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Item 31

BRISTOL SILVER MINES COMPANY
Bristol Silver, Nevada

Z-26

BRISTOL-BLACK METAL REPORT

By: J. H. Buehler &
Paul Gemmill

February 1941

0720 0026

September 18, 1941

Mr. Paul Gemmill

Bristol Silver, Nevada

Dear Paul:

Last evening I studied your Bristol--Black Metal report. It is very complete and excellently prepared.

As to the pumping and tunnel problem, I have a couple of questions I wish you would answer for me.

What is the vertical height from the "1700 foot level" to the pumping discharge point at the top of the shaft? What is the linear length of pipe, the "7400" and "7200 U.S." being so close together on the vertical section is not clear to me.

No cross-section areas of the proposed tunnels are given. Those on the "West Valley Side" would be for drainage only, with track and equipment salvaged, and run with as small a cross-section as possible; while the "Black Metal" drives would be about the opposite. What cross-sections did you figure on?

Did you get your professional engineering license? How goes the Las Vegas litigation case?

Sincerely,

Director

jac;lb

OFFICE: 218 FELT BUILDING MINES: PIOCHE, NEVADA

BRISTOL SILVER MINES COMPANY
PIOCHE, NEVADA

September 17, 1941

Dr. Jay A. Carpenter,
Director, Mackay School of Mines,
University of Nevada,
Reno, Nevada

Dear Jay:

Your letter of August 23d has remained unanswered, dut to my long absence. The carbon copy of your letter was handed to me upon my return from Idaho. The original, however, must not have passed the censors, as I have not yet received it.

I understand that Mr. Ahern sent you a copy of our Bristol Mine report, which I trust you will find interesting, as well as informative. Due to your interest and cooperative help, particularly pertaining to our geological problems, you may keep the report as your personal property, with my compliments.

We regret exceedingly that other urgent engagements made it impracticable for you to attend Mr. Snyder's mill opening on Labor Day.

You need not be told that the latch string is out at all times for you. We feel that you are one of us and we are looking forward with pleasure to having you again visit us when it is convenient for you to so do.

With kind personal regards, I remain

Yours sincerely,

J H Buehler

J.H.Buehler

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BRISTOL SILVER MINES COMPANY

Bristol Silver, Nevada

BRISTOL-BLACK METAL REPORT

By: J. H. Buehler
Paul Gemmill

February 1941

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BRISTOL-BLACK METAL REPORT

BRISTOL SILVER MINES COMPANY

Bristol Silver, Nevada

SUMMARY AND CONCLUSIONS

The Bristol Mine and adjacent mines on the same general fissure system are now owned by Bristol Silver Mines Company. These mines were discovered in the late seventies and, except for depression periods, several of the mines have had a continuous operation for over fifty years.

No production figures are available for periods prior to 1906, but old reports indicate that ore aggregating in excess of $3,000,000 in gross value was shipped from the various mines between 1878 and 1906.

From 1906 to December 31, 1940 the property has shipped 378,872 tons of ore to the Salt Lake smelters. This ore had a gross metal payment value of $4,434,534, and a net mine value of $3,122,433.

From the above, it will be noted that in excess of $7,400,000 gross value of ore has been produced since discovery of the properties by the prospectors.

Total development performed to date, principally in the Bristol Mine, amounts to over nine miles of shafts, drifts, raises and winzes. For each foot of development work performed since 1924, the Bristol Mine has produced 7.8 tons of ore. The mine has never failed to respond to development; therefore, we feel that the past record of the mine clearly demonstrates that future production depends entirely upon the amount of intelligent development work performed, and the speed with which it is done. The time element is always an important factor in connection with any successful development operation. A development program in the Bristol Mine should be carried far enough in advance to maintain an ore production that will result in maximum operating efficiency.

So many excellent possibilities for finding ore are apparent, that it would be difficult to place a limit on the ultimate possible tonnage that might be attained.

Some new light has been thrown on the mode of ore deposition and the position of favorable ore horizons that should help to decrease the development necessary to maintain any given rate of production.

When several stoping areas are available for mining, substantial savings can be made by properly mixing and classifying ores to save on treatment charges and freight rates.

Much of the development work performed in recent years has been under stress of low metal prices with consequent financial stress, and many short drives have been undertaken that had less real merit than some of the longer drives, when risk is weighed against possible reward. This was, of course, done in the hope of finding ore in a short period of time.

We believe that continued operation with a sound development program should enable the mine to produce in excess of 36,000 tons of ore per year at an overall cost not to exceed $5.00 per ton, based on past experience with comparable production. The average net mine value of Bristol ore has been $8.24 per ton for production from 1906 to 1940, inclusive.

The above applies to ore occurring above the water level. There are possibilities for large, bedded sulphide ore deposits below the water level, and recent developments northwest of the Snyder Shaft on the 1500 and the 1700 Levels have exposed some of the lower formations. On the 1700 Level a large body of sulphide iron ore was found in the Prince horizon, opening possibilities for large commercial sulphide ore above water level. These possibilities are fully discussed in the body of this report.

The Bristol Silver Mines Company has an 84% stock ownership in the Black Metal Mine which has also had a substantial production and offers good possibilities for developing more ore. A short report covering the Black Metal Mine is made a part of this report.

BRISTOL SILVER MINES COMPANY

Bristol Silver, Nevada

LOCATION

Bristol Silver Mines Company's property, consisting of approximately 638 acres of patented land and 1,222 acres of unpatented land, is situated chiefly on the west slope of the Bristol Range, in Lincoln County, Nevada, 16 miles (air line) northwesterly of Pioche, the county seat.

Bristol camp is connected with the Town of Pioche by 10 miles of graveled road and 15 miles of oil-surfaced highway.

The main surface workings of the Bristol Mine are at an elevation of 7,250 feet. These workings are connected by an aerial tramway, 2 miles long, with the terminus of the Bristol Silver Mines Company's narrow gauge railroad at Jackrabbit, on the east slope of the Bristol Range. The narrow gauge railroad (purchased from the Pioche Pacific Railroad Company in June, 1930) extends from Jackrabbit to Pioche, where it connects with the Union Pacific Railroad through a branch line from Caliente, Nevada.

PROPERTY

The mining claims owned by Bristol Silver Mines Company, through patent, location, lease or stock ownership, are as follow:

<u>Patented - 24 Claims</u>

Coyote	Lost Fraction
Hillside	Contact
Detroit	Libby Williams Extension
Great Eastern	Chicago Extension
National	Great Eastern Extension
Tempest	Vesuvius
J.M.F.	Red Cloud
White Rock	December
Iron Mine	Crescent
May Day	Crescent Extension
May Day Extension	North Star Extension
Bristol	North Star

<u>Unpatented - 62 Claims</u>

Libby Williams	Inman
Twenty Eight Thirty	Cassandra
Home Run Mine	Sure Thing Fraction
Fire Fly Mineral	Chicago
Fire Fly No. 2	Elenor No. 1
Fire Fly No. 3	Elenor No. 2
Wedge Fraction	Elenor No. 3
Sphynx	Elenor No. 4
Bristol Fraction	Elenor No. 5
Bristol No. 1	Elenor No. 6
Bristol No. 2	Elenor No. 7
Bristol No. 3	Elenor No. 8

Unpatented Claims (Continued)

Bristol No. 4	Elenor No. 9
Bristol No. 5	Elenor No. 10
Bristol No. 6	Hillside No. 1
Bristol No. 7	Hillside No. 2
Bristol No. 8	Hillside No. 3
Bristol No. 9	Hillside No. 4
Bristol No. 10	Hillside No. 5
Bristol No. 11	Hillside No. 6
Bristol No. 12	Hillside No. 7
Rattler No. 1	Hillside No. 8
Rattler No. 2	Hillside No. 9
Rattler No. 3	Hillside No. 10
Rattler No. 4	Hillside No. 11
Brutis	Hillside No. 12
Blue Bird No. 1	Hillside No. 14
Blue Bird No. 2	Hillside No. 15
Blue Bird No. 3	Hillside No. 16
Blue Bird No. 4	Hillside No. 17
Blue Bird Fraction	Hillside No. 18

Patented - 7 Claims (Lease and 50% Stock Ownership)

Miller	Kismet
Adaline	Kismet No. 1
Sunset	Kismet No. 2
Wallace	

BLACK METAL MINES, INC. (84% Stock Ownership)

Patented - 4 Claims

Onandago	Jackrabbit
Cotton Tail	Junction

Unpatented - 6 Claims

Wedge	Wedge No. 1
Hillside No. 13	Wedge No. 2
Nevada	Wedge No. 3

BAMBERGER GROUP (Optioned)

Patented - 6 Claims

Apex	Union
Klondyke	Blue Bell
Skylark	Gusset Patch

BRISTOL SILVER MINES COMPANY

Bristol Silver, Nevada

EQUIPMENT

The Bristol Mine is adequately equipped to mine and transport to the Union Pacific Railroad 200 tons of ore per day and carry on normal development operations above the water level of the mine. The water level at present is at the 1735 Level of the Snyder Shaft.

The Snyder Shaft is the main shaft of the Bristol Mine. It is a 70° Incline Shaft--single compartment and manway from surface to the 1200 Level, and two compartment and manway from the 1200 Level to the 1700 Level.

SURFACE BUILDINGS AND EQUIPMENT

1. Hoist and Compressor Building.
2. Blacksmith and Machine Shop Building, completely equipped.
3. Assay Office, fully equipped.
4. Main Office, Shift Boss Office and Store Room, all equipped.
5. Change House.
6. Boarding House - Fully equipped to accommodate 75 men.
7. Bunk Houses and Dwellings, equipped to accommodate 100 men, and 25 families
8. Powder Magazines, Saw Shed, etc.

SURFACE MACHINERY AND EQUIPMENT

1. One Nordberg Double Drum Hoist, equipped with time relay controls and direct connected to a 125-HP Westinghouse Slip-ring motor.
2. One Sullivan 850 cu. ft. Angle Compound Compressor, direct connected to a General Electric 150-HP Synchronous motor.
3. One Ingersoll-Rand 450 cu. ft. Compound Compressor, belted to a 75-HP General Electric motor.
4. Conveyor-Type Ore Sorting Equipment.
5. Necessary Surface Tracks and Waste Dump Site.

UNDERGROUND MACHINERY AND EQUIPMENT

1. Ten Pneumatic Rock Drills.
2. Three Sullivan Turbinair Tuggers.
3. Fifteen Mine Cars
4. Wheelbarrows, Picks, Shovels, etc., sufficient for a crew of 50 men.
5. Necessary Air and Water Lines.
6. One Ventilation Fan, together with 2,000 feet of 10" Ventilation pipe.

PUMPING EQUIPMENT - UNDERGROUND

1. One Rumsey High Pressure Triplex Pump, connected to a 35-HP motor.
2. One Rumsey High Pressure Triplex Pump, connected to a 10-HP motor.
3. Two 5-HP Sponge Pumps.
4. Three High Pressure Boiler Feed Pumps.
5. One Byron Jackson, 4 Stage Centrifugal Pump direct connected to a 150-HP motor.
6. 1,800 Feet of 7" Water Column, and 1,800 Feet of 4-1/4" Water Column.

ELECTRIC POWER AND LIGHTING SYSTEM

1. Twenty-Four Miles of 44,000 Volt Transmission Line.
2. Two Miles of 23,000 Volt Transmission Line.
3. Two Miles of 11,000 Volt Transmission Line.
4. Transformers:
   - 3 - 200 KVA, 23,000/440 Volt.
   - 3 - 25 KVA, 23,000/2,200 Volt.
   - 3 - 200 KVA, 11,000/440 Volt.
   - 3 - 100 KVA, 11,000/440 Volt.
   - 3 - 10 KVA, 2,200/220/110 Volt.
5. Miscellaneous Wiring and Power Service Lines for Mine and Camp Purposes.
6. Fenced Substations.

TRAMWAY EQUIPMENT

1. One Broderick and Bascom Aerial Tramway - 9,000 Feet long, in good operating condition. Capacity - 300 Tons per 24 Hours.
2. Two Tramway Terminals, equipped with ore storage bins with a capacity of 500 Tons. Both terminals housed.
3. Loading Station and Storage Bins at Tempest Mine.

RAILROAD EQUIPMENT

1. Eighteen Miles of Narrow Gauge Railroad, in fair condition.
2. Locomotive and 13 Railroad Cars.
3. Roundhouse and Storage Bins and Tanks.
4. Necessary Maintenance Tools and Equipment.

PUMPING PLANT (For Water Supply) - Two Miles Down Slope from Jackrabbit

1. One Triplex Pump, connected to 35-HP motor.
2. One Deep Well Pump, with 10-HP motor.
3. Three Storage Tanks with total capacity of 35,000 gallons.
4. Two Miles of 3" Pipe Line.

POWER PLANT

1. Power Plant Building - 150' x 30'
2. One 360-HP Fairbanks-Morse Diesel Engine, direct connected to a 300-KVA Generator, together with panels and accessory equipment.

BRISTOL SILVER MINES COMPANY

Bristol Silver, Nevada

ORE PRODUCTION AND HISTORY

Different types of ore in the Bristol Mines have been attributed to mineralization by certain types of fissures carrying characteristic mineralizing solutions. Four types of fissuring occur throughout the mine and are known as the May Day, the Tempest, the Gypsy and the Lead-Zinc fissures. The May Day type has a N 65° E to E-W strike and a dip of 35° to 55° South. The Tempest type is more nearly E-W in strike with a dip of 70° South. The Gypsy type has a strike of N 7° E to N 15° E with a dip of 65° to 80° East. The Lead-Zinc type has a N 20° W strike with a dip of 75° to 80° West.

Due to mineral migration and the fact that orebodies occur on intersections between fissures of various types, ore shipments vary over a wide range in ratio between silver, lead, copper and zinc. The average metal content in any one orebody will thus be different from any other orebody, but will usually come fairly close to falling into one of the following classifications:

Class	Au	Ag	Pb	Cu	Zn	Fe	CaO	Mn	Insol
1. Secondary Copper	.01	5.0	0.1	17.5	--	12.5	10.8	1.0	15.6
2. Iron-Copper	.025	17.0	1.0	3.5	1.5	28.0	8.0	2.0	7.0
3. Lead-Zinc	.015	10.1	8.5	0.1	10.3	1.5	30.5	2.5	6.8
4. Lead	.015	12.5	8.6	1.8	6.2	8.5	22.0	2.0	8.0

Since the ore occurs irregularly in limestone, the grade is largely dependent upon how clean the ore is mined, as well as upon the amount of waste sorted from the ore. The amount of care taken in keeping the ore clean is, of course, a point in economics dependent on various factors, such as the size and nature of the orebody and the mining costs, freight rates and smelter contracts. The high iron, manganese and lime contents in the classes of ore given above make these ores a desirable material for the smelters and result in an unusually low treatment charge.

There are practically no production records available for operations prior to 1906; however, it is reported that from 1878 to 1906 the district's gross production was in excess of $3,000,000. Of that amount, the Hillside Mine is credited with $2,000,000. The May Day, the Tempest, the Gypsy, the National, the Vesuvius, and the Great Eastern mines are credited with $1,000,000. These mines are all situated along the strike and on the May Day or Tempest fissure systems.

The production from the Hillside Mine served as the principal ore supply for the Bristol Wells Smelter, which operated during the late '70s and early '80s. The smelter ceased operations due to poor metallurgy resulting from a small amount of sulphur contained in the Hillside ore, which caused a considerable amount of the copper and the silver to be lost in the slag, resulting in poor recoveries.

A pan-amalgamation mill was then built at the Roeder Mill Site and approximately 30,000 tons of ore was produced at the Hillside Mine for testing and treatment at the mill; however, only about 10,000 tons of this ore was treated and mill operations were discontinued, leaving approximately 20,000 tons of Hillside ore at the mill site. This ore, together with tailings from mill operations, was shipped in later years to the Salt Lake smelters and, while records are not available, it is reported these shipments brought handsome returns. Some slag from the Bristol Wells Smelter was also shipped to the Salt Lake Valley smelters and it too returned good profits to the shippers. In more recent years, several small operators have been working around the surface of the old mill site and a number of flasks of quicksilver have been recovered.

Since the early days, mining at the Hillside has been desultory and only a small amount of development work has been done.

From 1906 to December, 1919, there was produced in the district, according to smelter settlement records, 33,475 tons of ore having a net mine value of $375,902.82, or an average value of $11.22 per ton. The 33,475 tons was produced from the following mines:

Mine	Dry Tons	Net Mine Value
May Day Group	28,489	$317,371.27
Home Run	697	6,926.46
Iron Mine	212	2,837.25
Tempest	2,121	31,093.84
Day Mine Lease	726	2,607.34
Hillside	772	9,995.75
Vesuvius	458	5,070.91
Total	33,475	$375,902.82

In December, 1919, various properties were purchased by W. F. Snyder & Sons Company and incorporated as "Bristol Silver Mines Company" under the laws of the State of Nevada.

From December, 1919, to May, 1923, Bristol Silver Mines Company produced 37,330 tons of ore having a net mine value of $376,303.04, or a net mine value per ton of $10.08.

From 1924 to and including 1940, the Company and its lessees produced and shipped 308,067 dry tons of ore having a total net mine value of $2,370,227.63, or a net mine value of $7.69 per ton.

The following tabulation represents the estimated production of the properties now owned by Bristol Silver Mines Company from 1878 to 1906, and accurate figures for the period 1906 to 1940, inclusive. (This does not include the production from the Black Metal Mines, Inc.)

Period	Tonnage	Gross Value	Net Mine Value
1878 to 1905		$3,000,000.00	$2,107,783.00
1906 to 1919	33,475	535,020.99	375,902.82
1920 to 1923	37,330	535,590.59	376,303.04
1924 to 1940	308,067	3,363,923.01	2,370,227.63
Total		$7,434,534.59	$5,230,216.49

Since the organization of the Bristol Silver Mines Company (December, 1919), the holdings of the Company have been increased by 17 patented mining claims and 41 unpatented claims.

On June 5, 1930, the Company purchased the Jackrabbit-Pioche narrow gauge railroad from the Pioche Pacific Railroad Company and thereby gained complete ownership and control of all transportation facilities from Bristol to the Union Pacific Railroad at Pioche. Prior to this purchase, the Mine had been paying a freight charge on the narrow gauge railroad at the rate of $1.15 per wet ton during the Summer months and $1.40 per wet ton during the Winter months. The following tabulation shows the savings effected in the first seven months of operation of the railroad by the Company:

1930	Based on Old Rate Including Backhaul Charge		Actual Cost		Savings Effected	
	Total	Per Ton	Total	Per Ton	Total	Per Ton
June	$ 5,337.15	$1.20	$ 2,324.76	$0.55	$ 3,012.40	$0.73
July	6,867.51	1.21	2,025.98	.35	4,843.53	.85
August	5,071.81	1.22	2,215.08	.35	2,856.73	.71
September	3,747.40	1.22	2,343.52	.76	1,403.88	.46
October	4,829.58	1.58	1,696.72	.56	3,132.86	1.02
November	3,842.67	1.46	1,635.63	.51	2,207.04	.95
December	5,363.61	1.51	1,316.71	.37	4,046.90	1.14
Total	$35,060.75		$13,558.40		$21,503.34	

The total purchase price of the narrow gauge railroad, including extra rails, small equipment, etc. was $35,000.00. The soundness of this investment is readily reflected in the above tabulation. Costs comparable with those shown above are still maintained by the Company.

Prior to 1926, the Bristol Mine was operated with gasoline engines. In 1926, the Company installed two 240-HP Fairbanks-Morse Diesel Engines, direct connected to two 2300-volt generators. Thereafter, operations were carried on with electric energy. In 1929, the Company added one 360-HP Fairbanks-Morse Diesel Engine and one 440-HP Ingersoll-Rand Diesel Engine, giving the plant a total rated capacity of 1,280 horsepower.

The Diesel plant operated from 1926 to September 1, 1937, at which time the Bristol transmission system was connected to the Prince Substation of Lincoln County Power District No. 1, the north terminus of the Boulder Dam-Pioche Power Line. (It is interesting to note that Bristol Silver Mines Company and Combined Metals Reduction Company were the two prime movers in bringing Boulder Dam power to the Pioche and Bristol mining districts.)

Since discontinuing operations at the Diesel plant, the Company has sold the two 240-HP Fairbanks-Morse engines and the 440-HP Ingersoll-Rand Engine, together with accessory equipment necessary for the operation of each. The one 360-HP Fairbanks-Morse Diesel Engine, with generator and other equipment, is installed at the Jackrabbit power plant of the Company. With Boulder Dam power available, there is no need for this Diesel equipment, and the remaining unit is offered for sale.

The following example reflects clearly the advantages of Boulder Dam power over that generated by Diesel engines at the Jackrabbit Power Plant: On a monthly basis of 3,000 tons production while carrying 250 feet of development, power consumption is estimated at 125,000 KWH per month. The cost of power while the Company operated its Diesel plant was 3 cents per KWH, whereas the present cost, using Boulder Dam power, is less than one cent per KWH. On the above basis of operations, this would reflect a saving of $2,500.00 per month, or approximately 83 cents per ton in favor of Boulder Dam power.

From the above, it can readily be seen that substantial benefits have accrued to the Bristol Mine operation by virtue of the use of Boulder Dam power and the acquisition of the narrow gauge railroad. These two items, during a normal production period, reflect a reduction of approximately $1.60 per ton in operating costs.

BRISTOL SILVER MINES COMPANY

STATEMENT OF ORE PRODUCTION
YEARS, 1924 to DEC. 31, 1940

Average Settlement Assay

	Copper	Lead	Zinc	Silver	Gold	Insol	Iron	Sulphur	Lime	Mn
1924	1.05	10.87	14.81	13.34	.013	11.99	4.37		20.82	1.64
1925	2.23	8.38	8.39	14.92	.018	8.43	19.83	.71	12.67	2.39
1926	3.59	6.37	7.64	14.22	.023	10.19	11.32	.71	18.37	2.74
1927	3.05	5.17	5.89	11.18	.016	9.85	9.33	.7	22.37	2.59
1928	3.01	6.07	6.57	12.01	.013	10.97	10.51	.7	17.56	2.79
1929	2.70	4.14	4.83	8.66	.013	9.35	10.58	.52	21.43	2.57
1930	2.78	3.80	4.66	8.87	.013	10.36	12.33	.5	19.80	2.48
(1931 (5 Mo.	3.01	3.53	3.67	11.26	.013	9.60	13.68	.4	19.33	1.93
1932	No Mining Operations During 1932.									
(1933 (4 Mo.	5.16	6.89	6.03	12.68	.015	12.06	9.53	.45	11.82	2.69
1934	1.90	7.40	7.40	13.60	.014	9.40	11.30	.4	17.00	2.10
1935	1.20	6.10	7.00	11.00	.012	10.80	12.20	.7	17.70	2.10
1936	1.50	4.90	5.30	8.20	.011	8.40	9.10	.7	25.50	2.10
1937	2.50	3.10	3.80	6.90	.010	10.10	12.20	.5	21.50	1.90
1938	2.40	1.90	2.40	8.90	.009	9.40	22.70	.7	12.90	2.20
1939	2.81	1.73	1.91	8.64	.012	7.62	22.68	.51	16.47	2.30
1940	3.47	2.26	2.37	12.42	.012	8.60	23.61	.58	12.94	1.97

	Dry Tons Shipped	Smelter Metal Value	Treat-ment Charge	Smelter Value Per Ton	Gross Returns	Freight and Assaying	Net Smelter Returns
1924	1,034.64	$16.65	$2.46	$14.19	$ 14,680.03	$ 6,916.67*	$ 7,763.36*
1925	2,823.49	21.20	2.02	19.18	54,159.39	24,262.16*	29,897.23*
1926	9,895.71	16.76	1.36	15.40	152,450.84	59,931.66*	92,519.18*
1927	25,893.39	15.95	3.97	11.98	310,256.01	108,912.81*	201,343.20*
1928	41,303.62	18.00	4.37	13.63	562,849.10	186,279.30*	376,569.80*
1929	58,300.56	15.21	3.34	11.87	692,091.47	214,462.07*	477,629.40*
1930	41,276.18	10.00	1.67	8.33	343,700.27	107,631.79*	236,068.48*
(1931 (5 Mo.	14,471.28	7.60	.66	6.94	100,506.81	29,586.92	70,919.89
1932	No Mining Operations During 1932.						
(1933 (4 Mo.	3,413.83	12.33	3.00	9.33	31,868.11	7,159.72	24,708.39
1934	12,678.73	13.44	2.44	11.00	139,466.72	28,969.10	110,497.62
1935	14,604.60	12.24	2.24	10.00	146,047.71	31,615.98	114,431.73
1936	16,945.90	11.46	1.75	9.71	164,542.27	35,305.89	129,236.38
1937	16,652.39	12.68	1.92	10.76	179,226.12	36,082.75	143,143.37
1938	24,628.83	9.53	1.07	8.46	208,315.98	55,787.90	152,528.08
1939	13,729.25	10.30	1.15	9.15	127,622.18	32,939.03	94,683.15
1940	10,414.38	14.95	1.88	13.07	136,140.00	27,851.63	108,288.37

*Include freight paid the Pioche Pacific Railroad. In June, 1930, the railroad was purchased by the Bristol Silver Mines Company and freight was absorbed in Bristol Mine operations.

