF THE  
INTERNATIONAL SMELTING COMPANY FROM THE 600  
TO 1100 FOOT POINTS IN DEEPER INCLINE.

No.	Gold Ozs.	Silver Ozs.	Lead %	Copper %	Insol. %	Zn. %	Iron %	Lime %	Mang. %
1-2-3-4-5	)			0.04	28.6		22.0	1.6	7.9
6-7-8-9-10	)	Incline		0.03	11.6		26.2	1.2	10.3
11-13-14-15-16	)	below		0.02	13.6		27.8	1.2	10.0
17-18-19-20-21	)	Crosscuts		0.03	11.0		28.4	1.0	9.9
22-22A-23-24-25	)			0.01	14.8		24.4	1.0	10.6
25A-26-27-28-28A				0.03	19.0		24.8	0.8	8.9
29-30-30A-31-32				0.04	11.4		28.8	0.6	10.2
33-34-35-36-37				0.03	18.0		25.6	0.6	9.7
38-39-40-41-43				0.03	16.2		12.8	24.0	4.7
44-45-46-47-48				0.03	16.4		14.0	13.0	9.2
49-50-51-52-53				0.01	18.4		15.0	8.4	9.9
54-55-56-57-58				0.02	30.8		20.6	0.6	9.8
59-60-61-62-63				0.01	16.4		25.0	0.8	11.3
64-65-66-67-68				0.01	20.0		14.0	10.9	8.2
<hr/>									
AVERAGES	Trace	1.3	1.3	0.02	17.6	2.6	22.1	4.7	9.3