DEVELOPMENT WORK PERFORMED

The development work performed in the various mines of the Bristol Group from 1878 to 1919 is estimated in the following tabulation:

Mine	Drifting	Shaft Sinking
Hillside	1,500'	450'
Tempest	400'	300'
Red Cloud	100'	150'
McFadden	150'	50'
Vesuvius	275'	50'
Gypsy	1,600'	700'
May Day	750'	500'
National	100'	65'
Home Run	250'	250'
Iron Mine	600'	200'
Detroit	200'	250'
Inman	50'	

Shortly after Bristol Silver Mines Company was organized, an extensive development program was carefully planned. From 1919 to 1924, the Snyder Incline Shaft was sunk to the 1100 Level; also, during this period, approximately 900 feet of drifting was done.

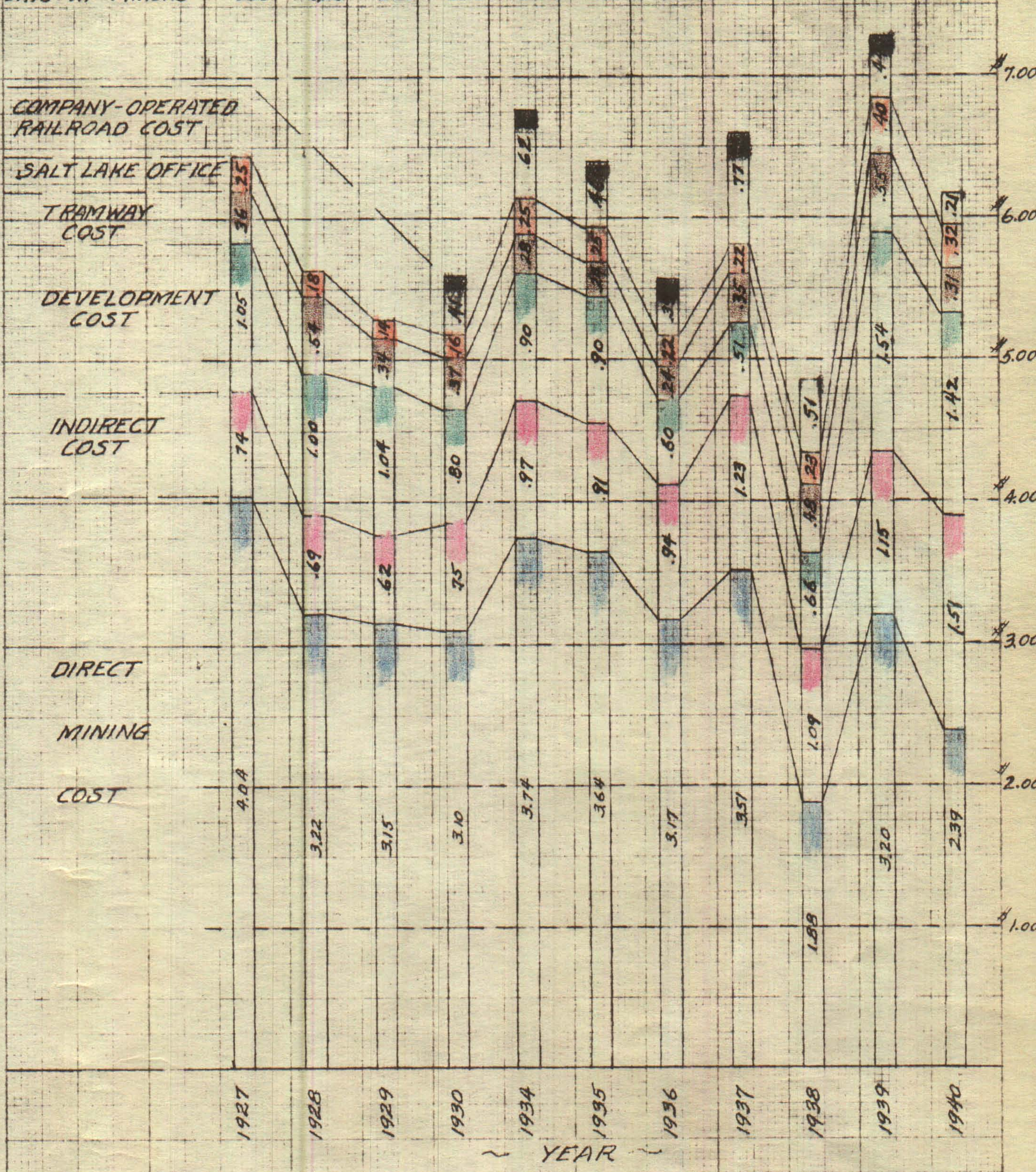
The following tabulation is a summary of development work performed by years from 1925 to December 31, 1940:

	Sinking Snyder Shaft Feet	Drifting Feet	Raising Feet	Winze Sinking Feet	Ore Pockets and Station Cutting Cu. Ft.
1925		162	30	15	
1926	94	2,633	172	20	
1927	131	3,765	689	130	5,000
1928		5,577	620	94	10,000
1929	399	5,294	725	267	7,000
1930		4,410	453	92	3,000
1931 to May		845	200	27	
1932		No Operation			
1933 From August		196	64	75	1,000
1934		474	79	246	5,000
1935		915	85	95	
1936		1,053	276	38	3,000
1937		1,306	590	47	
1938		1,314	548	179	4,000
1939		2,039	425	224	15,426
1940		2,035	316		
Totals	624	32,028	5,272	1,549	53,246

BRISTOL SILVER MINES COMPANY

BRISTOL SILVER, NEV.

	1927	1928	1929	1930	1934	1935	1936	1937	1938	1939	1940
DEVELOPMENT - FEET	4,715	6,291	6,685	4,955	799	1,095	1,367	1,943	2,041	2,688	2,351
PRODUCTION - DRY TONS	25,893	41,304	58,301	41,276	12,679	14,605	16,946	16,652	20,386	13,729	10,414
DAY'S PAY - MINERS	5.25	5.25	5.50	5.00	3.75	3.75	4.25	4.87	5.00	5.00	5.10



GRAPH SHOWING BREAK-DOWN OF COST PER TON OF ORE PRODUCED DURING FULL-YEAR OPERATING PERIODS SINCE 1927, TOGETHER WITH DEVELOPMENT FOOTAGE, TONNAGE PRODUCED AND AVERAGE DAILY PAY FOR MINERS DURING THE SAME YEARS.

Note:- Account classifications were not identical during the above years as shown on balance sheets, therefore, adjustments have been made to show comparable costs.

GEOLOGY

The report made in November, 1931, by Paul Murphy, and made a part of this report by reference, contains a comprehensive discussion of the geology. We concur in Mr. Murphy's descriptions, in a general way, but a considerable amount of information has been accumulated since the date of his report. In order to bring Mr. Murphy's descriptions to date, the geology will be discussed under the same headings used by him.

STRATIGRAPHY

In 1935, a horizon on the 1200 Level of the Bristol Mine was tentatively identified as the "Platy Dolomite" bed of the Pioche Geologic Column. Further detailed study proved, beyond reasonable doubt, that this formation had been properly correlated. Later, Dr. Harry E. Wheeler, of the Department of Geology, Mackay School of Mines, spent considerable time in the district, working on the stratigraphy, and he has completed a detailed columnar section for the Cambrian Series. His printed reports are available in the following University of Nevada Bulletins:

Geology and Mining Series 31 -
"Cambrian Formations of the Eureka and Pioche Districts, Nevada"

Geology and Mining Series 34 -
"Revisions in the Cambrian Stratigraphy of the Pioche District, Nevada"

The accompanying columnar section shows the various members as identified at the Bristol Mine, with local formation names and corresponding names given by the U.S.G.S. and by Dr. Wheeler.

The chert beds mentioned by Mr. Murphy are identified as "Member J" of Dr. Wheeler's section.

Reference is also made to "Geology and Ore Deposits of the Pioche District, Nevada," U.S.G.S. Professional Paper 171. This paper contains a discussion of economic geology on the Bristol Mine by Dr. Adolph Knopf.

In regard to the elevation at Bristol of various beds known to be particularly amenable to ore deposition in the Pioche District, the 1700 Level workings penetrate various faulted blocks, ranging from the middle of Newport ("E") to the bottom of what is now thought to be Prince Limestone (Lyndon), or a range of more than 1,200 feet in the geologic column. The amenability to replacement of the latter formation at Bristol is evidenced by the large pyritic replacement in this formation on the 1700 Level.

STRUCTURE

Mr. Murphy has adequately covered the structural features in regard to faulting. Changes in formation and flat-dipping bedding-faults are likewise responsible for local structure of great importance in ore deposition.

ORE GEOLOGY, MINERALIZATION, AND PROSPECTS IN BRISTOL DISTRICT

Under the above headings, Mr. Murphy discusses general features of the district that will not be elaborated upon in this report.

STRUCTURE AND ORE SHOOTS AT BRISTOL MINE

A knowledge acquired in recent years of the geologic column, together with development performed since Mr. Murphy's report, have thrown new light on the mode of ore deposition in the Bristol Mine.

Since identifying the different members of the geologic column in the Bristol Mine, it is now apparent that Bristol Limestone ("G") has been much more productive than other horizons above it. To the west of the Snyder Shaft, the 1200 Level is mostly in Platy Dolomite, with the large stopes bottoming in Bristol Limestone above the level. (See revised Murphy section, Plate 7.) Between 600 and 1,100 feet east of the Snyder Shaft, a large stoping area occurs immediately over the Platy Dolomite contact below the 1200 Level. (See revised Murphy section, Plate 6.)

Turning to formations below Platy Dolomite, we now have three stoping areas from which practically our entire production is coming, all of which are below the Platy Dolomite bed.

Porphyry dikes increase in number and size on the 1700 Level, as compared to the 1500 Level, but this is only true of the west side of the mine, since no porphyries have been encountered on any level east of the Snyder Shaft. Mr. Murphy suggests that the increase in size and number of these dikes means an approach to some large porphyry mass accompanied by silicification of the limestone with consequent poor chances for ore deposition in lower formations. It is recognized that some such condition may occur to the west and below the 1700 Level; nevertheless, any desired distance from such a mass could be obtained in any desired bedding by moving laterally in the bed.

The writers do not subscribe to the theory that the Bristol Mine shows any evidence of being bottomed, either for lack of favorable structural conditions, bedding horizons, or proximity of large intrusive masses. Rather, we feel that ultimate development of the lower formations will yield large returns.

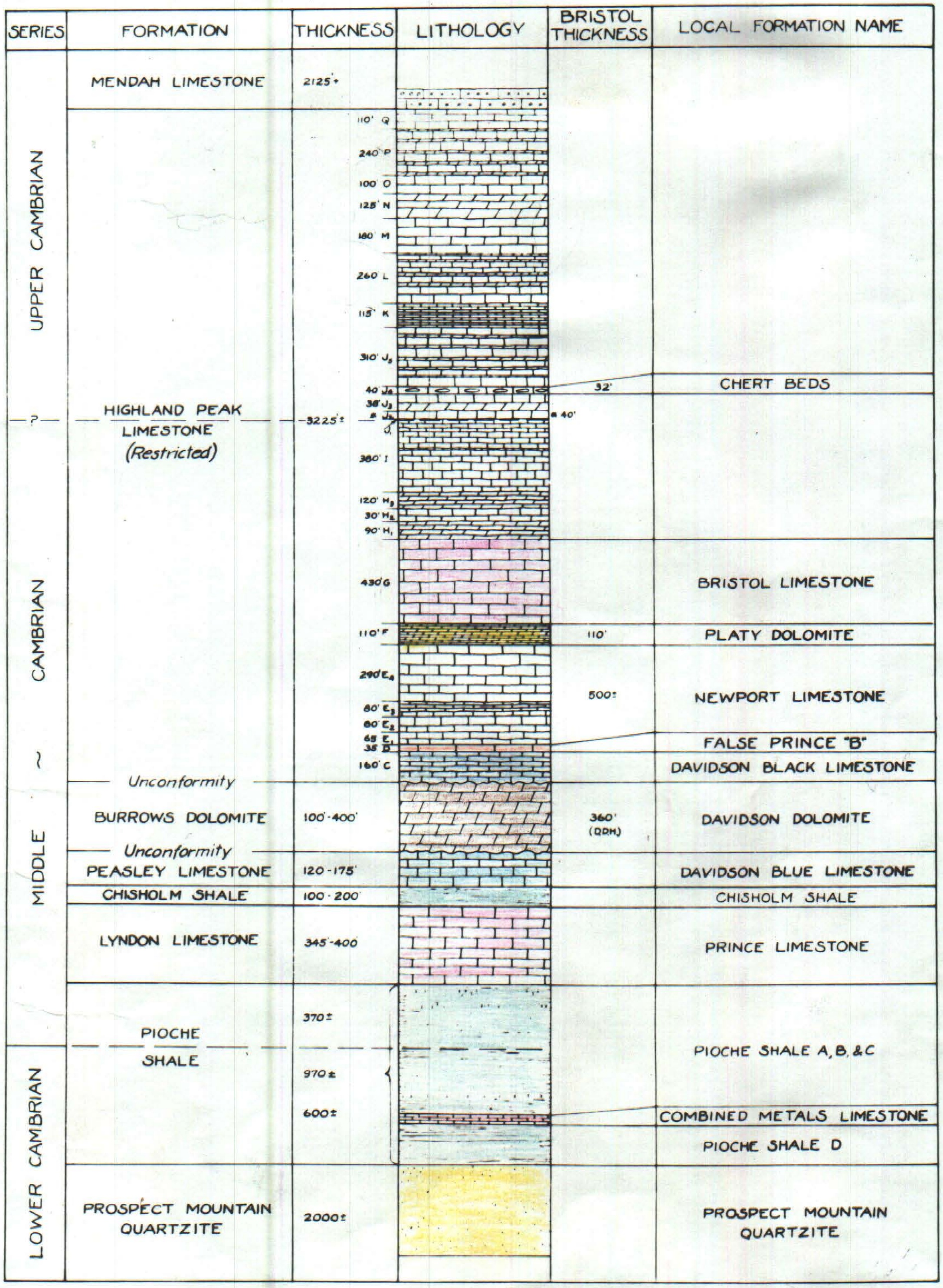
For the immediate future, lateral development is recommended, due to the fact that water has been encountered below the 1700 Level.

BRISTOL SILVER MINES COMPANY

BRISTOL SILVER, NEVADA
DECEMBER 1940

CAMBRIAN COLUMNAR SECTION OF THE PIOCHE DISTRICT

SHOWING LOCAL FORMATION NAMES AND MEASURED THICKNESS OF CERTAIN MEMBERS IN THE BRISTOL MINE



References:
Bristol maps
University of Nevada Bulletins,
Geology and Mining Series No. 31
" " " " No. 34

BRISTOL SILVER MINES COMPANY

Bristol Silver, Nevada

ORE RESERVES

There is no way to accurately forecast ore reserves in the Bristol Mine. The nature of ore occurrence makes it impossible to measure reserves. Although 307,158 tons of ore have been mined and shipped during the past 15 operating years, with an average daily production of 60 tons, production forecasts are seldom made more than 30 days in advance. The Company's most experienced engineers rely strictly upon the general appearance of ore faces at the time, when making production forecasts.

Considering the mine's many years of continued operation and its past production record; also, the small amount of development work performed in comparison with the mineralized area, and with only a few of the major objectives reached, it is certainly consistent to believe that the mine has a good future, and that a substantial production can be sustained for many years.

The ore in the Bristol Mine occurs in fissures, on junctions of fissures, fracture zone intersections and in beddings. Orebodies are irregular in size and shape, therefore, the amount of ore that each stope will produce cannot easily be estimated.

The May Day, the Dave Fox, the Bonanza, the Bingham Canyon, the Perry, the Cave, the Lloyd, the Johnson, the Shrinkage, the North, the 1050, the 1100, the 1200 West and the Domenici stopes are all contiguous and extend from the surface to the 1500 Level of the Bristol Mine--a slope distance of over 2,000 feet. The Copper Stope extends from the 675 Level to the 1250 Level. It is now believed that the downward extension of this stope has been found in the east end of the Domenici Stope a short distance above the 1400 Level. The 1200 East Stope extends from the 650 Level to the 1300 Level. The 1700 East Stope, recently encountered, is directly under the 1200 East Stope, and the two stopes will, no doubt, connect.

Very little timber has been used in mining these orebodies, although most of the stopes are large--some having been opened up to a size of 75 by 100 by 150 feet.

The mine is at present producing 40 to 50 tons of ore per day. To substantially increase production will depend mainly upon the amount of development work performed, and the speed with which it is done.

During the years 1927, 1928, 1929 and 1930, the mine shipped in excess of 100 tons of ore per day, and during that period not less than four development headings were being advanced. Favorable response to the development work performed was responsible for the consistent production during this four year period.

Due to the low metal prices, following 1930, very little development work was done in the mine until 1937. During the period between 1930 and 1937, production gradually dropped off to less than 25 tons per day. Since 1937, development work has been confined principally to the 1700 Level, where two orebodies have been exposed--one 250 feet southwesterly and the other 700 feet east of the Snyder Shaft. Neither of these orebodies has been fully developed. It is believed that the 1700 East Stope will connect with the 1200 East Stope. The unexplored distance between the two stopes is approximately 300 feet. The unexplored area above the 1700 West Stope extends to the Domenici Stope--a short distance above the 1400 Level.

In order to increase and eventually maintain a production consistent with the capacity of mine equipment and maximum operating efficiency, it is recommended that more development headings be advanced to explore the intersections and objectives referred to under that part of this report headed "Development Recommendations."

BRISTOL SILVER MINES COMPANY

Bristol Silver, Nevada

DEVELOPMENT RECOMMENDATIONS

Future development of the Bristol Mine involves two problems: first, to continue exploiting productive horizons above the water level, and; second, to explore the very attractive possibilities in formations below the water level. The various aspects of these two development problems will be discussed separately.

DEVELOPMENT ABOVE WATER LEVEL

Experience has shown that a program of continuous development must be conducted to insure steady ore production. On the basis of past experience, over 3,000 feet of development should be performed each year, in order to maintain a production consistent with the crew and overhead necessary to operate the mine, the tramway and the railroad efficiently. Due to lack of adequate finances, the Company has been unable to perform sufficient development to insure a substantial production since 1931. Rather, it has had to rely on the chance that an orebody of sufficient size and grade would be found, while doing relatively little development, to start the mine off on a paying basis. Unfortunately, the new ore found did not produce such results, and each stoping area would become almost exhausted before another could be located; however, it can be shown, that if the same development had been done with sufficient speed, or, in other words, if sufficient headings had been carried toward the same objectives, a profit would have been realized from the ore shipped, by virtue of being able to maintain an adequate rate of production and consequent efficiency.

Innumerable good objectives could be outlined for performing development in the Bristol workings. We have listed a few drives under "Outline of Important Development Recommendations" that we believe stand good chances of finding new orebodies. Likewise, we feel that all of the recommendations, outlined by Mr. Paul Murphy in his report, are well considered.

DEVELOPMENT BELOW WATER LEVEL

After the 1700 West orebody was encountered, and it was found that ore continues below the water level, an attempt was made to develop the downward continuation of the orebody. This attempt was abandoned, after an expenditure of about $35,000.00, when it was seen that the quantity of water to be handled (over 1,200 gallons per minute) was too great to pump continuously from below the 1700 Level to the surface. It was, therefore, decided that future development below the water level should not be attempted until after completion of a tunnel drive to decrease the pumping head.

On the basis of our experience, it is estimated that pumping costs would be about $9,000.00 per month, or over $100,000.00 per year, while performing development and pumping to the surface through the Snyder Shaft.

The large flow of water would, no doubt, greatly decrease after extended pumping and drainage of open water courses and cavities in the limestone, but, on the other hand, an increase in flow would be expected while sinking.

Detail estimates have been prepared on the cost of tunnel drives at various elevations from the West Slope of the Bristol Range, and two proposals from the Black Metal side. A summary of these estimates is as follows:

Depth in Bristol Mine	Distance of Drive	Estimated Cost
West Valley Side		
1200 Level	6,750 Feet	$109,552.00
1500 Level	11,400 Feet	195,396.00
1700 Level	14,000 Feet	252,582.00
Black Metal Incline Shaft		
1200 Level	5,435 Feet	111,465.00
Black Metal Surface		
1200 Level	8,235 Feet	153,465.00

Justification for performing any one of the above tunnel drives is, of course, primarily a matter of justifying further development below the water level in the Bristol Mine. With this in mind, a diamond drilling program was started in April, 1940. A number of short holes were drilled on the 1700 Level for exploration above the water level. Two holes were drilled below the water level, and a description of each follows:

Hole No. 6 was collared at the water level in the extreme west end of the 1700 West Stope. This location was chosen, due to the fact that ore occurrence in this area was mixed with considerable limestone and it was felt that the limestone might keep the hole from caving, whereas, if the hole were to be drilled in the soft, clay-like ore in the main part of the stope, it would be impossible to core and extremely difficult to drill, until primary ore should be reached. The hole encountered some average grade ore and considerable scattered mineralization down to 77 feet in depth. Thereafter, highly shattered limestone and silicification adjacent to porphyry dikes caused so much trouble in drilling that the hole was discontinued at a depth of 227 feet.

Hole No. 7, shown on Plate 6 of Paul Murphy's maps, encountered ore between 66 and 76 feet in depth. This ore assayed as follows:

Depth		Au	Ag	Pb	Zn	Cu
66' - 69-1/2'	(Core sample)	.01	68.6	18.5	31.6	0.8
69-1/2 - 71'	Limestone, slightly mineralized	-	-	-	-	-
71' - 76'	Broken Sludge Sample		5.9	18.7	4.8	0.7

It was intended that this hole should continue to considerable depth to prospect the lower formations, but drilling became very slow and difficult after reaching a depth of 600 feet, where broken and silicified limestone was encountered. Drilling was finally discontinued at a depth of 825 feet in silicified limestone and pyrite.

The following reasons are set forth, to substantiate our belief that development below the water level in the Bristol Mine should be undertaken:

(1) Mineralization occurs just above the water in two recently discovered stope areas of the same character and grade as was mined in the early days from the top of the Bristol Mountain, over 2,500 feet, on the dip, above the water level. This is offered as evidence that the mine shows no indication of "bottoming." In regard to increase in number of porphyry dikes, silicification, etc. found in the west side of the 1700 Level, refer to "Structure and Ore Shoots at the Bristol Mine" under the heading of "Geology" above.

(2) The flat contacts between shale and limestone known to exist in formations below the water level are excellent structural features for ore deposition. This is evidenced in the Bristol Mine by the fact that large orebodies have made immediately above Platy Dolomite (a sandy dolomite) in Bristol Limestone. The Longitudinal Projection (Plate 6 of Murphy's Report) shows this relationship in the 1200 East Stopes. The relationship is not well shown just west of the Snyder Shaft, because stopes are projected and considerable faulting occurs in this portion of the mine that is difficult to show on generalized sections.

(3) The Pioche District has had a large production from formations that are below the 1700 Level of the Bristol Mine. The early-day production came from fissures in Prospect Mountain Quartzite. Since that time, the Prince, the Virginia-Louise, and the Combined Metals mines have had a large production from limestone beds above the quartzite. The latter mines are far from being exhausted and, in fact, are believed to have their most productive period ahead of them.

The following tabulation shows the total recoverable value of production from the principal mines of the district, and the formation in which the ore occurred:

Mines	Type of Ore Deposit	Formation	Production
Raymond-Ely and other properties in Pioche	Fissure-veins of silver-lead oxidized ores	Prospect Mountain Quartzite	$28,000,000
Delamar	Fissure-veins and irregular bodies of gold ore	Prospect Mountain Quartzite	$20,000,000
Combined Metals Mines	Bedding replacements of lead-zinc-silver sulphide ores	Combined Metals Limestone	$13,000,000
Prince and Virginia-Louise	Bedded replacements of lead-silver-manganese-iron oxide ore	Davidson Blue, Prince, and Limestone beds in upper Pioche shale	$ 8,000,000

+ + + + +

What is believed to be the Prince Limestone has been found in the footwall of the 1700 West workings. The amenability of this limestone bed to replacement in the Bristol Mine is shown by the fact that a very large bedded replacement of pyrite and quartz was found upon entering this formation.

We believe that the best chance for making the Bristol Mine a really important producer lies in the development of ore channels in the lower formations.

SUMMARY OF DEVELOPMENT RECOMMENDATIONS

In the following tabulation, development recommendations are shown in order of importance, as taken from "Outline of Important Development Recommendations," which is a supplement to this report. An average advance of 4 feet per round is used.

Drive No.	Objective	Length of Drift	Cost Per Foot Including Preparatory Work	Total Cost	Time In Shifts to Complete
Bristol Mine Proper					
9	1500 Level South Work	1,000'	$ 9.08	$ 9,080.00	260
10	1700 Level South Work	1,000'	9.08	9,080.00	260
7	1200 Level East Drive	2,000'	9.60	19,200.00	520
5	700 Level East Drive	900'	10.10	9,900.00	245
6	900 Level West Drive	950'	8.50	8,075.00	250
8	1200 Level West Drive	500'	9.50	4,750.00	135
Total Bristol Mine Proper		6,350'	$ 9.46	$60,085.00	1,670
Hillside Raise Sublevel					
2	East Drive on Hillside Fissure	325'	$ 8.30	$ 2,698.00	84
3	North Drive to McFadden Fissure	385'	8.30	3,195.00	97
1	South Drive on "Silica Dike"	80'	8.30	664.00	20
4	May Day Fissure in Foot-wall of No. 1 Fault	140'	8.30	1,162.00	35
Total Hillside Raise Sublevel		930'	$ 8.30	$ 7,719.00	236
TOTAL ALL DRIVES		7,280'	$ 9.31	$67,804.00	1,906

On the basis of our present operation, there is an average of 27 operating days per month, therefore, if three headings are driven simultaneously, the above drives can be completed in 24 months and 21 days, or about two years' time.

The monthly cost will be approximately $2,881.50.

In estimating the total development to be performed in the above two-year period, about 100 feet of work per month should be allowed for short drives necessary in stoping areas being worked. For example, this type of work is now being done on the 1400 Sublevel below the Domenici Stopes and off the 1200 East Winze to develop the upward continuation of the 1700 East orebody. This type of work is done at a cost of about $9.50 per foot.

From the above, it will be seen that the overall cost for development, during the two-year period in which the major drives outlined above are to be carried out, will be $3,831.50 per month, or $91,343.00 over the 2-year, 21-day period.

The total development per year during the above period will be about 4,700 feet. After the above work is completed, it is estimated that 3,000 feet of work per year should keep ore production above 36,000 tons per year, as stated elsewhere in the report.

BRISTOL SILVER MINES COMPANY

Bristol Silver, Nevada

BLACK METAL MINE

The Black Metal Mine is situated at the northeast end of the Bristol aerial tramway, a distance of two miles from the Bristol Mine, and at the terminus of the Bristol narrow gauge railroad at the foot of the East slope of the Bristol Range. The site is known as "Jackrabbit."

The mine was discovered in the early seventies and furnished a large tonnage of manganese-lime flux ore for the early-day smelters. It is reported that a substantial tonnage of high-grade silver ore was also shipped direct to Utah smelters.

ORE PRODUCTION

There are no production records available for periods prior to 1919, however, it is reported (and adequately confirmed by evidence of old stopes) that in excess of 200,000 tons of ore was mined from 1878 to 1919. Using estimated metal prices and treatment charges and the average assay taken from an old incomplete shipment record, the net mine value of the 200,000 tons of ore was in excess of $2,500,000.

Other reports are that several thousand tons of ore mined above the 300 Level assayed between 30 and 50 ounces of silver per ton. Ore extracted from below the 300 Level was of a lower grade.

From 1919 to 1924, the Black Metal Mine produced 23,690 tons of ore with a net mine value of $150,458.65. This ore assayed approximately as follows:

Au	Ag	Pb	Cu	Fe	Mn	CaO
.01 oz.	12.0 ozs.	0.6%	0.08%	3.5%	8.6%	36.0%

There are three bedding horizons, two above and one below the 300 Level, known as the "A", "B" and "C" beds, respectively. The 23,690 tons of ore referred to above was mined principally from "A" Bed, however, most of the Black Metal production came from fissure intersections, which formed the large chimney-like stopes shown on Black Metal Vertical Section A-A.

Fifty-four tons of ore mined from a concentrated bedded deposit in "A" Bed assayed as follows:

Au	Ag	Bi	Pb	Cu
.10 oz.	329.0 ozs.	2.1%	36.0%	6.5%

This shipment of 54 tons returned a net mine value of $17,500.00. It is interesting to note that settlement for this shipment was made on the basis of $1.37 per ounce for silver--the peak price ever paid for silver in this country. The bismuth content of the ore brought $10.00 per ton.

Geologic mapping by Paul Murphy shows that a flat fault cut the main ore shoot at the 900 Level. (See Plate 4 of Murphy's maps.) Mine workings extend to the 1200 Level, which is 1,000 feet below the surface, in line with the main ore shoot, but insufficient work has been done below the 900 Level to pick up the downward extensions of the large ore shoots in the footwall of the flat fault.

In the early days, several thousand tons of lead-silver ore was mined from the Onandago Mine near the collar of the Black Metal Incline Shaft. The average assay taken from 500 tons of ore shipped from the Onandago between 1919 and 1924 is as follows:

Au	Ag	Pb	Fe	CaO	Insol
.025 oz.	32.8 ozs.	21.7%	4.2%	24.0%	1.5%

MANGANESE PRODUCTION

From 1924 to March, 1927, the Black Metal Mine produced and shipped to the Columbia Steel Company 24,997 tons of manganese ore with a net mine value of $99,364.42, or $3.97 per ton. The average analysis of this ore is as follows:

Au	Ag	Mn	Zn	S	Insol
.01 oz.	3.5 ozs.	21.7%	.54%	.05%	1.5%

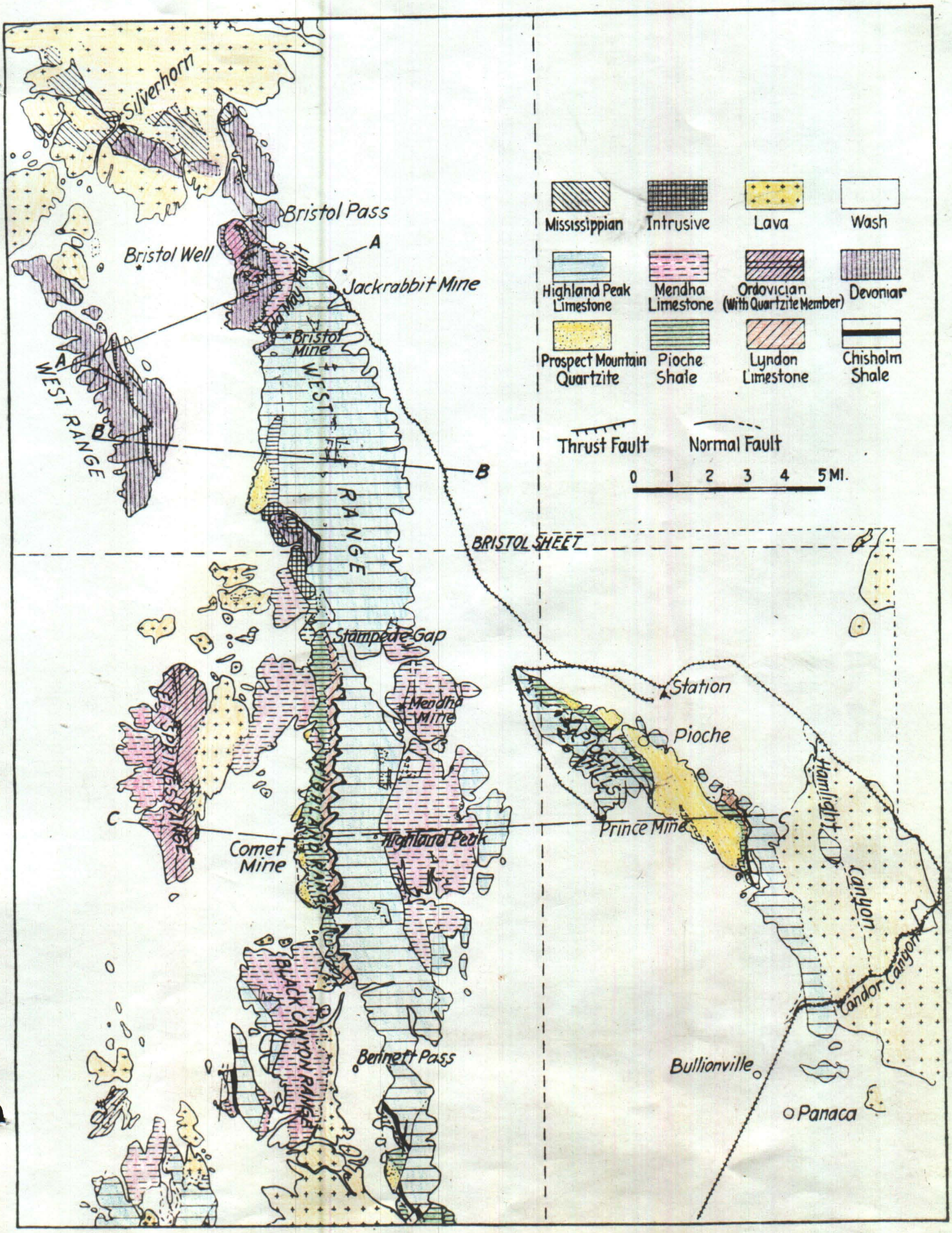
Although shipments were discontinued in March, 1927, the Company continued development until May of the same year and a large body of manganese ore was exposed. This ore will assay 20% (or better) manganese, and can be mined at a very low cost. The nature of this orebody is such that we believe another 25,000 tons or more can be mined.

No work has been done in the Black Metal Mine since May, 1927.

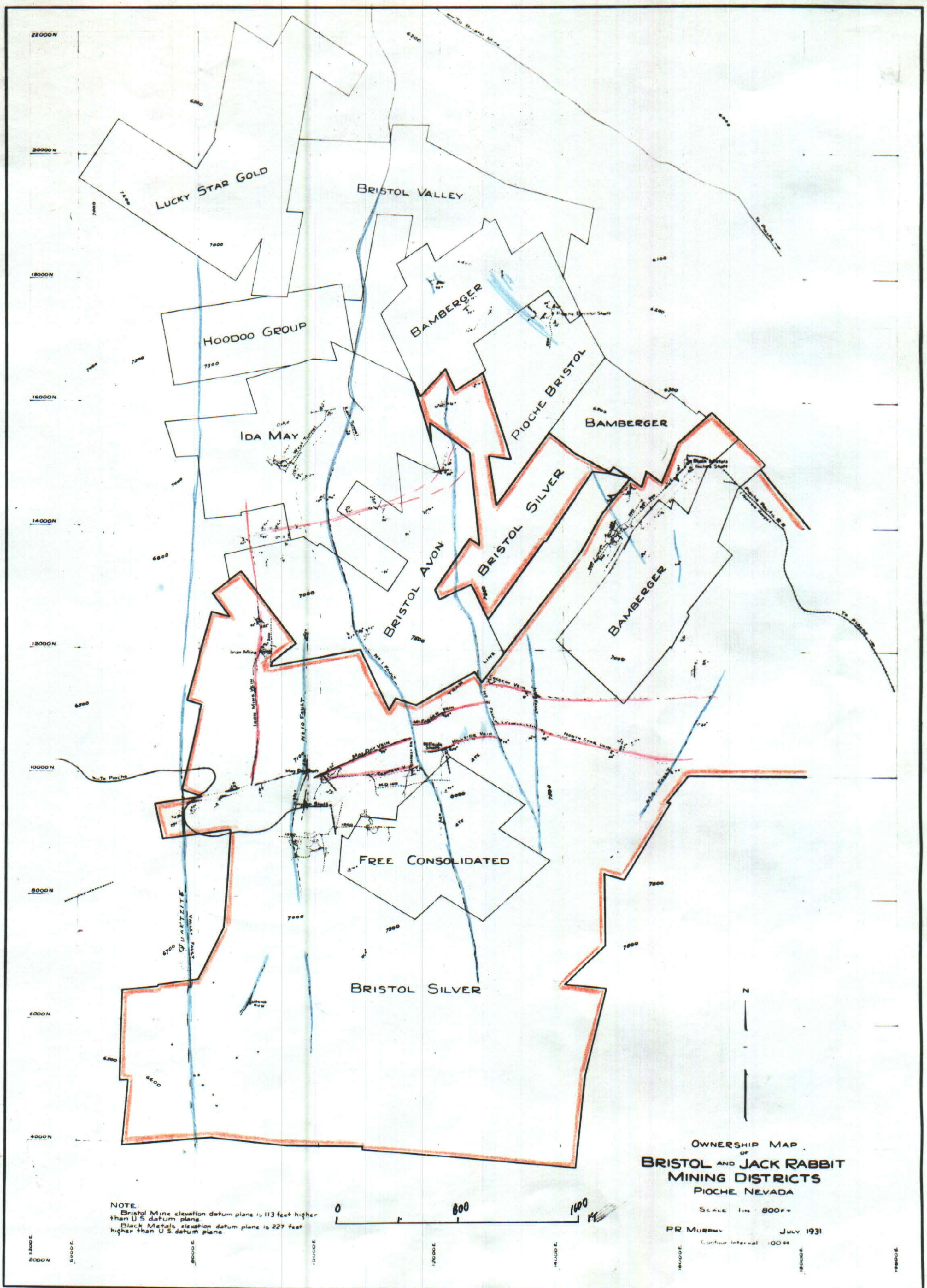
GEOLOGY

No attempt has been made, since working out detail of the geologic column for the Bristol-Jackrabbit district, to definitely locate the Black Metal Mine in its relation to known formations, however, Mr. Murphy shows the chert bed, which occurs above the Snyder (Bristol) Shaft, to be on the 100 Level of the Black Metal Mine. This indicates that the Black Metal Mine is in the same formation as the upper levels of the Bristol Mine.

The Onandago stopes are shown on Mr. Murphy's "Vertical Section Along Tram Line" as occurring on a strong thrust fault, which has not yet been encountered below the 900 Level of the Black Metal Mine. The flat fault should be an ideal structural feature for the formation of large orebodies, and should be explored in conjunction with fissure intersections.

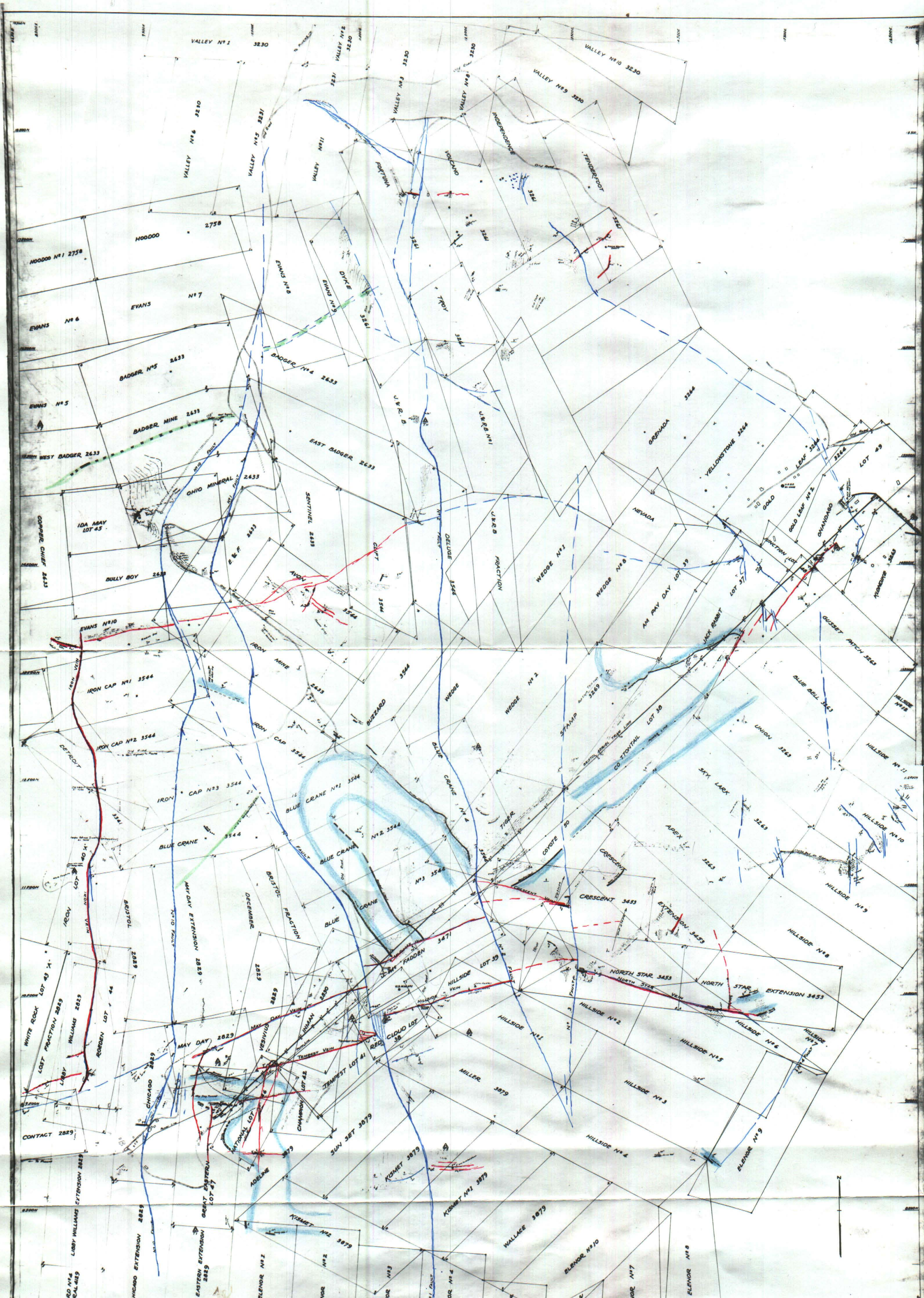


GEOLOGICAL MAP OF THE PIOCHE DISTRICT



Lucky Star Gold
Bristol Valley
Bamberger
Hoodoo Group
Pioche Bristol
Bamberger
Ida May
Bristol Silver
Bristol Avon
Bamberger
Iron Mine
Free Consolidated
Bristol Silver
Quartzite
To Pioche
To Pioche
Ownership Map
of
Bristol and Jack Rabbit
Mining Districts
Pioche Nevada
Scale 1in = 800ft
P.R. Murphy
July 1931
Contour interval 100 ft
Note:
Bristol Mine elevation datum plane is 113 feet higher than U.S. datum plane.
Black Metals elevation datum plane is 227 feet higher than U.S. datum plane.
0
800
1600

Plate 1



SURFACE MAP

BRISTOL & JACK RABBIT MINING DISTRICTS

LINCOLN COUNTY NEV.