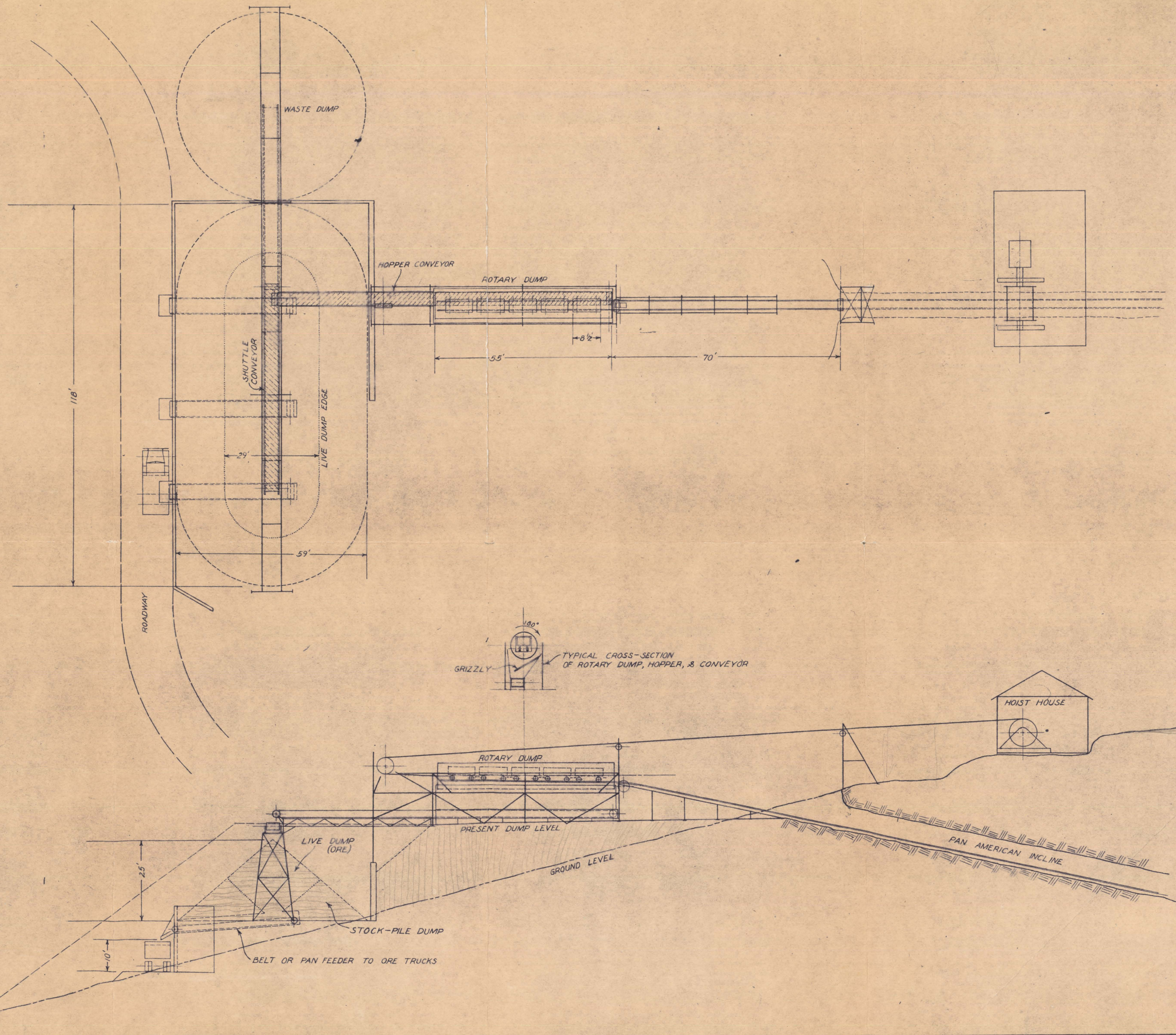












REVISIONS

REFERENCES

WORK

DRAWN *Harry S. Allen* 12/22/50  
 TRACED  
 CHECKED  
 APPROVED

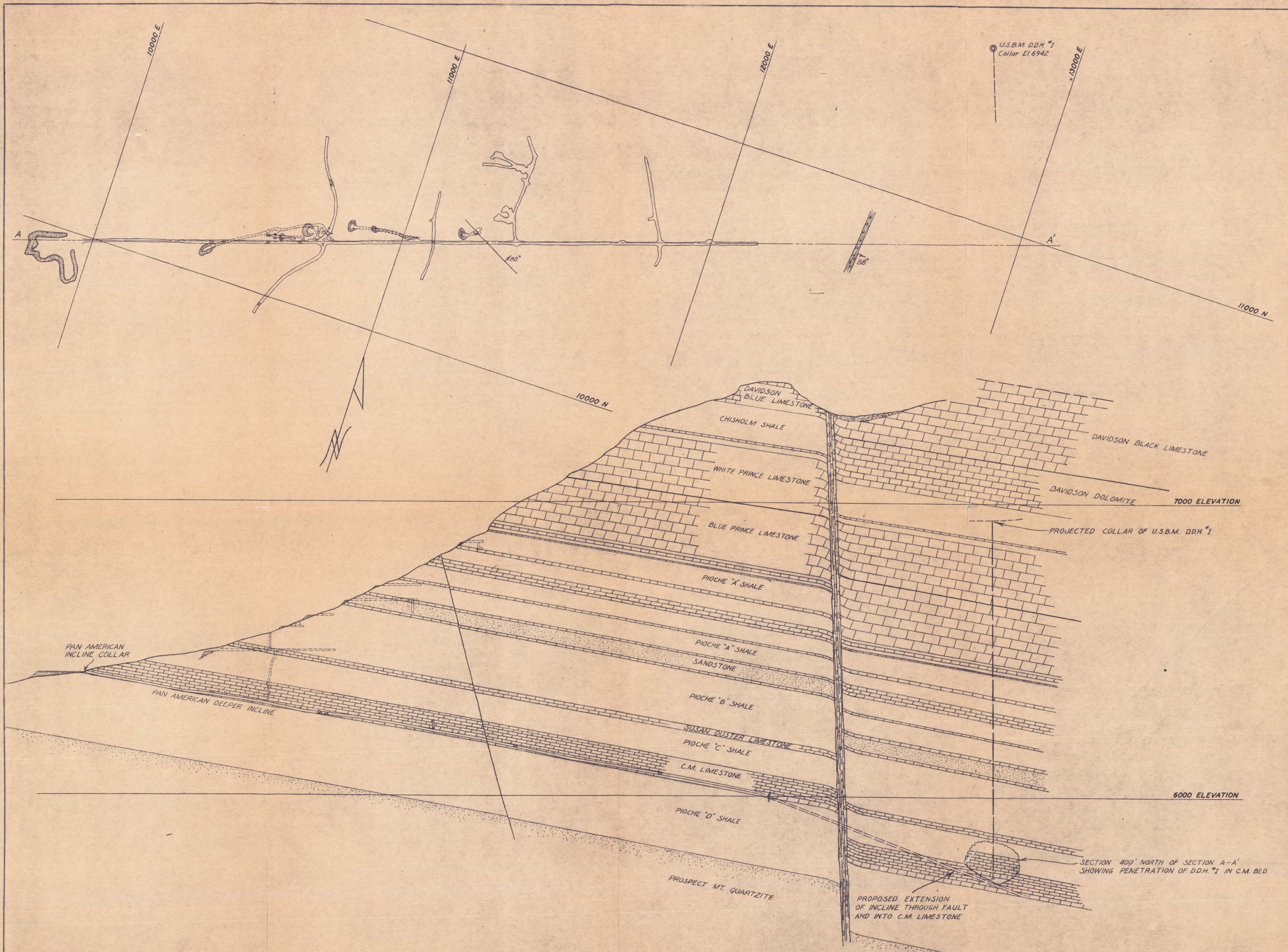
COMBINED METALS REDUCTION CO.  
 PIOCHE, NEVADA

PAN AMERICAN MINE  
 PROPOSED HOISTING, DUMPING, AND  
 STOCK-PILE ARRANGEMENT

SCALE 1" = 20'