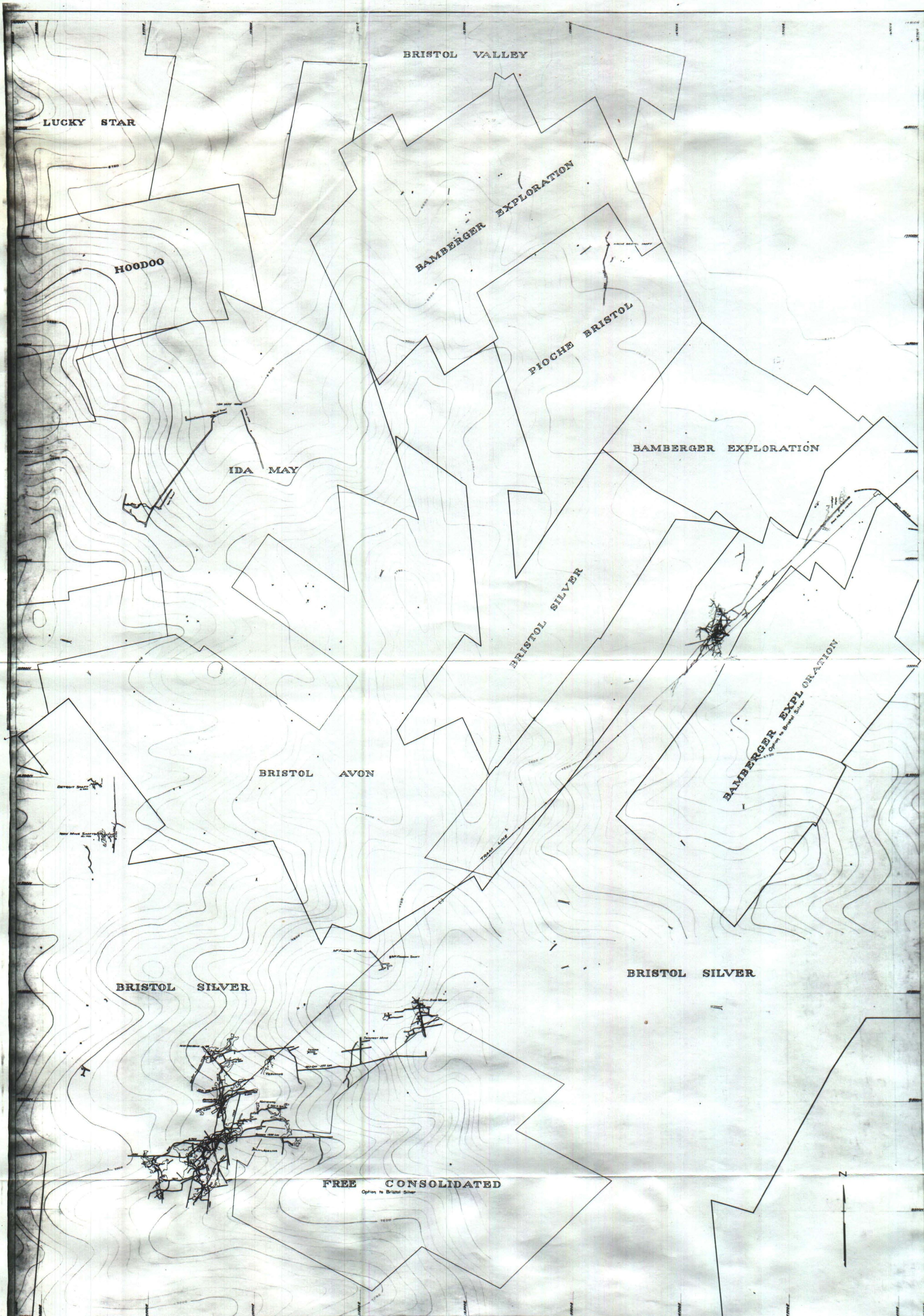
1" = 200'

To accompany report by Paul R. Murphy November 1931

0 200 400 FT.

NOT – scale is wrong!

PLATE 2



COMPOSITE MAP OF UNDERGROUND WORKINGS

BRISTOL & JACK RABBIT MINING DISTRICTS

LINCOLN COUNTY NEV.

1" = 200'

To accompany report by Paul R Murphy November 1931

0 200 400 Ft.

PLATE 3

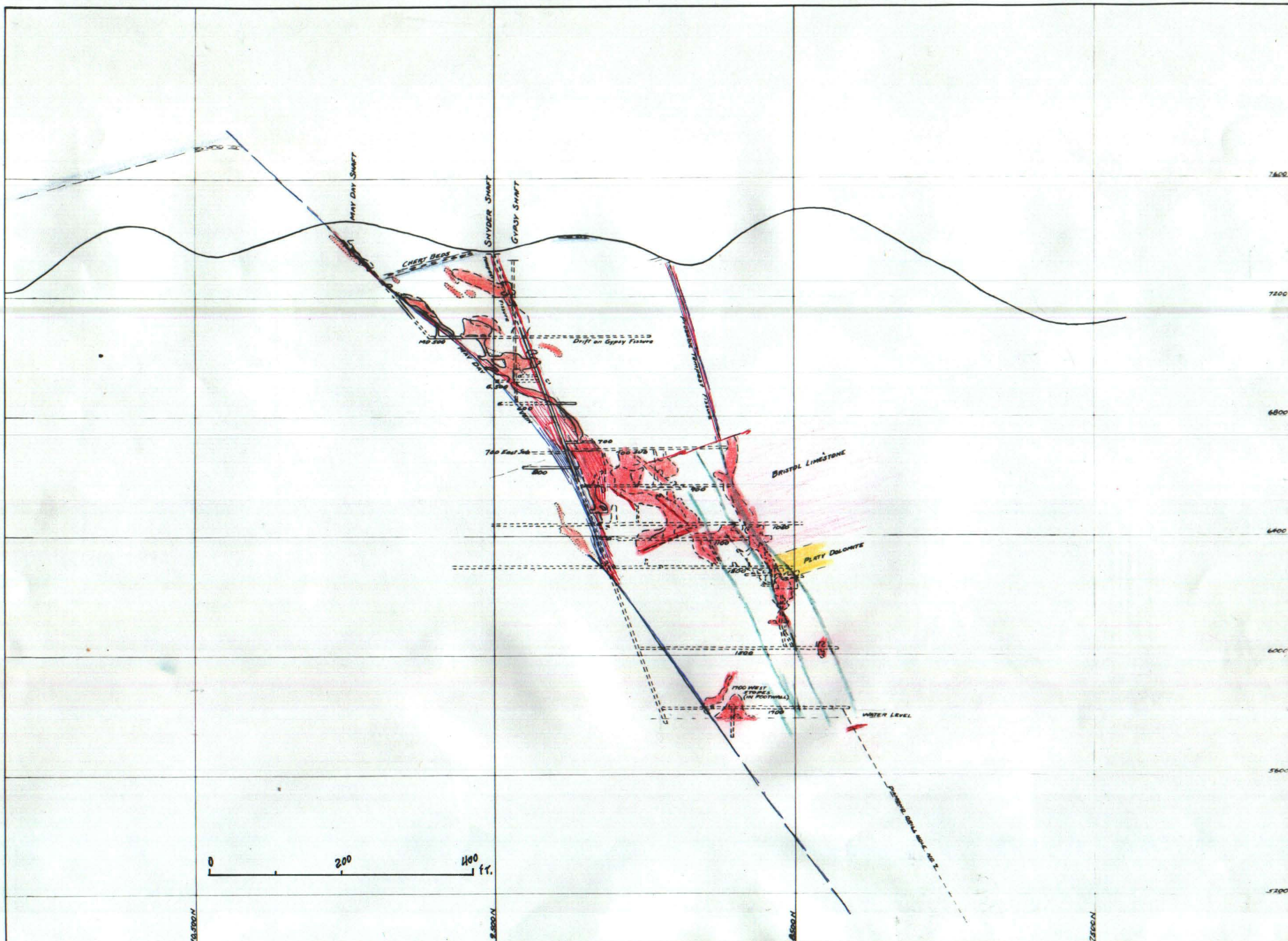
PLATE 4

0720 0026 36


SURFACE MAP
IN VICINITY OF THE
BRISTOL AND HILLSIDE MINE
BRISTOL MINING DISTRICT
PIOCHE, NEVADA
SCALE: 1 IN. = 200 FT.
Paul R. Murphy
July 1931
Contour interval 100 feet
DETROIT SHAFT
IRON MINE SHAFT
IRON VEIN
IRON LOT 40
BRISTOL 2829
No 10 FAULT
MAY DAY EXTENSION
DECEMBER 2829
BRISTOL FRACTION
IRON CAP No3 3544
BLUE CRANE 3544
BLUE CRANE No1 3544
BLUE CRANE No2 3544
BLUE CRANE No3 3544
BLUE CRANE No4 3544
TIGER
COYOTE 50
APEX 3263
SKY LARK 3263
CRESCENT EXTENSION 3453
CRESCENT 3453
NORTH STAR 3453
NORTH STAR EXTENSION 3453
J. McFADDEN 3471
HILLSIDE LOT 39
No 2 FAULT
No 3 FAULT
No 1 FAULT
No 4 FAULT
HILLSIDE FAULT
MAY DAY VEIN
MAY DAY 2829
VESIVIUS
INMAN 2829
RED CLOUD LOT 38
CHAMPION LOT 42
TEMPEST LOT 41
NATIONAL LOT 46
LOT 47
GREAT EASTERN EXTENSION 2829
CHICAGO 2829
CHICAGO EXTENSION 2829
LIBBY WILLIAMS 2829
LIBBY WILLIAMS EXTENSION 2829
ROEDEN LOT 44
BLUEBIRD No4 MINERAL 4129
MILLER 3879
SUN SET 3879
ADELINE 3879
KISMET 3879
KISMET No1 3879
KISMET No2 3879
WALLACE 3879
HILLSIDE No1
HILLSIDE No2
HILLSIDE No3
HILLSIDE No4
HILLSIDE No5
HILLSIDE No6
HILLSIDE No7
HILLSIDE No8
HILLSIDE No9
HILLSIDE No10
HILLSIDE No15
HILLSIDE No16
HILLSIDE No17
ELENOR No1
ELENOR No2
ELENOR No3
ELENOR No4
ELENOR No5
ELENOR No6
ELENOR No7
ELENOR No8
ELENOR No9
ELENOR No10
ELENOR

PLATE 5

EAST WEST PROJECTION
ALONG
MAY DAY VEIN SYSTEM
SHOWING
BRISTOL, TEMPEST AND HILLSIDE MINES
AND OTHER WORKINGS
LOOKING NORTH 1" = 200'
= VS 1" - 400' ?
To accompany report by Paul R. Murphy
REVISED AND BROUGHT TO DATE
JANUARY 1, 1941
By
Paul Gemmill
Vertical or on plane of vein?
8000 U.S.
8000
7600 U.S.
7600
7200 U.S.
7200
6800 U.S.
6800
6400 U.S.
6400
6000 U.S.
6000
5600 U.S.
5600
5200 U.S.
5200
7000 E
8000 E
9000 E
10000 E
11000 E
12000 E
13000 E
14000 E
15000 E
16000 E
MAY DAY SHAFT
HILLSIDE SHAFT
TEMPEST SHAFT
DAYLIGHT RAISE
ORDOVICIAN QUARTZITE
VALLEY FAULT
No 1 FAULT
No 2 FAULT
No 3 FAULT
No 4 FAULT
No 8 FAULT
PLATY DOLOMITE
BRISTOL LIMESTONE
NEWPORT
DOMINICI STOPES
BLACK LIMESTONE
DAVIDSON DOLOMITE
DAVIDSON BLUE LIMESTONE
DAVIDSON BLACK LIMESTONE
FALSE FOWLER
WATER LEVEL
1100 WEST STOPES
1100 EAST STOPES
Line of intersecting May Day and Tempest Veins Projected on Dip
0
200
400
Ft.
1" - 400'
0720 0026 38

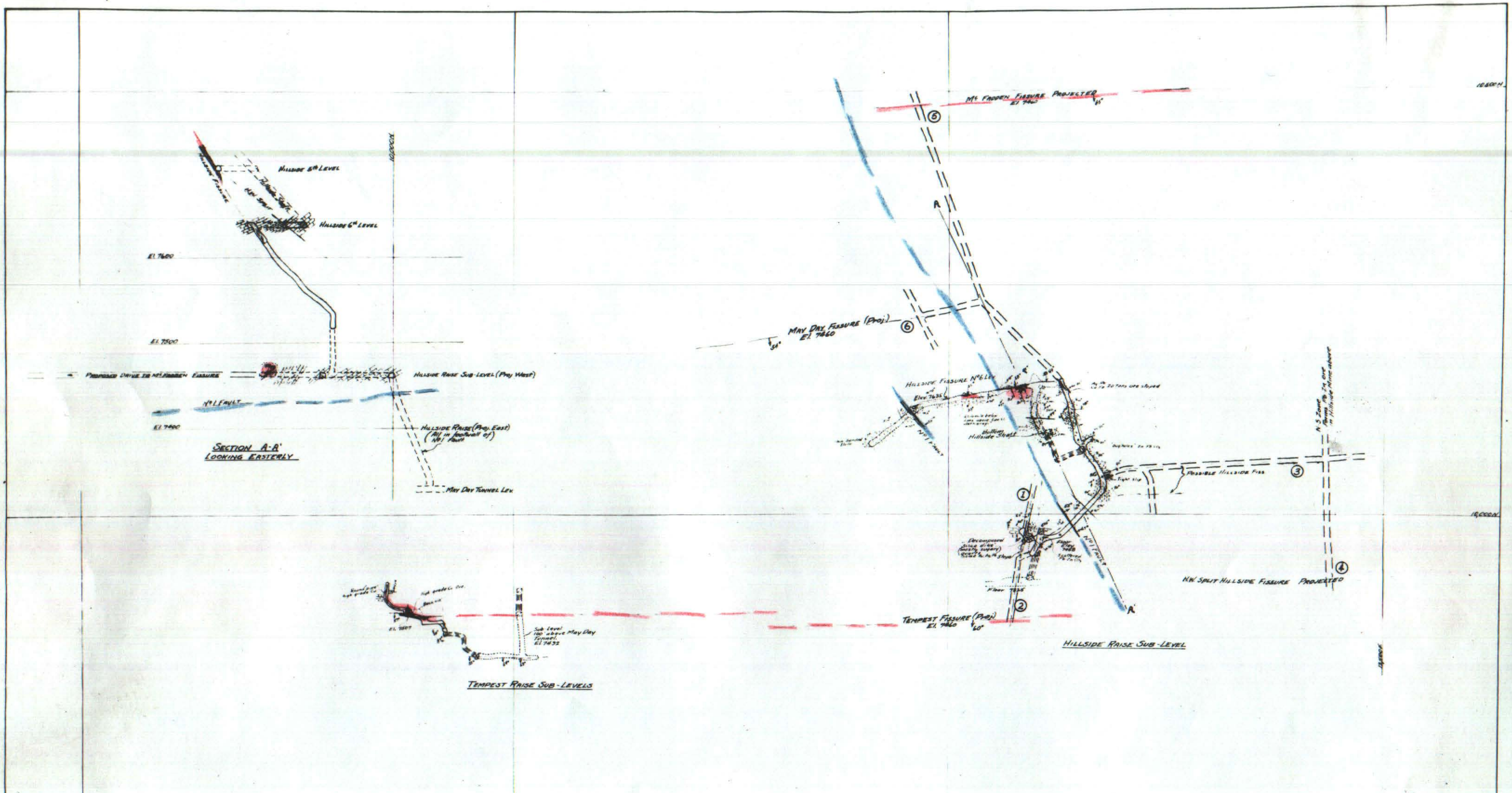


CROSS SECTION THROUGH CO-ORDINATE 10,200 EAST. - STOPES PROJECTED EAST AND WEST. - LOOKING EAST.
REVISED MAP BY PAUL R MURPHY, PLATE 7.
Revised and brought to date by [illegible] 1/1/41

BRISTOL SILVER MINES COMPANY
BRISTOL SILVER, NEVADA.

SCALE 1" = 200'

C - 12



HILLSIDE RAISE SUB-LEVEL AND TEMPEST RAISE SUB-LEVEL SHOWING GEOLOGY AND PROPOSED DEVELOPMENT

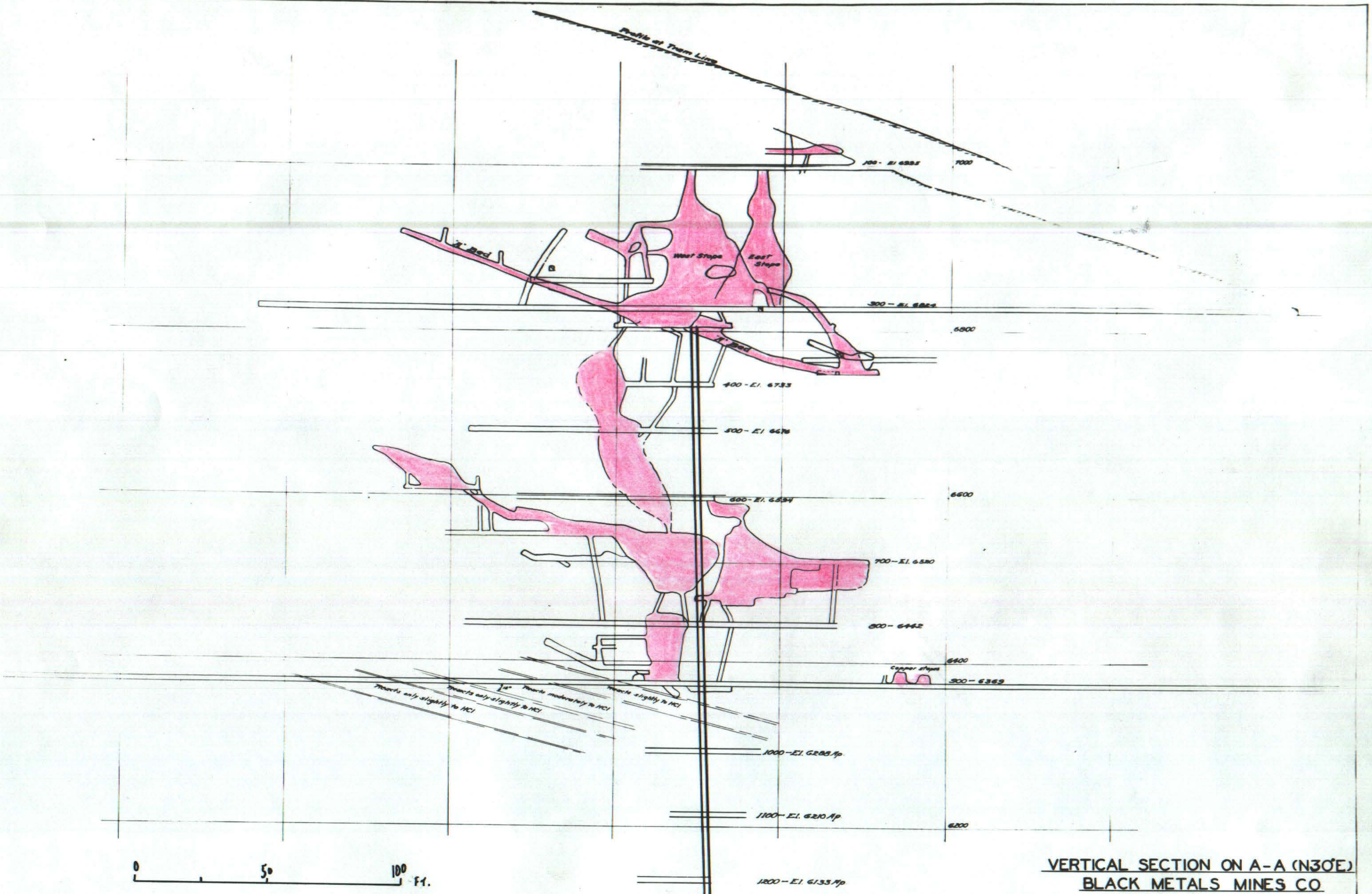
Date - July, 1940 By Paul Gemmill

BRISTOL SILVER MINES COMPANY

BRISTOL SILVER, NEVADA

SCALE 1" = 50'

H-1

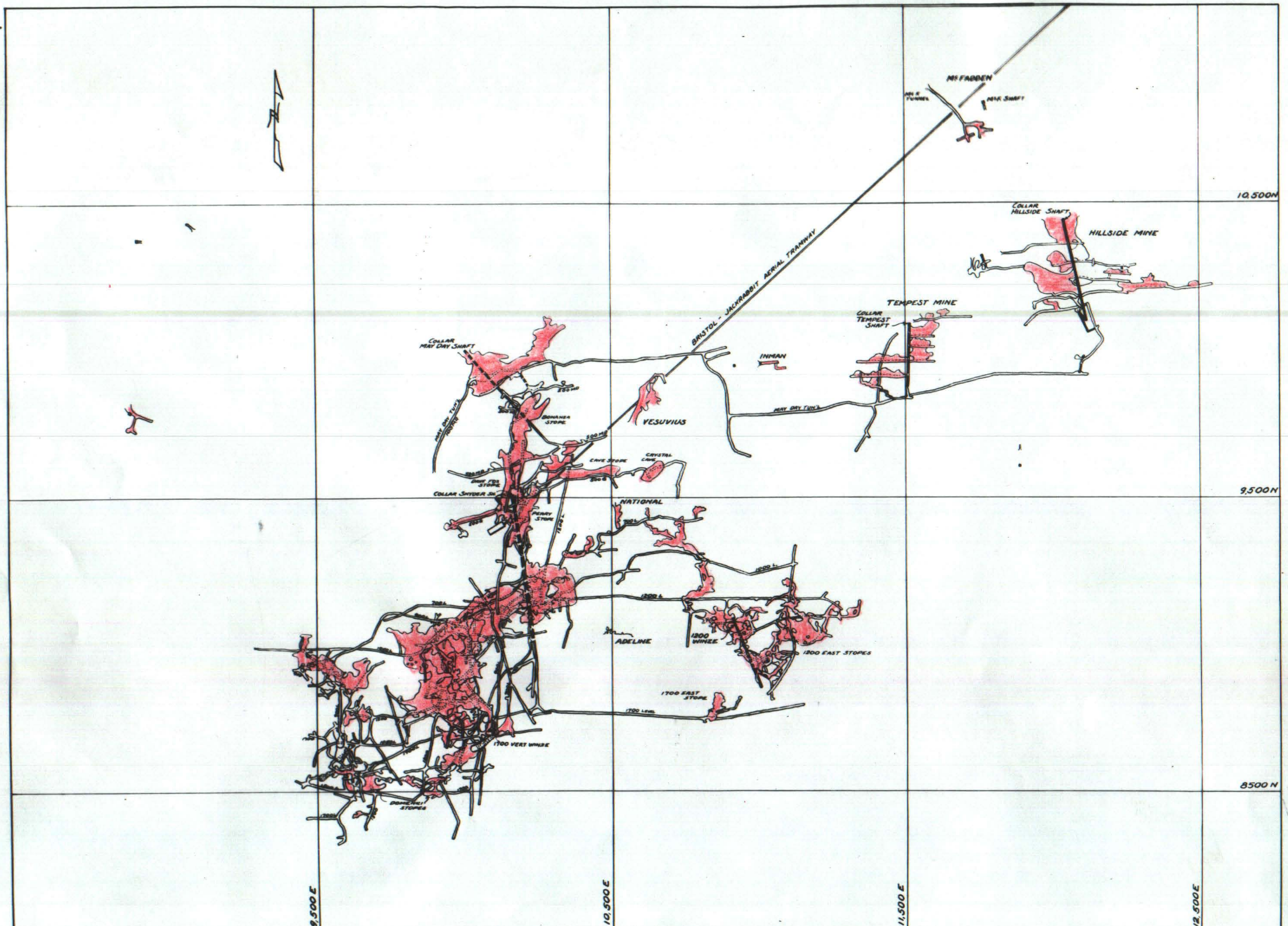


VERTICAL SECTION ON A-A (N30°E)

BLACK METALS MINES CO

Scale 1" - 50' (Pantographed from 40-scale Section by Ballard)

EGY



REFERENCE:- PLATE 7 MURPHY MAPS

0 100 200 FT.

COMPOSITE PLAN OF BRISTOL MINE WORKINGS

DATE - JANUARY, 1941

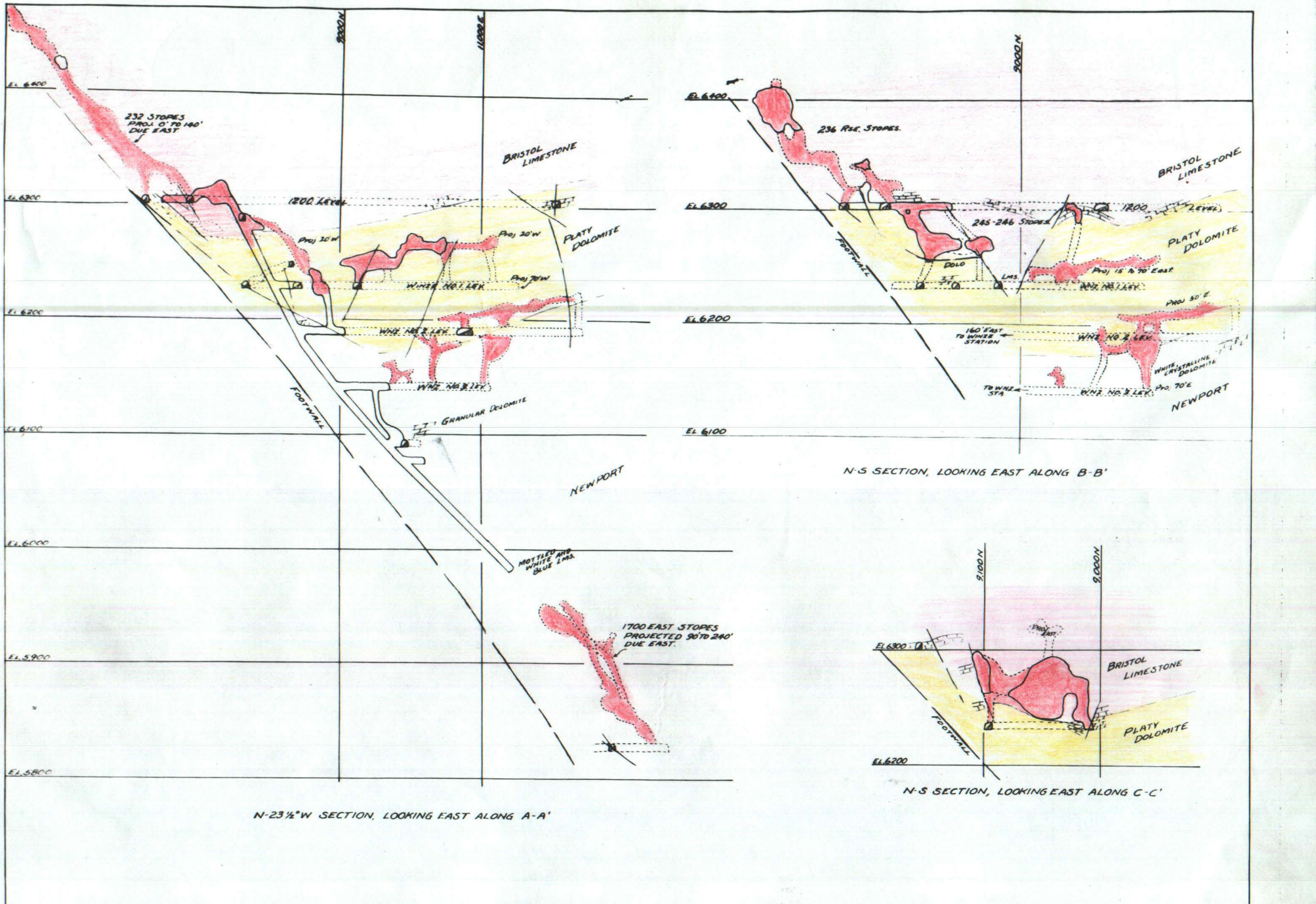
BY [signature]

BRISTOL SILVER MINES COMPANY

BRISTOL SILVER, NEVADA.

SCALE 1" = 200'

C - 11



REFERENCES - MAPS D-1 TO D-7

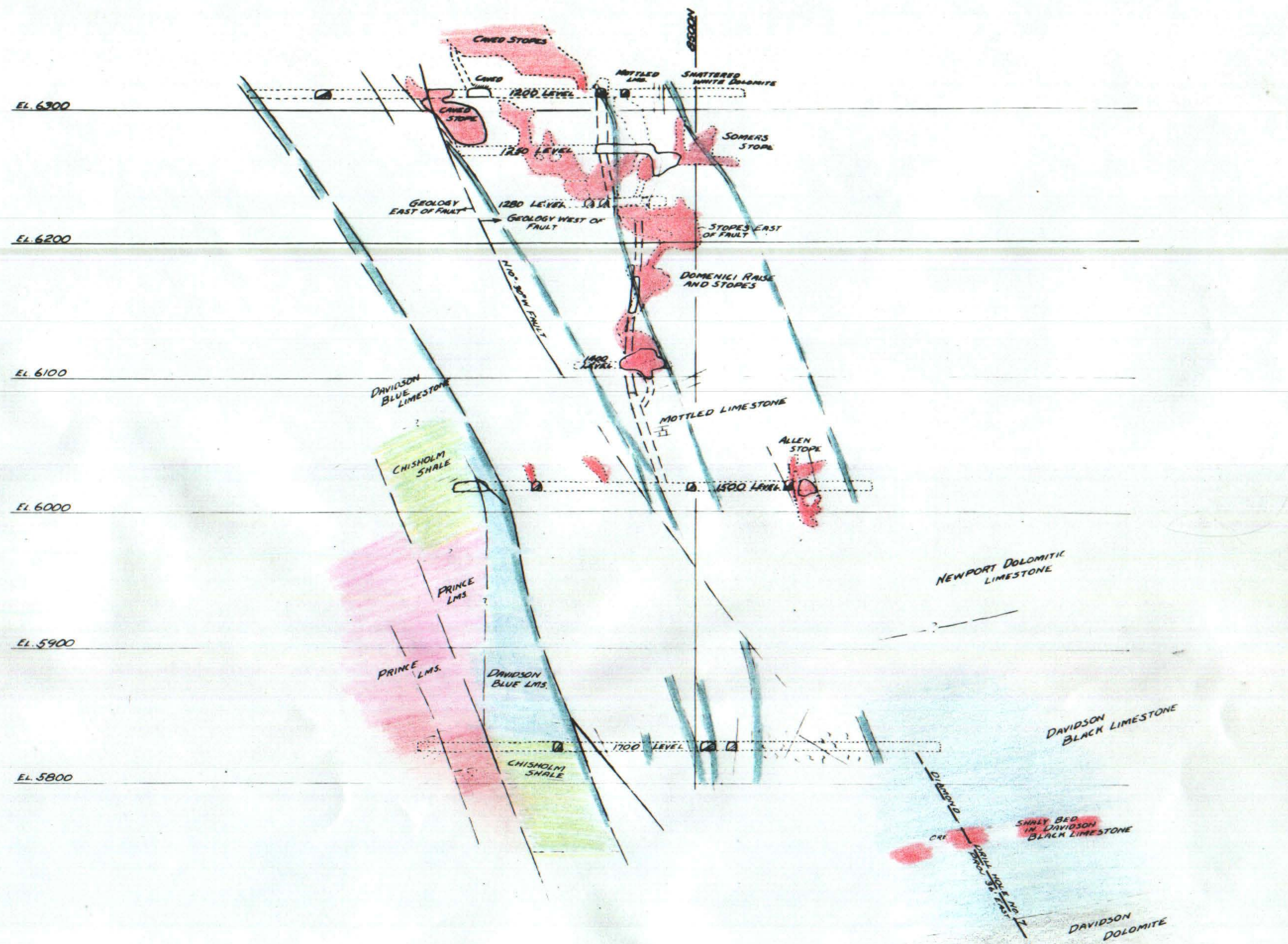
0 50 100 FT.

VERTICAL SECTIONS A-A', B-B' AND C-C'
SHOWING 1200-EAST STOPES AND 1700-EAST STOPE, WITH GEOLOGY
Date - January, 1941
By - Paul Gemmill

BRISTOL SILVER MINES COMPANY
BRISTOL SILVER, NEVADA

SCALE 1" = 50'

C - 10



REFERENCES: MAPS D-1 TO D-7

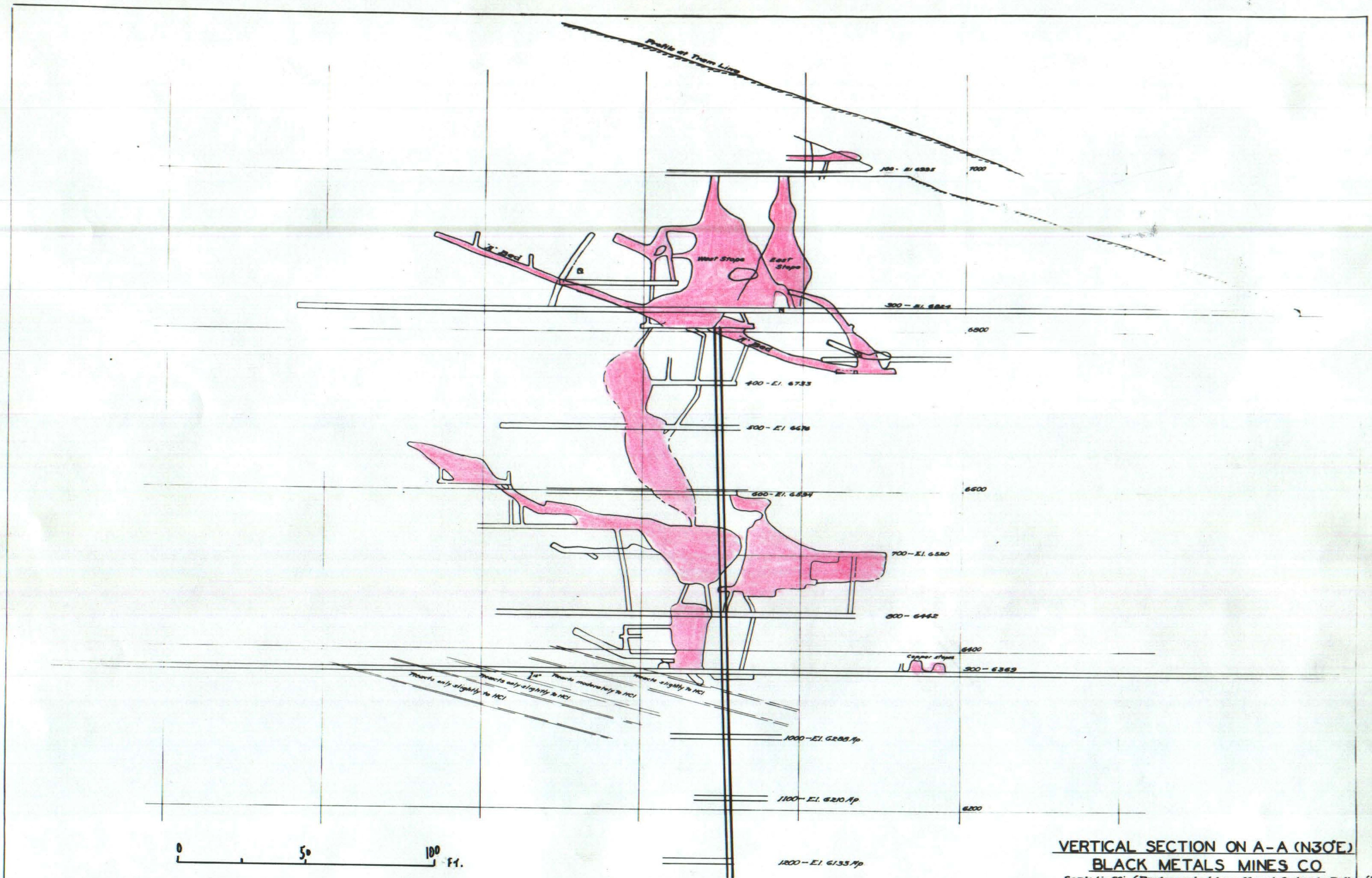
0 50 100 FT.

N-S SECTION D-D' LOOKING EAST.
SHOWING STOPES BETWEEN 1200 AND 1500 LEVELS,
PART OF DIAMOND DRILL HOLE NO. 7 AND GEOLOGY.
DATE - JANUARY, 1941 BY: [illegible]

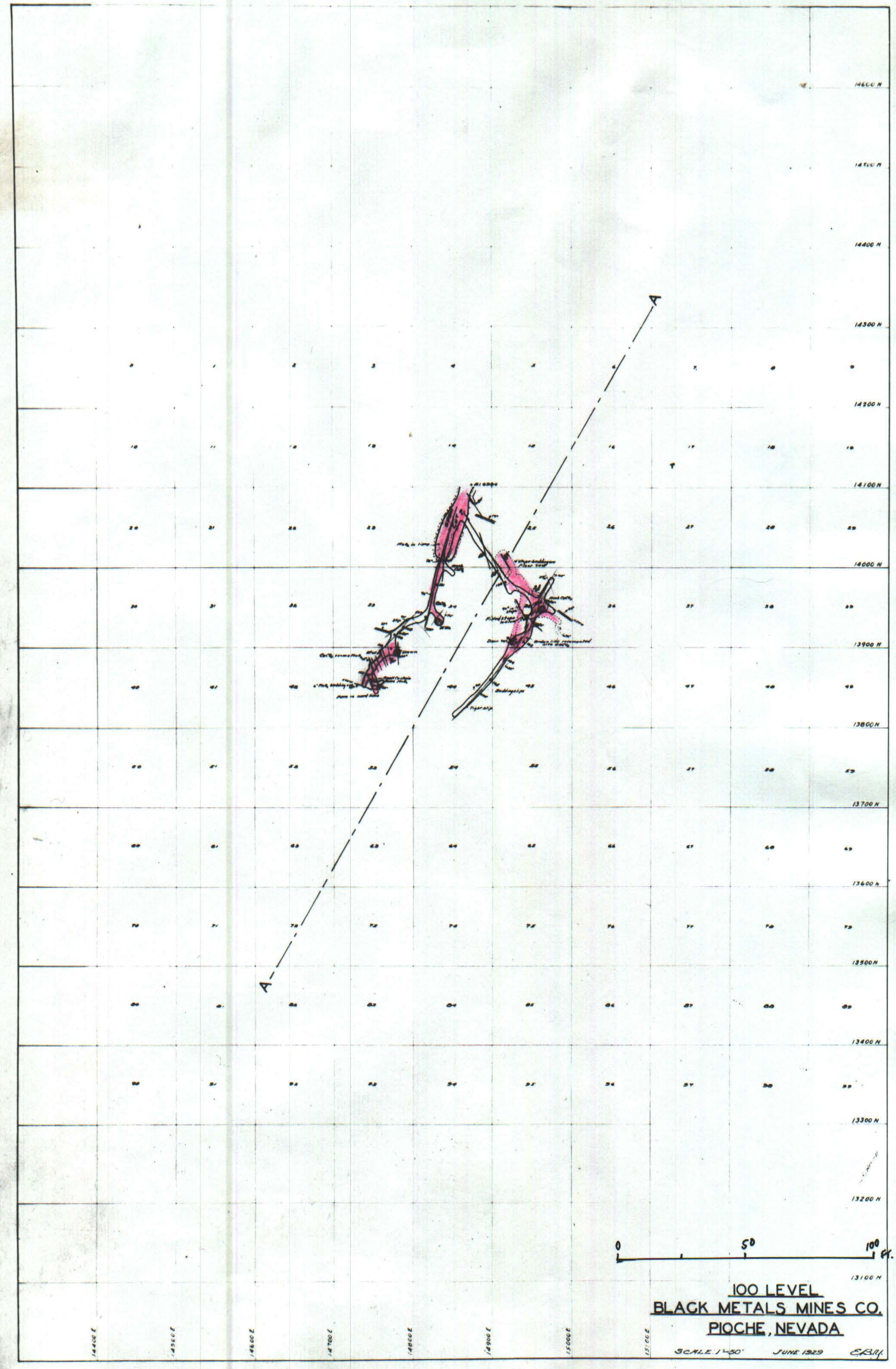
BRISTOL SILVER MINES COMPANY
BRISTOL SILVER, NEVADA.

SCALE 1" = 50'

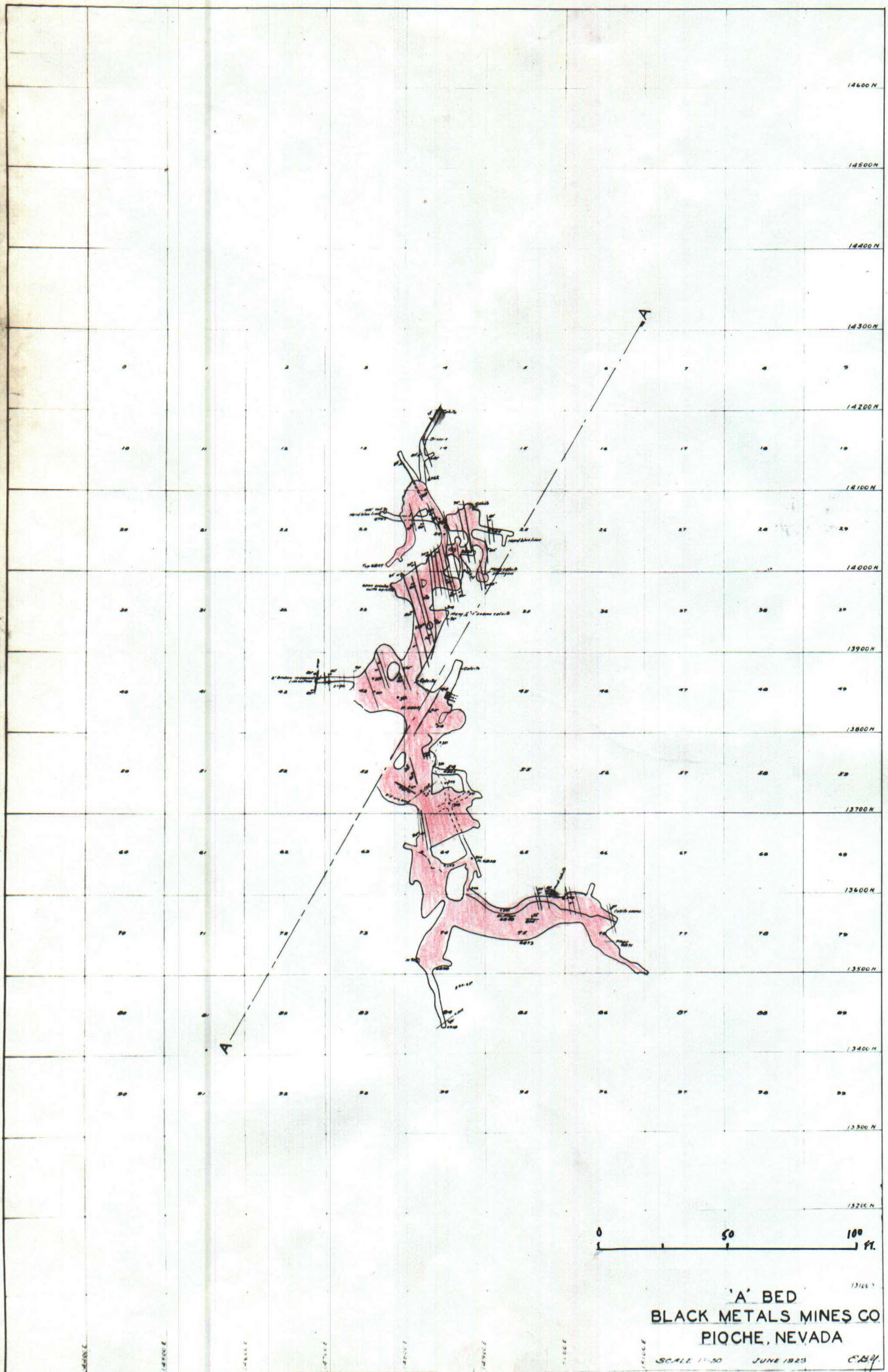
C-11



VERTICAL SECTION ON A-A (N30°E)
BLACK METALS MINES CO
Scale 1" - 50' (Pantographed from 40-scale Section by Ballard)
EGY



A
A
14600 N
14500 N
14400 N
14300 N
14200 N
14100 N
14000 N
13900 N
13800 N
13700 N
13600 N
13500 N
13400 N
13300 N
13200 N
13100 N
14400 E
14500 E
14600 E
14700 E
14800 E
14900 E
15000 E
15100 E
0
50
100
FT.
100 LEVEL
BLACK METALS MINES CO.
PIOCHE, NEVADA
SCALE: 1"=50'
JUNE 1929
E.B.H.