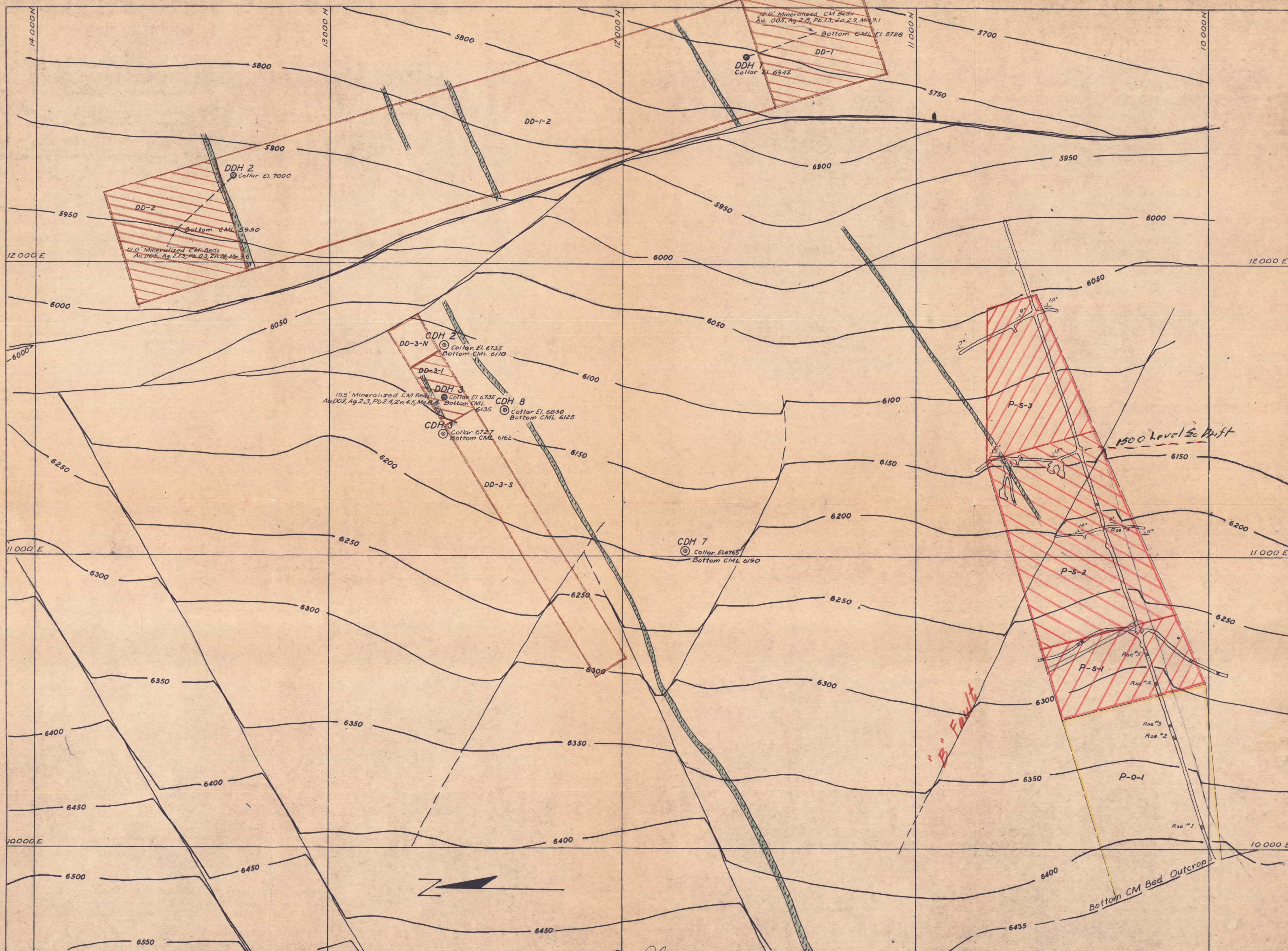
C-1083





REVISIONS  	REFERENCES  	WORK DRAWN <i>Harry S. Bolton</i> 12/13/50 TRACED CHECKED APPROVED	COMBINED METALS REDUCTION CO. PIOCHE, NEVADA	LONGITUDINAL SECTION PAN AMERICAN DEEPER INCLINE SHOWING PROJECTED GEOLOGY AND PROPOSED DEVELOPMENT	SCALE 1" = 200' C-1082





REVISIONS	SULPHIDE ORE - DEVELOPED " " PROBABLE " " POSSIBLE OXIDIZED " PROBABLE		DRAWN <i>[Signature]</i>	COMBINED METALS REDUCTION CO. PIOCHE NEVADA	PAN AMERICAN AREA ~ COMET DISTRICT CONTOUR MAP OF C.M. BED, FOOTWALL CONTACT SHOWING ORE BLOCKS AND DRILL HOLES	SCALE 1" = 200' C-1076
			TRACED <i>[Signature]</i>			
			CHECKED <i>[Signature]</i>			
			APPROVED <i>[Signature]</i>			
3-26-50						