14600 N
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13700 N
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13200 N
A
A
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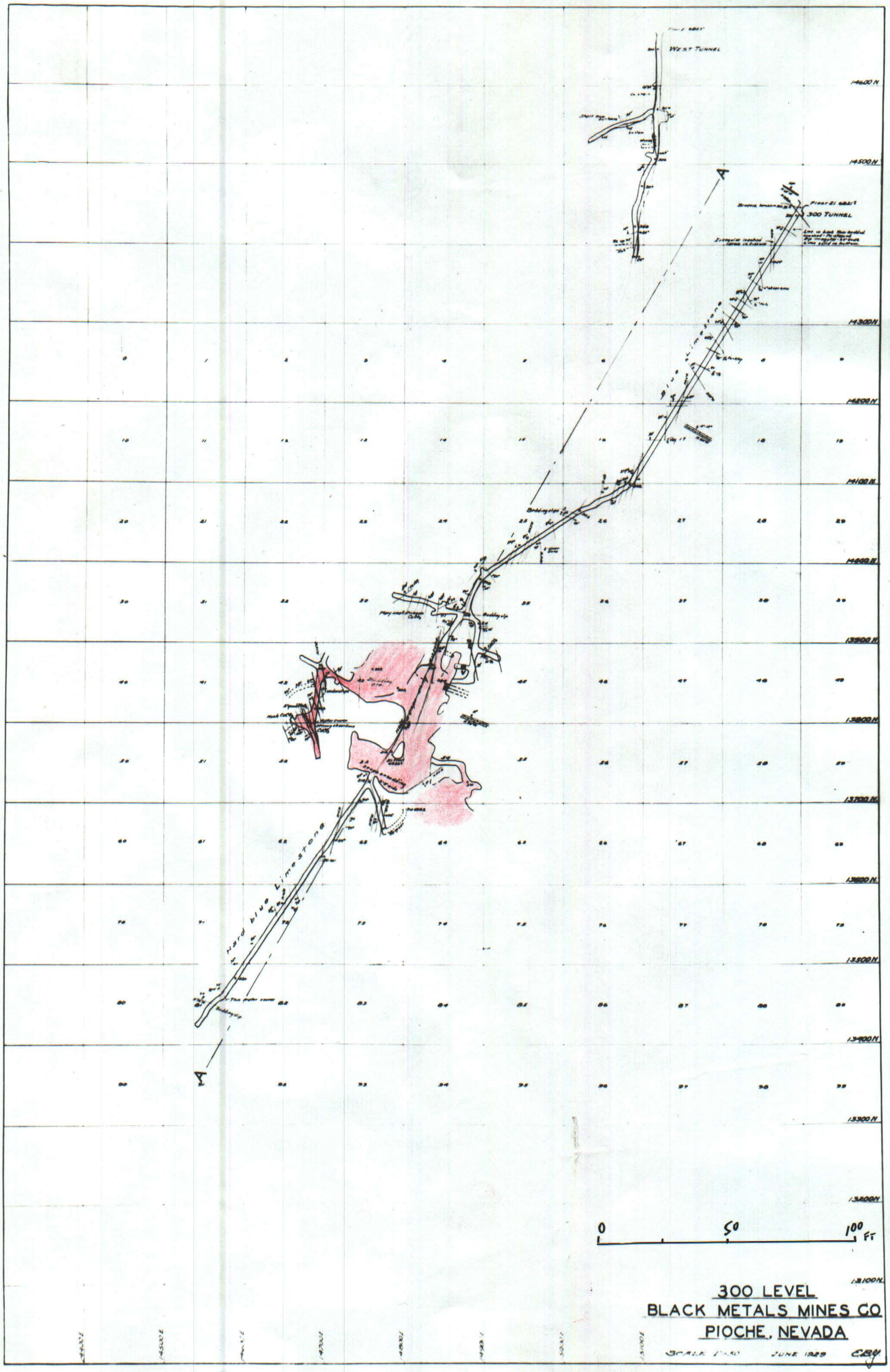
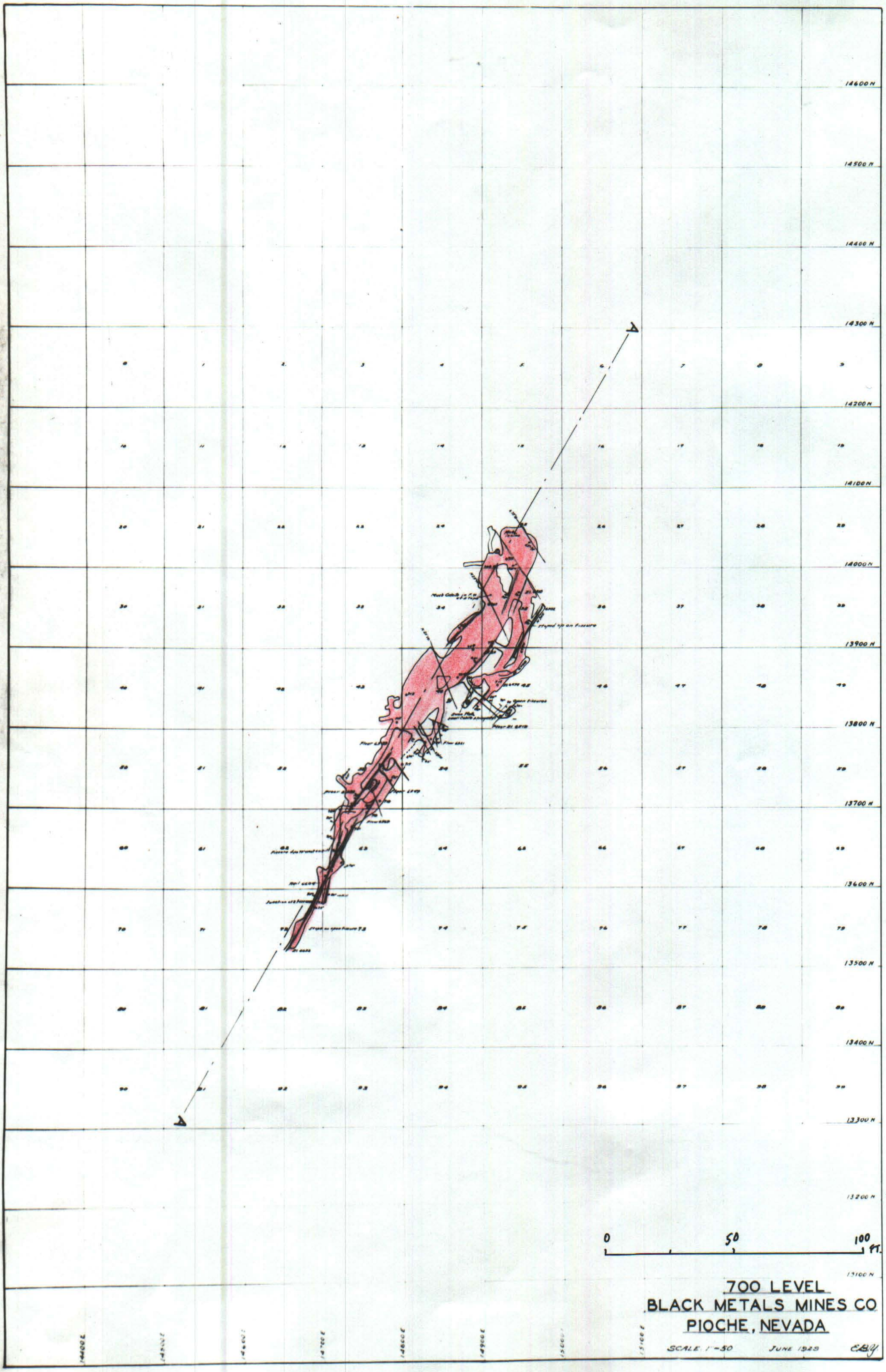
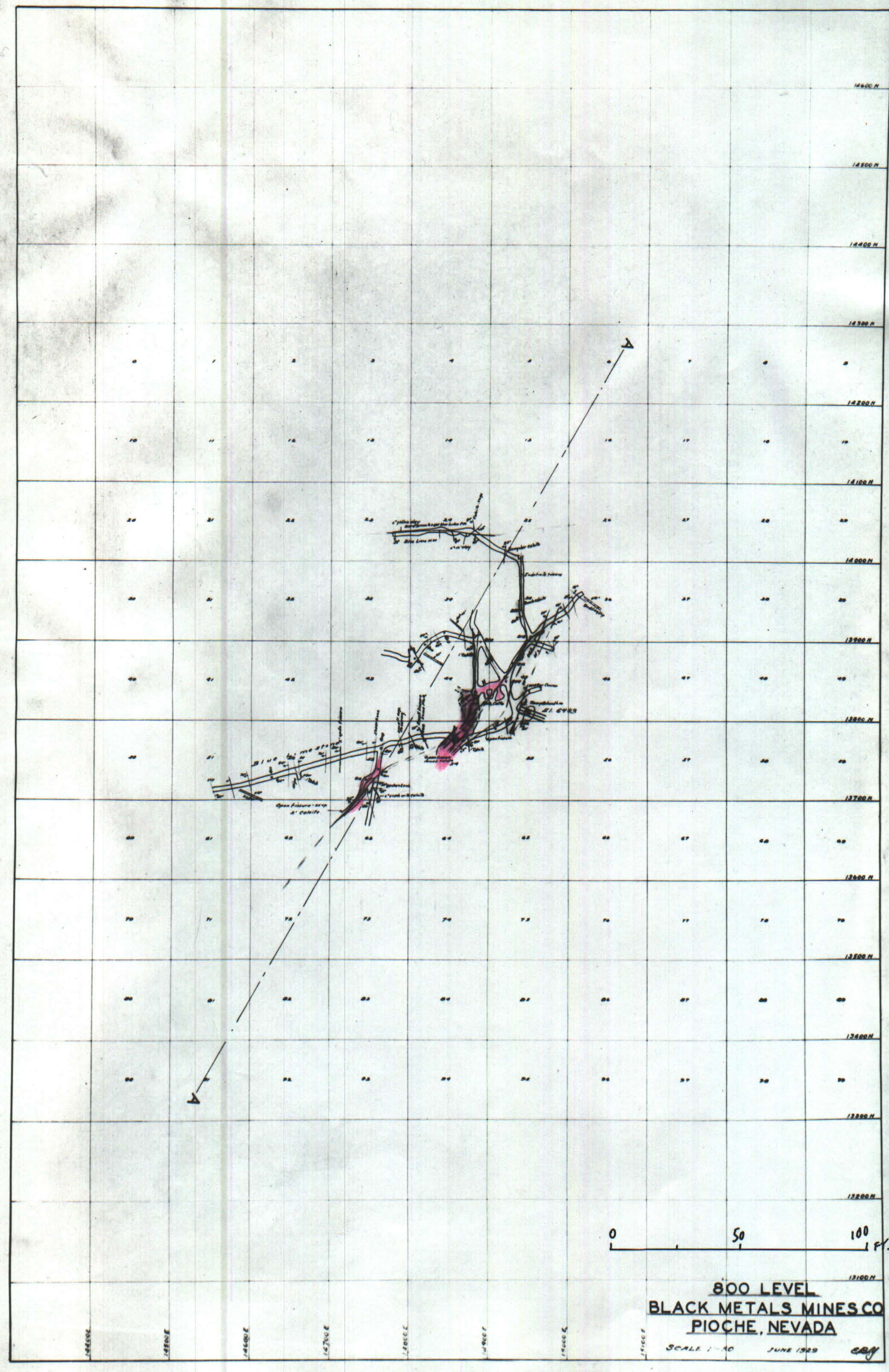
100
FT.
'A' BED
BLACK METALS MINES CO
PIOCHE, NEVADA
SCALE 1"=50
C.B.Y.


West Tunnel
300 Tunnel
Hard blue Limestone
A
A
14600 N
14500 N
14300 N
14200 N
14100 N
13900 N
13800 N
13700 N
13600 N
13500 N
13400 N
13300 N
13200 N
13100 N
0
50
100 FT
300 LEVEL
BLACK METALS MINES CO
PIOCHE, NEVADA
JUNE 1929
C.B.Y.



0 50 100 FT.
700 LEVEL
BLACK METALS MINES CO
PIOCHE, NEVADA
SCALE 1"=50
E.B.Y.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El. 6493
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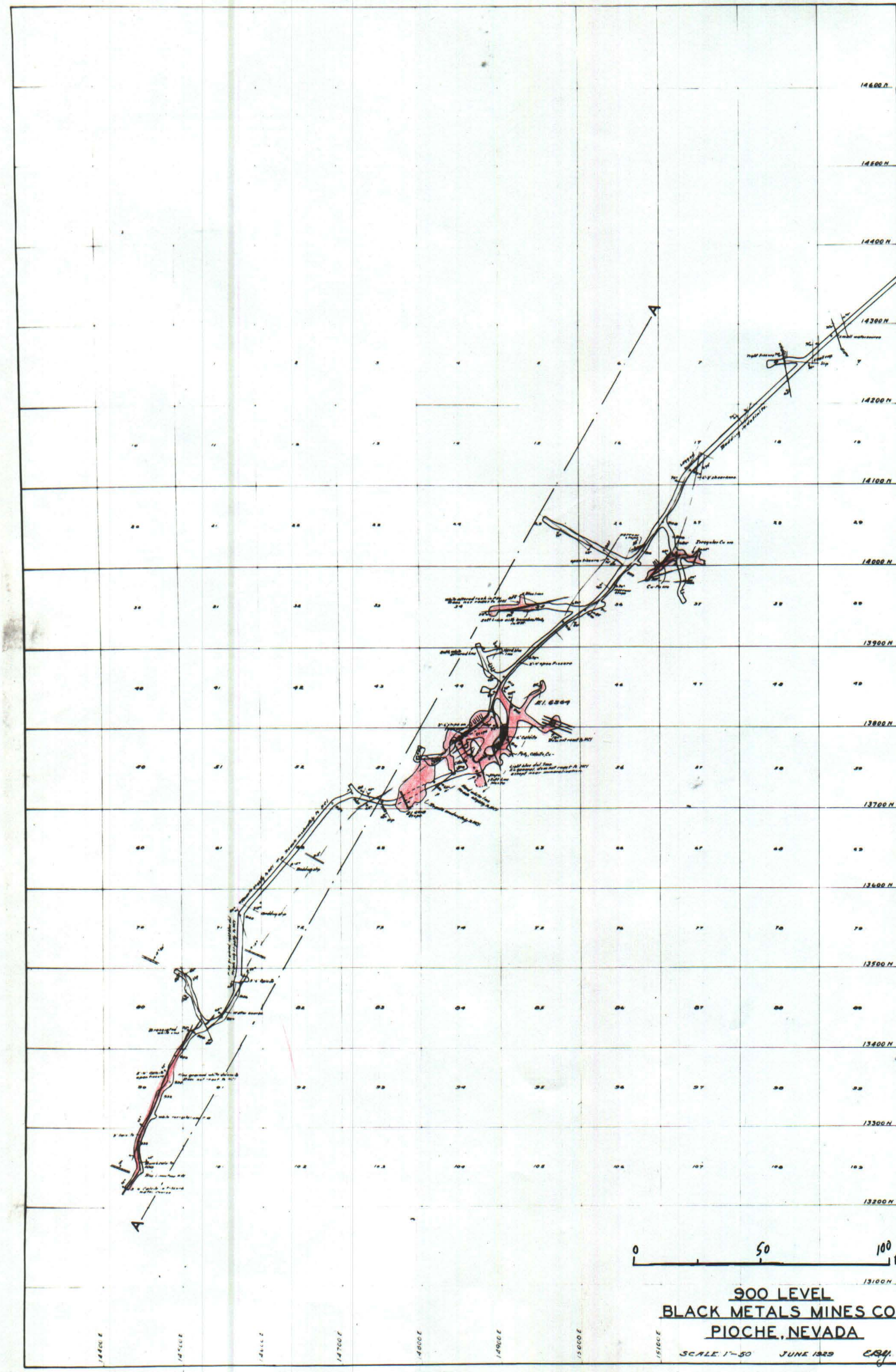
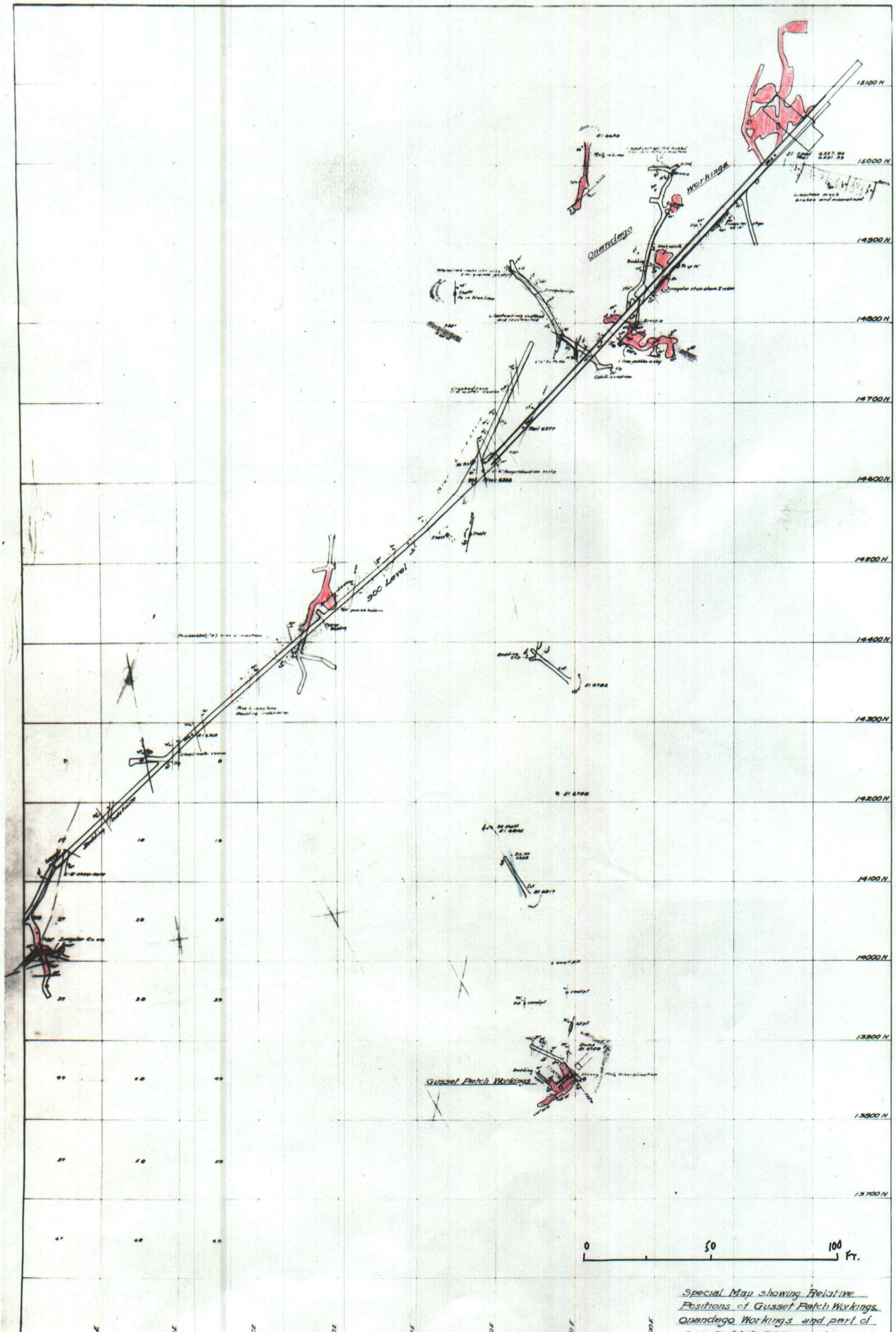
FT.
800 LEVEL
BLACK METALS MINES CO
PIOCHE, NEVADA
JUNE 1929



900 LEVEL
BLACK METALS MINES CO
PIOCHE, NEVADA

SCALE 1"=50 JUNE 1929


15100 N
15000 N
14900 N
14800 N
14700 N
14600 N
14500 N
14400 N
14300 N
14200 N
14100 N
14000 N
13900 N
13800 N
13700 N
Onandego
Workings
900 Level
Gusset Patch Workings
0
50
100
Ft.
Special Map showing Relative
Positions of Gusset Patch Workings,
Onandego Workings and part of
Jack Rabbit 900 Level
Scale - 1" = 50'

EBH

BRISTOL SILVER MINES COMPANY

Bristol Silver, Nevada

OUTLINE OF IMPORTANT DEVELOPMENT RECOMMENDATIONS

In the study of the following development recommendations, please refer to maps accompanying this report.

Mr. Paul Murphy, Geologist for International Smelting & Refining Company, completed an examination of Bristol Silver Mines Company's properties in the Summer of 1931, and his findings and recommendations are made a part of this report.

The order in which development recommendations appear in this report is not set forth in the order of their relative importance, but as they appear from the surface to the lower levels of the Bristol Mine.

HILLSIDE RAISE SUBLEVEL (See Maps H-1 and H-2)

Subsequent to Mr. Murphy's recommendations, a raise was driven 135 feet from the May Day Tunnel level toward the Hillside Shaft. In 1936, lessees performed additional work, which connected with a winze on the bottom level of the Hillside Mine. This work is shown on Map H-1.

No. 1 - Drive Southerly Along "Silica Dike"

Approximately 30 tons of lead-silver ore was mined along this intrusive assaying: .05 oz. gold, 25.0 ozs. silver and 18% lead.

A drift should be driven southerly along the dike to the intersection of the Tempest Fissure. Length of drive - 80 feet.

No. 2 - Drive Easterly Along Hillside Fissure to North-South Fracture Zone

The Hillside Fissure, being highly mineralized, should make a large orebody at intersection with the North-South Fracture Zone in the formation exposed on the Sublevel. A distance of 325 feet of drifting will reach this objective.

No. 3 - Drive Northerly to McFadden Fissure

Just back of the present sublevel face, a small shoot of ore was encountered. The small stope above the level produced 20 tons of fair shipping ore from high-grade spots in brecciated limestone. The present face is well mineralized and should be extended along the fissure. A good grade of shipping ore may be encountered at any distance. If no ore is encountered within 125 feet, the drift's course should be changed slightly to avoid encountering the McFadden Fissure too close to the No. 1 Fault. As in the case of the Hillside Fissure, fracturing synthetic to the No. 1 Fault might cause the McFadden (May Day) Fissure to be obscure. To reach the above referred to objective, 385 feet of drifting would have to be done.

No. 4 - Drift and Crosscut to May Day Fissure in Footwall of No. 1 Fault

The May Day Fissure should be explored in the footwall of the No. 1 Fault. On the surface, the May Day Fissure is strongly mineralized and indicates good possibilities at this depth. Approximately 140 feet of drifting should reach the May Day Fissure in this location.

BRISTOL MINE

No. 5 - 700 Level, East Drive

An extension of the 700 East Drift a distance of 2,000 feet was recommended by Mr. Murphy in 1931, as shown on his East-West Projection. At this elevation, the May Day and the Tempest fissures are approaching the intersection on the dip. Work performed a few feet below the level indicates that these two fissures are only a few feet apart.

This drift level should also be the approximate elevation of the contact between two formations in the geologic column with massive, black (Bristol) limestone below, and a 90 foot thickness of laminated dolomite above, in turn overlain by a bed of massive limestone. These formation contacts, together with North-South and East-West fissure intersections, are believed to be ideal structural conditions for ore deposition. The present face is in low-grade iron ore. For several hundred feet along this drift, much low-grade iron ore has been exposed. A 2,000 foot drive along the fissure would interesect North-South fissures passing through the Vesuvius, the Inman, the Tempest, the Hillside and other workings, including the No. 1 and the No. 3 faults east of the Hillside Mine. The immediate objective is to cut the North-South fissuring projected from the Tempest Mine. This will require a drive of approximately 900 feet.

No. 6 - 900 Level, West Drive

It will be noted on Plate 5 of Mr. Murphy's report that the No. 10 Fault shows a decided bulge to the west as it crosses the canyon in which the Bristol Camp is situated. If this bulge is due to the west dip of the fault and not to a curve in strike, the fault has a dip of 52° West. Projecting the No. 10 Fault from a point above the 900 Level West End stopes, the Fault would be encountered on the 900 Level at a point 410 feet west of the present face.

The West End stopes formed in the southwest quadrant of a flat East-West fault and a steep North-South fault. Dark, massive limestone forms the hanging wall of the stope, and altered, gray dolomite forms the footwall.

It is recommended that a drift be driven west on the fault contact between the limestone and the dolomite to encounter the No. 10 Fault proper, as well as other probable North-South fractures. It is estimated that 450 feet of drifting will be required to reach the No. 10 Fault. After reaching the No. 10 Fault, an additional 500 feet of work is recommended for crosscutting and prospecting for the Iron Mine Fissure in the footwall of the May Day Fissure.

No. 7 - 1200 Level, East Drive

Principal production from the east on the 1200 Level came from the stopes forming in Bristol Limestone where this formation contacts Platy Dolomite.

Similar North-South fracturing (referred to under No. 5 above) seen in the Tempest Mine projects east of the present face of the 1200 Level, and the Platy Dolomite contact is a short distance below the 1200 Level; therefore, continuation of the 1200 Level to the east is recommended, as similar structural conditions to those found in the 1200 East stopes are most likely to be encountered.

The 1200 East stopes produced about 30,000 tons of ore assaying: 9.0 ozs. silver, 8% lead and 7% zinc. The extension of the 1200 East Drift along the strike of the May Day-Tempest fissure system also has possibilities of developing a silver-copper-iron orebody, since the drift will cut the downward projection of the Tempest Mine, which has had a substantial production of ore assaying: .03 oz. gold, 15.0 ozs. silver and 3.5% copper.

The May Day Zone or "Footwall" has an average trend of about N 80° E. The Bristol-Black Metal Tunnel Proposal, for water drainage purposes, listed under "Development Below Water Level," is also on the 1200 Level and has a course of N 47° E from the Bristol workings. Thus, a point will ultimately be reached, in extending the 1200 Level to the east, that is much closer to the Black Metal Mine than present Bristol workings, and this development could serve a two-fold purpose later on.

For the present time, it is recommended that the No. 1 Fault be selected as the objective in continuing the 1200 Level easterly, or a drive of about 2,000 feet.

No. 8 - 1200 Level, West Drive

Development recently performed on the 1700 Level West and the 1500 Level West end exposed some of the lower formations of the geologic column. As seen on the North-South Section (Map C-11), it is probable that Davidson Blue Limestone and the top of Chisholm Shale may be encountered to the northwest on the 1200 Level.

The thickness of these formations at the Bristol Mine is not definitely known, and the small amount of development work done on the 1700 and the 1500 Levels does not give us sufficient information to determine what has happened on the upper levels, nevertheless, these formations, in other districts, have proved to be good ore horizons when associated with mineralized fissures, and further work should be done to explore them in the Bristol Mine.

These lower formations are north of the "Footwall" faulting, and probably in the footwall of the Iron Mine fault-fissure. (See surface map, Plate 5 of Murphy's maps.) The Iron Mine fissure shows strong mineralization on the surface over a great distance, and an attempt should certainly be made to explore its possibilities in the lower formations. Five hundred feet of work is recommended for this purpose on the 1200 Level.

No. 9 - 1500 Level, South

As seen on Composite Plan Map D-7, Section C-11, and Plate 7 (revised) of Murphy's maps, downward projection of the Domenici Stopes that are now being worked should be found south of the main drift on the 1500 Level. Plate 7 also shows that many of the large stopes above the 1200 Level have a very flat dip to the south and their downward projection may still be found south of the 1500 Level workings. For these reasons, at least 1,000 feet of work should be done in crosscutting and drifting south of the present workings on this level.

No. 10 - 1700 Level, South

For the same reasons given above for South work on the 1500 Level, a considerable amount of development should be done on the 1700 Level. In addition to downward projections from stopes above, high grade ore was found in Diamond Drill Hole No. 7. (See description on Page 19.) The ore in this hole is in a shaly limestone horizon of Davidson Black Limestone, and is believed to be bedded ore. In going south this bedding should come above the water level on its dip, therefore, at least 1,000 feet of crosscuts and drifts should be done on the 1700 Level West End to the south.

BRISTOL SILVER MINES COMPANY

Bristol Silver, Nevada

LENGTH AND ESTIMATED COST OF TUNNEL PROPOSALS

The following tabulations show the estimated costs of five tunnel proposals being considered to facilitate water disposal and mining below the water level. Details of these estimates are attached and made a part of this report.

The proposals cover two schemes: (1) That of connecting with the Black Metal Mine; (2) That of tunneling from the valley on the west side of the Bristol Range to connect with the workings of the Snyder Shaft.

WEST VALLEY SIDE

Depth Obtained in Bristol Mine	Approximate Distance of Drive	Cost Per Foot	Total Estimated Cost of Drive
1200 Level	6,750 Feet	$16.23	$109,552.00
1500 Level	11,400 Feet	17.14	195,396.00
1700 Level	14,000 Feet	18.04	252,582.00

BLACK METAL SIDE
(To Connect with Black Metal Incline Shaft)

1200 Level	5,435 Feet	$20.51	$111,465.00

(To Connect with Black Metal Surface)

1200 Level	8,235 Feet	$18.64	$153,465.00

Inasmuch as the Bristol Mine-Black Metal 900 Level connection involves a hoisting and pumping problem through the Black Metal Incline Shaft, as well as other costs not involved in the West Valley Side proposals, the detail estimates attached hereto were compiled for the Bristol Mine-Black Metal connection only; however, material, electric power and labor costs are applicable to all tunnel proposals.

BRISTOL SILVER MINES COMPANY

Bristol Silver, Nevada

SUMMARY OF ESTIMATED COST

CONNECTING BRISTOL MINE 1700 LEVEL WITH THE SURFACE
WEST VALLEY SIDE - DISTANCE OF DRIVE - 14,000 FEET

BUILDINGS		
Blacksmith Shop and Compressor Building	$ 450.00	
Boarding House and Equipment	1,500.00	
Bunk House - 20 Beds	1,400.00	
Change Room	800.00	$ 4,150.00
EQUIPMENT		
Compressor and Receiver	2,000.00	
Blacksmith Shop Equipment (On Hand)		
28,000 Feet of 20-lb. Rail	5,000.00	
1,560 Fish Plates and Bolts	400.00	
5,200 - 3" x 6" x 4' Ties	1,100.00	
20,000 Track Spikes	300.00	
16,400 Feet 3" Air Line (Used)	5,000.00	
16,400 Feet 1" Water Line	1,400.00	
14,000 Feet 14" Ventilation Pipe	28,000.00	
Pipe Fittings	400.00	43,600.00
PORTABLE EQUIPMENT		
Motor Tramming Equipment	3,712.00	
10 Mine Cars	2,500.00	
Mucker and Conveyor	4,750.00	
7 Drill Machines - 3 Bars	2,965.00	
Steel, Hose, Spare Machine Parts	5,000.00	
Small Tools	500.00	
Water Supply Tank (On Hand)	100.00	
2 Blowers	700.00	20,227.00
TIMBER		
1,000 Tunnel Sets		5,000.00
ELECTRICAL EQUIPMENT		
2.5 Miles - Transmission Line	3,750.00	
3 - 50 KVA Transformers - 23,000/440 volt	3,000.00	
Substation	200.00	
Charging Station	413.00	
28,000 Feet No. 8 Rubber Covered Wire and insulators, includes light globes	550.00	7,913.00
EXPLOSIVES AND SUPPLIES		
Powder, Caps, Fuse, Carbide, Oil, etc.		42,000.00
ELECTRIC ENERGY		10,500.00
ROADS		500.00
LABOR - All Labor - $5.70 Per Foot		79,660.00
		$213,550.00
CONTINGENCIES - 15%		32,032.00
SUPERVISION AND MANAGEMENT		7,000.00
TOTAL COST - 14,000 Feet @ $18.04 Per Foot		$252,582.00

BRISTOL SILVER MINES COMPANY

Bristol Silver, Nevada

SUMMARY OF ESTIMATED COST

COMPLETE CONNECTION WITH BLACK METAL 900 LEVEL
DISTANCE OF DRIVE - 5,435 FEET

SURFACE IMPROVEMENTS		
Hoist and Compressor Building	$ 328.00	
Headframe and Bins	500.00	
Housing Facilities	6,000.00	$ 6,828.00
SUBSTATION		
Transformers - Three 50-KVA	3,000.00	
Installation and Materials	659.00	3,659.00
MACHINERY		
Hoist and Compressor Installation		1,545.00
PRELIMINARY UNDERGROUND WORK		
Black Metal Shaft - Track Repairs	707.00	
900 Level Chutes and Pockets	246.00	
Electric Signaling System	26.00	
Recovering Drift Caves	1,031.00	
Enlarging and Straightening Drift	2,621.00	
Installation of Equipment to Present Face of Black Metal 900 Level	1,209.00	5,840.00
TUNNEL EQUIPMENT - Permanent		
Track Equipment	4,073.00	
Air Lines and Fittings	2,211.00	
Water Lines and Fittings	749.00	
Ventilation and Drainage Equipment	13,860.00	
Power Line and Lighting	804.00	
Battery Charging Station	413.00	22,110.00
TUNNEL EQUIPMENT - Portable		
Motor Tramming Equipment	6,833.00	
Mucking Machine Equipment	2,475.00	
Drilling Equipment	6,002.00	
Blower and Accessories	363.00	
Small Tools	136.00	15,809.00
ELECTRIC ENERGY		4,448.00
TUNNEL DRIVING LABOR		27,782.00
TUNNEL DRIVING SUPPLIES		21,444.00
Total - Including Contingencies		$109,465.00
SUPERVISION AND MANAGEMENT		2,000.00
TOTAL COST - 5,435 Feet @ $20.51 Per Foot		$111,465.00

Note: Tunnel Driving is based on operating four 6-hour shifts in the face and breaking 6 feet per round, or an advance of 24 feet per day. It is estimated the tunnel driving would require 230 days operating time.

BRISTOL SILVER MINES COMPANY

Bristol Silver, Nevada

TUNNEL PROPOSALS

By extending the proposed Bristol Mine-Black Metal Mine 900 Level connection a distance of 2,800 feet N 47° E, the surface could be reached on the slope just below the Jackrabbit camp. This extension would serve as a drainage tunnel with gravity flow from the 1200 Level of the Bristol Mine to the surface, and would eliminate the necessity and cost of pumping water from the 900 Level of the Black Metal Mine to the surface, as well as serve as a haulage way for waste disposal from mining operations.

If the surface connection were started prior to, or at the same time as, the tunnel driving job, it could be used as a haulage way for disposing of all or part of the waste taken from the tunnel job, and would thus eliminate hoisting of waste.

We estimate this job could be done at an overall cost of $15.00 per foot, or a total cost of $42,000.00 for the 2,800 foot drive.

	Cost Per Foot	Total Cost
Bristol Mine-Black Metal 900 Level Connection	$20.51	$111,465.00
Bristol Mine-Black Metal Surface Connection	$18.64	$153,465.00

ESTIMATE 1 A (1)

HOIST AND COMPRESSOR HOUSING

MATERIALS		
Studding and Braces:		
26 pcs. 2 x 6 - 12' - 312 Bd.Ft. @ $40/M	$ 12.48	
Window and Door Casements:		
8 pcs. 1 x 6 - 12' 48 "		
9 " 1 x 6 - 10' 45 "		
6 " 1 x 6 - 8' 24 "		
117 Bd.Ft. @ $60/M	7.02	
Door - 1 only 4' x 6'6"	4.50	
Windows - 3 only 4'0" x 5'1"	18.00	
Hardware - Nails, Lock, etc.	5.00	
Corrugated Iron:		
20 sheets - 10' long) / 40 " - 12' ") @ $7.00/100 sq.ft.	47.60	
Concrete for Floor (125 cu.ft.: 1:4 Mix):		
32 Sacks Cement @ $1.00	32.00	
3-1/2 Yards Sand and Gravel - Delivered	10.00	$ 136.60
LABOR		
Carpenter - 6 Shifts @ $5.75	34.50	
Carpenter Helpers - 12 Shifts @ $4.75	57.00	
Filling in Floor - 8 " @ $4.50	36.00	
Pouring Floor - 1 " @ $5.75	5.75	
2 " @ $4.50	9.00	
Total Payroll	142.25	
Insurance and Taxes	19.20	161.45
Labor and Materials		$298.05
Contingencies - 10%		29.95
TOTAL - ESTIMATE 1 A (1)		$ 328.00

ESTIMATE 1 A (2)

HEADFRAME AND BINS

MATERIALS

	Bd.Ft.		
Timber:			
10 - 8 x 8 - 16'	853		
35 - 3 x 12 - 16'	1,680		
	2,533	$ 88.66	
Spikes, Bolts, etc.		10.00	$ 98.66

LABOR

Placing Sills under Headframe, Squaring Bins and Relining Bins:			
Carpenter -	15 Shifts @ $5.75	86.25	
Carpenter Helpers -	48 " @ $4.75	228.00	
Total Payroll		314.25	
Insurance and Taxes		41.64	355.89

Total Labor and Materials	$454.55
Contingencies - 10%	45.45
TOTAL - ESTIMATE 1 A (2)	$500.00

\+ + + + +

ESTIMATE 1 A (3)

HOUSING FACILITIES

Two buildings are contemplated for bunk house and boarding house--bunk house to include change room. These buildings are to be constructed in such a manner that they can later be used for dwellings.

Cost for Each Building	$3,000.00	
TOTAL - ESTIMATE 1 A (3)		$6,000.00

ESTIMATE 1 B

SUBSTATION

EQUIPMENT AND MATERIALS		
3 - 23,000/440 Volt, 50 KVA Used Transformers	$3,000.00	
Switches	83.00	
Fuses	50.00	
Lightning Arresters	180.00	
Poles, Timber and Fencing	50.00	
Wire, Insulators, etc. (On Hand)	-	$3,363.00
LABOR AND CONTINGENCIES		296.00
TOTAL - ESTIMATE 1 B		$3,659.00

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ESTIMATE 1 C (1)

HOIST INSTALLATION

EQUIPMENT AND MATERIALS		
Hoist - f.o.b. Jackrabbit, with motor	$ 500.00	
Skip (Now at Mercur, to be returned)	10.00	
Cable (Use old Bristol cable) - Trucking	8.00	
Cement - Grouting on old foundation	5.00	
Miscellaneous - Bolts, etc.	10.00	
Switchboard (Use equip ment in Power Plant) Small Parts	10.00	543.00
LABOR		
Assembling Hoist - Mechanic - 4 Shifts @ $5.75	23.00	
Helpers - 4 " @ $4.50	18.00	
Grouting in Hoist - 2 Shifts @ $5.00	10.00	
Electrical Work - 4 " @ $5.75	23.00	
2 " @ $4.75	9.50	
Total Payroll	93.50	
Insurance and Taxes	12.62	106.12
Total Labor and Materials		649.12
Contingencies - 10%		64.88
TOTAL - ESTIMATE 1 C (1)		$ 714.00

ESTIMATE 1 C (2)

COMPRESSOR INSTALLATION

EQUIPMENT AND MATERIALS

Note: Based on using Ingersoll-Rand Compressor now at Bristol, complete with motor.

(1)	Compressor and Motor, f.o.b. Jackrabbit			
	Shipping heads to Salt Lake Shop to reseat valves, make new pistons, etc.	$125.00		
	Generally overhauling compressor, bearings, unloader, etc.	100.00		
	Purchase of New Belt for drive	75.00		
	Delivering compressor to Jackrabbit	60.00	$360.00	
(2)	Receiver - Using old boiler now at Jackrabbit, welding ends, etc., or purchase of other receiver		150.00	
(3)	Circulating Tank			
	Now at Well - Trucking only	10.00		
	Timber for platform under tank	14.00	24.00	
(4)	Piping, Valves, etc. (Practically all with compressor now on hand)		15.00	
(5)	Foundation - (160 cu. ft. or 6 yds.)			
	Cement - 30 Sacks @ $1.00	30.00		
	Sand and Gravel - 5 yds. @ $3.00	15.00		
	Form Timber, Bolts, etc.	8.00	53.00	$ 602.00

LABOR

(1)	Compressor and Motor Foundation			
	Building Forms - 2 Shifts @ $5.75	11.50		
	Pouring Concrete 1 " @ $5.75	5.75		
	3 " @ $4.50	13.50	30.75	
(2)	Assembling and Setting Compressor			
	Mechanic - 4 Shifts @ $5.75	23.00		
	6 " @ $4.50	27.00	50.00	
(3)	Circulating Tank (Tank now at Well)			
	Excavation and Laying Timber			
	2 Shifts @ $4.50	9.00		
	Moving Tank - 1 Shifts @ $5.75	5.75		
	3 " @ $4.50	13.50		
	Connecting Tank - 2 Shifts @ $5.00	10.00	38.25	
(4)	Electrical Connections			
	2 Shifts @ $5.75 - 1 Shift @ $4.75		16.25	
(5)	Receiver - Boiler is now in place			
	Total Payroll		135.25	
Insurance and Taxes			18.26	153.51
				755.51
Contingencies - 10%				75.49
TOTAL - ESTIMATE 1 C (2)				$ 831.00

ESTIMATE 2 A (1)

BLACK METALS INCLINE SHAFT

TRACK REPAIR

MATERIALS		
Ties - 690 Feet of Shaft, ties spaced 3' o.c.		
230 pcs. 4 x 4 x 8' or 3,680 bd.ft. @ $35	$128.80	
Plank Lengthwise Under Rail		
1,400 running ft. 3 x 12, or 4,200 bd.ft.	147.00	
Nails - 50 lbs. of 40d nails @ $6.00/cwt.	3.00	
Track Spikes - One 200 lb. Keg 4" x 3/8" @ $7.10	14.20	
Track Bolts - One 100 lb. Keg @ $8.00	8.00	$ 301.00
LABOR		
Removing Track and Cleaning Shaft		
6 Shifts @ $4.75	28.50	
Placing Ties, Planks and Leveling		
7 Shifts @ $5.75; 28 Shifts @ $4.75	173.25	
Placing Rails		
4 Shifts @ $5.75; 16 Shifts @ $4.75	99.00	
Total Payroll	300.75	
Insurance and Taxes	40.60	341.35
Total Labor and Materials		642.35
Contingencies - 10%		64.65
TOTAL - ESTIMATE 2 A (1)		$ 707.00

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ESTIMATE 2 A (2)

900 LEVEL CHUTES AND POCKETS

	Bd.Ft.		
MATERIALS			
Stringers - 5 8 x 8 - 16'	427		
Posts and Frame for Chutes			
12 - 8 x 8 - 16'	1,024		
Plank - 35 3 x 12 - 16'	1,680		
Total @ $35.00/M	3,131	$109.58	
Spikes - 15 lbs. @ $6.00/cwt.		.90	
Chute Door		20.00	130.48
LABOR			
Removing Old Timber - 4 Shifts @ $4.75		19.00	
Construction of Chutes and Pockets and Platform			
6 Shifts @ $5.75; 6 Shifts @ $4.75		63.00	
		82.00	
Insurance and Taxes		11.07	93.07
Total Labor and Materials			223.55
Contingencies - 10%			22.45
TOTAL - ESTIMATE 2 A (2)			$ 246.00

ESTIMATE 2 A (3)

ELECTRIC SIGNALING SYSTEM IN BLACK METALS SHAFT

MATERIALS
(See Estimate 3 A (5))

LABOR		
4 Shifts - Overall Labor Cost		$ 26.00
TOTAL - ESTIMATE 2 A (3)		$ 26.00

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ESTIMATE 2 B (1)

RECOVERING 900 LEVEL DRIFT WHERE CAVED

(a) RETIMBERING BAD GROUND

	Bd.Ft.		
Materials			
Timber - 15 Sets - 23 8 x 8 x 16'	1,962		
30 3 x 12 x 16'	1,440		
40 2 x 12 x 16'	1,280		
Total @ $35.00/M	4,682	$163.87	
Wedges		8.00	
Spikes, Carbide, etc.		8.00	$ 179.87
Labor			
Timberman - 15 Shifts @ $5.75		86.25	
Timberman Helpers - 30 " @ $4.75		142.50	
		228.75	
Insurance and Taxes		30.88	259.63

(b) DRIFTING AROUND CAVE - 45 Feet

Power - 10 Shifts using 50 KW		35.00
Materials		
15 Boxes 40% Powder	86.25	
2 Boxes Caps	3.20	
1,400 Feet Fuse	9.80	
Other Supplies and Repairs, oil, carbide, etc.	20.00	119.25
Labor		
Miners - 20 Shifts @ $5.00	100.00	
Mucking, Tramming and Skiptending - 20 Shifts	100.00	
Hoistman - 10 Shifts @ $5.75	57.50	
Top Car - 10 Shifts @ $4.50	45.00	
	302.50	
Insurance and Taxes	40.84	343.34
Total Power, Labor and Materials		937.09
Contingencies - 10%		93.91
TOTAL - ESTIMATE 2 B (1)		$1,031.00

ESTIMATE 2 B (2)

ENLARGING AND STRAIGHTENING 900 LEVEL DRIFT

Note: Up to the point where chutes are caved on the 900 Level, the drift is large enough and will require comparatively little side-swiping. Beyond this point, however, the drift is quite narrow and crooked, so that some side-swiping will be necessary for this entire distance.

For the purpose of estimating this work, side-swiping is divided into two types: (1) That which will require only two long holes to be drilled at each set-up to make room for the ventilation and drainage pipe (this includes most of the side-swiping on the east side of the drift); and (2) That which will require from 4 to 8 holes per set-up. (Includes all side-swiping on west side of drift.)

Type (1) Side-Swiping - 353 Feet
Figuring that one miner can drill out 25 feet along the drift per shift, this work will require 7 shifts work for two miners.

Type (2) Side-Swiping - 584 Feet
Figuring that one miner can drill out 14 feet per shift, this work will require 42 shifts work for two miners.

ESTIMATE COVERING ALL SIDE-SWIPING AND STRAIGHTENING

POWER		
49 Shifts using 50 KW, 7 Hr./Shift - 17,150 KWH		$ 171.50
MATERIALS		
Powder - 5 Sticks per hole - 40% - 4,010 sticks, or 42 Boxes @ $5.75	$421.50	
Caps - 9 Boxes @ $1.60	14.40	
Fuse - 7,200 Feet @ 7¢	50.40	
Carbide	7.50	
Oil	5.00	
Pipe Fittings	10.00	
Other Supplies	20.00	528.80
LABOR		
Miners - 98 Shifts @ $5.00	490.00	
Muckers and Trammer Operators - 98 Shifts @ $5.00	490.00	
Hoist and Compressor Operator - 49 " @ $5.75	281.75	
Surface Labor, handling supplies, muck disposal, etc. - 49 Shifts @ $4.50	220.50	
	1,482.25	
Insurance and Taxes	200.10	1,682.35
Total Power, Materials and Labor		2,382.65
Contingencies - 10%		238.35
TOTAL - ESTIMATE 2 B (2)		$2,621.00

ESTIMATE 2 C

INSTALLATION OF EQUIPMENT TO PRESENT FACE

Note: The following installations will be made while the 900 Drift is being straightened and enlarged, however, the first 750 feet of drift will not require enlarging, so track, air and water lines, mucking machine, cars and drilling equipment must be installed before side-swiping commences.

POWER		
4 Shifts while laying track first 750 feet		$ 8.00
LABOR		
(1) Laying Track		
First 750 ft., 4 Shifts @ $5.75; 12 @ $4.25	$ 80.00	
1,230 ft. while side-swiping - 49 @ $5.75	281.75	
(2) Air Line (2,700 ft. from compressor to face) (Pipe to be made up from old boiler tubes in Black Metal boilers) - Cutting out boiler tubes - Welder 2 @ $5.75; 2 @ $4.50	20.50	
Welding 2,700 ft. of line - 1/2 Hour per weld, 193 Welds, or 12 days 12 Shifts @ $5.75; 12 Shifts @ $4.50	123.00	
(3) Water Line (2,700 ft. of 1" Line) 4 Shifts @ $5.00; 4 Shifts @ $4.50	38.00	
(4) Blower Installation		
(a) Power Line from charging station to fan - 1,200 ft. #3 Wire, 440-Volt - Stringing Wire - 1 Shift @ $5.00; 1 Shift @ $4.75	9.75	
(b) Installing Blower proper, includes bulk-head at shaft, electrical hook-up and fan pipe connections 2 Shifts @ $5.75; 2 Shifts @ $4.50	20.50	
(5) Ventilation Pipe Installation (900 ft. to present face) 15 Welds to carry pipe around bends - 5 Shifts @ $5.75 and 10 Shifts @ $4.50	73.75	
Other Labor handling pipe - 4 Shifts @ $4.50	18.00	
(6) Charging Station Installation		
Back-switch - 2 @ $5.75; 2 @ $4.50	20.50	
Rack Foundation - 2 @ $5.75; 2 @ $5.00	21.50	
Motor Generator Set Foundation - 2 @ $5.00	10.00	
Electric Connections & Panel - 3 @ $5.75	17.25	
(7) Lighting System - 7-1/2 KVA Transformer near fan, 2,700 ft. of 2-wire line down incline shaft and through entire drift length to present face. Electrician - 3 Shifts @ $5.75 and 3 Shifts @ $4.75	31.50	
(8) Cabinets for Tools, Oil and Supplies Carpenter - 3 Shifts @ $5.75	17.25	
(9) Lowering Cars, Mucking Machine, Drilling Equipment, etc. - 3 @ $5.75; 6 @ $4.50	44.25	
Total Payroll	827.50	
Insurance and Taxes	111.71	
TOTAL - ESTIMATE 2 C		$ 939.21

ESTIMATE 3 A (1)

TRACK EQUIPMENT

Rail - 5,435 ft. Drift, 1,230 ft. on 900 B.M., 300 ft. Turnouts, 7,800 ft. of Track or 15,600 ft. of Rail, 5,200 yds - 5,200 yds. 20# Rail - 52 Tons @ $50.00/T	$ 2,600.00
Ties - Spaced 4 ft. o.c. - 2,600 3x6x4' - 2,600 x 6 bd.ft. - 15,600 bd.ft. @ $35.00	546.00
Track Spikes - 4 x 2,600 - 20,400 spikes - 1 200# Keg contains 1,140 - 3/8" x 4" Spikes - 10 Kegs Spikes @ $14.20/keg	142.00
Fish Plates - Requires 780 joints of 20 ft. rail or 780 pair of fish plates @ 45¢	351.00
Track Bolts - 4/pair of plates - 3,160 bolts at 985 bolts/200# keg - 3.23 kegs - 4 200# Kegs - 800# @ $8.00/cwt.	64.00
Total Track Equipment	$3,703.00
Contingencies - 10%	370.00
TOTAL - ESTIMATE 3 A (1)	$4,073.00

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ESTIMATE 3 A (2)

AIR LINE AND FITTINGS

Pipe to end of present Black Metal 900 Level is covered in Estimate 2 C.

Pipe Line - 5,450 ft. of 4" Air Line (2nd Hand) @ 30¢/ft.	$1,635.00
Pipe Fittings - 275 Couplings @ $1.00 each	275.00
Manifolds, Valves, Miscellaneous	100.00
Total Air Line and Fittings	$2,010.00
Contingencies - 10%	201.00
TOTAL - ESTIMATE 3 A (2)	$2,211.00

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ESTIMATE 3 A (3)

WATER LINE AND FITTINGS

Pipe Line from Hoist House - 8,200 ft - 1" Pipe @ 80¢	$ 656.00
Fittings - Various	25.00
Total Water Line and Fittings	681.00
Contingencies - 10%	68.00
TOTAL - ESTIMATE 3 A (3)	$ 749.00

ESTIMATE 3 A (4)

VENTILATION AND DRAINAGE LINE

Pipe - 900 ft. from Blower to Present Face	
5,400 " " Face through Tunnel	
6,300 ft. - Total of 14" Line (Used) @ $2.00	$12,600.00
Contingencies	1,260.00
TOTAL - ESTIMATE 3 A (4)	$13,860.00

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ESTIMATE 3 A (5)

POWER LINES AND LIGHTING SYSTEM

Power Line - Surface to 900 Level Charging Station	
1 only 60 Amp., 440-Volt Switch	$ 14.30
900 ft. of 3-Wire, 440-Volt Line, 05 2,700 ft. of #4 R.C. Wire @ $40.00/M	108.00
Power Line - To Blower and Lighting Transformer	
1,200 ft. of 3-Wire, 440-Volt Line, 3,680 ft. of #8 R.C. Wire @ $19.00/M	68.40
2 - 7-1/2 HP - 440 Volt Switches	12.00
Lighting Transformer - 1 - 7-1/2 KVA, 440/220-Volt	20.00
Lighting Lines - 7,800 ft. of Drift - One 100-W Bulb every 100 feet - 15,600 ft. of #8 R.C. Wire @ $19.00/M	296.40
80 Weatherproof Sockets @ 10¢	8.00
100 - 100 Watt Light Bulbs @ 20¢	20.00
Hoist House Lighting - Various Supplies	10.00
Shaft Signaling System - 2,100 ft. #10 R.C. Wire @ $11.00/M	23.10
2 Signal Bottles @ $10; 1 Bell @ $20	40.00
Miscellaneous Lights and Fixtures	10.00
Sundry Supplies - Insulators, Marlin Twine, Tape, etc.	100.00
	730.20
Contingencies - 10%	73.80
TOTAL - ESTIMATE 3 A (5)	$ 804.00

ESTIMATE 3 A (6)

CHARGING STATION

Motor Generator Set	$ 300.00
Materials for Charging Rack (Welding in Estimate 2 C)	25.00
Electric Meters and Panel	50.00
	375.00
Contingencies - 10%	38.00
TOTAL - ESTIMATE 3 A (6)	$ 413.00

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ESTIMATE 3 B (1)

TRAMMING EQUIPMENT

Motor Trammer - 3 Ton Mancha Locomotive	$3,179.00
Batteries - 2 Sets - Charged for @ $33.30/month each, $66.60/month for 8 Motors	532.80
Mine Cars - Ten 35-cu.ft. Mine Cars @ $250.00 each	2,500.00
	6,211.80
Contingencies - 10%	621.20
TOTAL - ESTIMATE 3 B (1)	$6,833.00

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ESTIMATE 3 B (2)

MUCKING EQUIPMENT

Final decision has not been reached as to whether a conveyor loader should be used in order that several cars may be filled by loader without switching, or whether frequent switching space should be allowed. A second-hand mucking machine will very likely be available, but to make allowance for the possibility of needing a conveyor, the price of a new Gardner-Denver machine is used in this estimate.

One New Gardner-Denver Mucker	$2,250.00
Contingencies - 10%	225.00
TOTAL - ESTIMATE 3 B (2)	$2,475.00

ESTIMATE 3 B (3)

DRILLING EQUIPMENT

Jumbo - To be constructed in our shop	$ 150.00
Leyners - 6 New Gardner-Denver - 3" Non-automatic	2,370.00
Drill Steel - 5 Tons of Steel @ $13.88/cwt.	1,388.00
Making up Steel for detachable bits	400.00
Cost of detachable bits (Accurate figures not available)	500.00
Hoses	
8 - 3/4" x 50' Air Hose, or 400 ft. @ 45¢	180.00
8 - 1/2" x 50' Water Hose, or 400 ft. @ 34¢	136.00
Couplings and Hose Clamps @ $2.00/hose	32.00
Spare Machine Parts - Spare clamps for columns and other stock of this nature to be kept on hand at all times (Not included in "Machine Repairs")	300.00
	5,456.00
Contingencies - 10%	546.00
TOTAL - ESTIMATE 3 B (3)	$6,002.00

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ESTIMATE 3 B (4)

BLOWER AND ACCESSORIES

Blower with 7-1/2-HP Motor	$ 300.00
Control Valves for Plus or Minus Pressure Control	30.00
	330.00
Contingencies - 10%	33.00
TOTAL - ESTIMATE 3 B (4)	$ 363.00

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ESTIMATE 3 B (5)

VARIOUS SMALL TOOLS

Track Tools - Jim Crow $18.00; Wrenches, Bars, etc. $15.00	$ 33.00
Drilling Tools - Miscellaneous	18.00
Other Underground Tools (Not Replacements)	42.50
Tools on Surface	30.00
	123.50
Contingencies - 10%	12.50
TOTAL - ESTIMATE 3 B (5)	$ 136.00

ESTIMATE 4 A

POWER CONSUMPTION IN TUNNEL DRIVING

		Cost Per Foot
HOIST		
Muck-hoisting 111 tons/day, elevating 250 ft., or 222,000# x 250 ft. - 55.5 x 10.6 ft./lb., or $\frac{55.5 \times 10.6}{33 \times 10.3 \times 60}$ HPHr. - 280 x .746 KWH or 209 KWH at 50% efficiency - 418 KWH. (Weight of skip and cable not included in above)		
418 KWH @ 1¢	$4.18/day	
Men, Supplies, etc.	1.00	
Total Daily Hoisting	$5.18/day	
24 ft. Advance Per Day @ $5.18/day		$0.216
COMPRESSOR		
Using 300 cu.ft. of air for 50% of the time, with 100 cu.ft. requiring 20-HP takes 60-HP for 12 hours, or 720 HP Hr. or 53.7 KWH	53.7 KWH	
Plus 12 Hours idle running @ 20-HP equals 240-HP Hr.	17.9 "	
Total Per Day	71.6 KWH	
71.6 KWH @ 1¢ - $7.16/day		
24 ft. Advance Per Day @ $7.16/day		0.298
OTHER POWER CONSUMPTION		
Blower - 7-HP, or	5.6 KW	
Battery Charger (Continual)	5.0 KW	
Lights - All	10.0 KW	
Losses - Transformers, etc.	3.0 KW	
Total	23.0 KW	
One Day's Consumption - 23 x 24 - 552 KWH - $5.52		
24 ft. Advance Per Day @ $5.52		0.230
Total Cost of Power Per Foot		$0.744
5,435 Feet @ $0.744 Per Foot		$4,043.64
Contingencies - 10%		404.36
TOTAL - ESTIMATE 4 A		$ 4,448.00

ESTIMATE 4 B

LABOR COSTS IN TUNNEL DRIVING

LABOR - Underground

Note: As a basis for purpose of estimating, the following figures show what would be expected of miners working on day's pay basis. Actually, the work at the face should be contracted, using this as a yardstick, so that any advance over the amount shown would result in increased pay for the men and, at the same time, a substantial saving to the Company.

Three men on each shift, capable of mining, operating mucking machine, or motor trammer, should be able to complete the operating of drilling, blasting, mucking out and laying track in each of four 6-hour shifts. One man will be required, one shift per day, to keep pipe lines to the face.

		Cost Per Foot
3 Men/Shift, 4 Shifts = 12 Shifts @ $5.00	$ 60.00	
1 Man, 1 Shift	5.00	
	65.00	
Insurance and Taxes	8.78	
Total	$ 73.78	
24 Foot Advance Per Day @ $73.78		$3.074
LABOR - Surface		
Hoist - 4 Men @ $5.75	23.00	
1 Top Carman @ $4.50	4.50	
1 Blacksmith and Mechanic	5.75	
	33.25	
Insurance and Taxes	4.50	
Total Per Day	$ 37.75	
24 Foot Advance Per Day @ $37.75		$1.573
TOTAL COST PER FOOT		$4.647
5,435 Feet @ $4.647 Per Foot		$25,256.00
Contingencies - 10%		2,526.00
TOTAL - ESTIMATE 4 B		$27,782.00

ESTIMATE 4 C

SUPPLIES

Powder	
100 lbs. per round - 4 rounds/day - 400 lbs. @ $11.50	$ 46.00
Caps	
25 Caps per round - 4 rounds/day - 1 Box Caps @ $1.60	1.60
Fuse	
200 ft./round, 4 rounds - 800 feet @ 7¢	5.60
Carbide	
0.3 lb. per man per shift - 13 x 0.3 = 3.9 lbs. per day	.28
Drill Steel	
Regrinding 50 bits per round, or 200 bits per day @ 10¢	20.00
Repairing Drill Rods, per day	5.00
Machine Repairs @ $100.00 per month - Per day	3.30
Repairs to other machinery - $100 per month - Per day	3.30
Oil, etc. - Per day	1.00
Total Supplies Per Day	$ 86.08
24 Foot Advance Per Day @ $86.08	$3.587 Per Foot
5,435 Feet @ $3.587 Per Foot	$19,495.00
Contingencies - 10%	1,949.00
TOTAL - ESTIMATE 4 C	$21,444.00

Report on the

BRISTOL MINE

Pioche, Nevada

By

PAUL R. MURPHY

November 1931

INTRODUCTION

For the past decade, the Bristol Mine controlled by Snyder Brothers of Salt Lake City has been an important shipper of oxidized lead and copper ores to the International Smelting Company plants at Tooele, Utah. During the period of its contribution to the International Smelter, this property has been subject to periodical examination by members of the Geological Department, principally with a view to determining the immediate prospects of continuing shipments to the plant. These examinations confined strictly to the limited underground openings driven to exploit a particular ore shoot could report but little beyond the immediate expectancy indicated by the condition of the current working faces.

Under the compulsion of a declining grade of ore on the bottom levels, the continued productivity of the mine is predicated on the successful outcome of a development campaign which must seek for new orebodies by lateral extension of the working faces, or resort to further sinking the Bristol shaft to prospect the Bristol fissures in the more favorable horizons believed to lie at considerable depth below the present workings. If geology is to aid in planning this future development, the narrow geological conceptions based on the restricted observations of the past must give way to conclusions reached after a general geological examination of the district.

SCOPE OF EXAMINATION, REPORT AND MAPS

With the problem of expanding development in the Bristol area pressing for solution, a comprehensive examination of the District was begun in October, 1930, and has been continued at intervals up to the present time. While the field work of this examination was intensified in the vicinity of the Bristol, Black Metals and other holdings of the Bristol Silver Mines Company, the investigation covered as well all of the independent mining properties in the Bristol and Jackrabbit Mining Districts. And the general maps accompanying this report show the location, ownership, workings and surface geological features of these outlying properties.

Although scores of prospects of varying merit were disclosed in the examination of this large area, to the comparable prospects in the immediate vicinity of the Bristol workings must be added the weight of a relatively large past production and an economy of operation in prospecting from this established site. This limitation of the most favorable prospective area at once prescribes the scope of this report and forecasts the emphasis of later paragraphs on immediate extension of the Bristol mine workings.

In preparing the large number of figures and plates accompanying this report, it has been the intention of the writer to eliminate all but the most essential descriptive matter. Reference to Figure 1 shows the relative position of the Bristol District with respect to other western mining districts and to the Salt Lake Valley smelters. Figure 2 shows the general surface geology and the relative location of Bristol with respect to the other mining areas and prospects of the Pioche Region. Figure 3 is a Columnar Section of the rocks exposed in the Pioche Region on which is indicated the general stratigraphic position of the principal mines and prospects.

Besides the plates listed below, there has been prepared a set of separate level tracings showing the geology at the Bristol and Black Metals mines. These separate level maps are on file in the Geological Department of the International Smelting Company.

The maps accompanying this report are as follow:

Plate 1 - An 800-scale plan map showing topography, ownership, principal faults, veins, etc. in the Bristol-Jackrabbit Districts.

Plate 2 - A 200-scale surface geological map showing claims and property outlines.

Plate 3 - A 200-scale composite plan map of all underground workings in the Bristol and Jackrabbit Districts.

Plate 4 - A 200-scale geological cross section along line of Bristol-Black Metals mines tram line showing relative stratigraphic position of Bristol and Black Metals mines.

Plate 5 - A 200-scale plan map showing the surface geology and principal workings along the Bristol-Hillside vein zone, together with the proposed work along this vein zone.

Plate 6 - A 200-scale Longitudinal Section showing workings, stopes and proposed work along the Bristol-Hillside vein zone.

Plate 7 - A 200-scale north-south cross section looking east through coordinate 10200-E showing relation of Bristol stopes to geological features.

Plate 8 - A 100-scale plan map of Bristol 900 level indicating the proposed crosscut to the Iron vein in the footwall of the May Day vein.

GENERAL FEATURES

The Bristol and Jackrabbit Mining Districts occupy, respectively, the Western and Eastern flanks and merge in the Northern toe of the Bristol Mountain Range, a typical north-south range of the Great Basin type which rises some 2,500 feet above the adjacent valleys to attain a ridge line elevation near the 8,500 foot contour above sea level. From its northern limit at Bristol Pass, the range rises to the south with the approximate but modified dip slope formed in Upper Highland Peak limestone beds, and meets the ridge line level of the range which runs almost due south to Stampede Gap, a distance of some ten miles.

Notwithstanding the monoclinal dips to the north which persist throughout this great distance, any attempt at direct stratigraphic measurement having in view a tie to the measured sections of the underlying formations at Pioche and Comet is defeated by the fault pattern of the range, which conspires to a continual repetition of the Upper Highland Peak limestones at the backbone of the range.

Beyond Stampede Gap the Bristol ridge continues to the south to form the Highland Peak Range on whose western flank lie the Pan American and Forlorn Hope properties of the Comet Mining District. And to the east, some five miles, the island of Pioche Hills rises out of the surrounding valleys to complete the geographical unit commonly designated "The Pioche Region."

HISTORY AND PRODUCTION

Ore deposits in the vicinity of Bristol have been known since the late sixties when the discovery of the bonanza silver mines of the adjacent Pioche District caused an influx of prospectors to the district. Some, too late to participate in the prosperity of Pioche, turned to the near-by mountains and discovered among others the separate outcropping orebodies of the May Day, Tempest and Hillside claims destined to become the site of the Bristol Mine of later years. It should be noted here that the production from the Bristol is the outcome of the deeper development of the old May Day and Gypsy ore shoots. No attempt has yet been made to press development through the lean zone below the Hillside and Tempest ore shoots. This fact is important in view of the work recommended later in this report.

The following taken from U. S. G. S. Bulletin 648 is the only available record of the early history and production of the districts:

> "According to Whitehill, the Bristol district was organized April 10, 1871, by Hardy, Hyatt, and Hall. A smelter was built at Bristol Well in the late seventies, and later, a 5-stamp mill at the same place.
>
> "In 1877 the Hillside Company was organized to take over the properties of Mr. Steele, which included the Hillside mine and the mill and smelter. At that time the incline on the Hillside fissure was 200 feet deep, and the vein was reported to be 5 to 8 feet wide, carrying ore which averaged $100 a ton in silver and lead.
>
> "For several years the Hillside and Bristol companies operated the Hillside and May Day deposits on the west side of the range. The Day (Jackrabbit) mine in Lake Valley was operated independently. These properties and several others near Bristol were consolidated in 1911 by the Day-Bristol Consolidated Mining Company, which, in 1913, was operating the May Day and Gypsy mines and had leased the Inman, Tempest, and Hillside properties. The Day (Jackrabbit) was idle, and it was reported that the lower workings were below the ore zone. This company at present holds 23 patented claims and four locations.

"The production of the mines in the vicinity of Bristol previous to 1904 could not be learned, though undoubtedly many thousand dollars worth of silver, lead and copper were recovered during the period from 1869 to 1904."

In Table 1 attached, we present the record of production in the Bristol District insofar as the record is available. The production of 1904 to 1912, inclusive, is taken from Bulletin 648 quoted above. The production of 1913 to 1922 has been compiled from several sources and may be subject to minor corrections. The most accurate record is, of course, the later years, 1922 to 1931, for which an exact record of the production is available.

GENERAL GEOLOGY

Stratigraphy

Finding support in a geographic unity and certain common geological factors, all informal discussions of the prospective outlook at Bristol are colored by applying the yardstick of Pioche production to the possibilities in these undeveloped underlying formations in the Bristol District. In order to determine the proximity of the objectives on which this parallel is based, an exact determination of the stratigraphic interval between the productive horizon at Pioche and the Bristol formations became one of the pressing problems of the examination.

In a wide reconnaissance of the region, we found no continuous section or complete undisturbed portions of the section whereby this interval could be determined as a result of direct measurement. Lacking direct measurement, determination of the stratigraphic interval between the productive Pioche horizons and the Bristol beds rested on the recognition of some formation common to both the Pioche and Bristol sections--an extremely difficult and dangerous correlation in this great thickness of limestone formation notable for its lack of distinguishing markers and the repetition of its peculiarly marked members.

However, a study of both the measured Pioche section and the beds exposed in the Bristol shaft indicate a common feature in the 80 foot white limestone bed exposed in the shaft between the 1500 Level and the 1600 Level. This white limestone seemingly correlates with the False Prince "B" bed of the Pioche section. On the presumption that this correlation is correct and that no major faulting disturbs the normal sequence of beds below, the Bristol shaft, now at the 1700 Level, would have to be extended an additional 1,000 feet to penetrate the base of the Prince or Lyndon limestone formation, and extended a distance of 1,800 feet to reach the top of the Combined Metals ore bed of the Pioche shale formation. To these extensions of the shaft in the footwall of the May Day fissure must be added some 600 feet--the apparent May Day normal faulting--before levels from the shaft could penetrate these favorable Pioche formations in the productive hanging wall block of ground. With favorable objectives close at hand, these deep and expensive long range objectives, based on the Pioche yardstick, cannot be advised in the present program of development.

Notwithstanding the difficulty of determining the actual stratigraphic position of the Bristol formations, the relative position in the rock section at a given point in the district can be determined with considerable accuracy. Early in the field work, a number of chert beds of certain distinctive banding and textures, at first believed to be local, were found to extend throughout the area mapped. These chert beds not only served as a marker with which to determine relative stratigraphic position, but their disposition in the various fault blocks was a means of measuring the displacement of the several faults. This marked horizon is indicated in a distinctive color on the maps and sections accompanying this report.

Structure

Although the sedimentary beds of the Bristol area are characterized by a general east-west strike and low dip to the north 10° to 20°, the east-west cross section of the range show a gentle doming of the formations about an axis lying in the general locality of the ridge line of the range. In general, the net result of this doming, together with the effect of faulting, as indicated by the east-west cross section, or on longitudinal sections of east-west veins, is to keep the profile line of the section in approximately the same stratigraphic member. This holds, however, only within the major faults which roughly define the east and west limits of the productive portion of the district.

On the west effective prospecting has been limited by a major north-south west dipping normal fault, here called the Valley Fault, that brings Ordovician quartzite on the west side into juxtaposition with the Highland Peak limestone beds on the footwall or Bristol side of the fault. The great stratigraphic interval involved in this fault indicates that its throw must be expressed in the thousands of feet. East of the Valley Fault and occurring at intervals across the district, is a series of north-south normal faults, designated from west to east on the maps and sections as the Nos. 10, 1, 2, 3 and 4 faults. Among these, both east and west dips occur, and the throw can be expressed in hundreds of feet or less.

In contrast to the sharp limit of effective prospecting at the Valley Fault on the west, the foot of the range at the east side of the district is involved in a much more complex fault system. Here both east and west dipping normal faults and flat west-dipping thrust planes occur, together with steepening, brecciation and other evidences of pressure phenomena associated with thrusting. In the mine workings between the Onandago and Black Metals mines, the local effect of some of this disturbance is to bring formations some several hundred feet higher in the section into opposition with the chert member to the west of the disturbance. Whether this is the result of overriding on a west dipping thrust fault or the simple expression of an east dipping normal fault, or both, cannot be determined in the limited exposures available for study.

While local prospecting in the Black Metals area must certainly be modified in accordance with the complex fault system established, general thrust faulting in the range, as might be inferred from the specific evidence cited and which finds some support in the physiographic expression at the northeast base of the range, is of far larger import. For instance, should the mechanics of the range involve an underthrust on the apparent normal

Valley Fault and a compensating overthrust along a flat west-dipping fault or zone of deformation, whose outcrop is indicated in the cited evidence at the northeast base of the range, then this flat west-dipping zone or sole of the range might have an important influence on the localization of intrusive rocks, mineralization and associated phenomena. All the lesser faults, veins and porphyry dikes on the surface would then be local to the block above the thrust zone and might be interpreted as the upper weaker manifestation of the deformation, mineralization and intrusion of the deformed zone. That some underlying disturbance, either faulting or intrusion, is being approached in the lower levels of the Bristol mine, is indicated in the change from the remarkable undisturbed limestone beds of the upper levels to the highly folded, crushed and marbelized formations in the lower levels of the mine. This change in the Bristol, however, could as well be attributed to the approach to some local porphyry mass not in any way indicative of the major thrust zone described above.

ORE GEOLOGY

Within the frame of major structures described in preceding paragraphs lie the structural features of immediate economical importance in the Bristol-Jackrabbit Districts. These vein and fault systems are shown on the accompanying surface geological maps of the district. (See Plates 1 and 2.) The maps depict two prominent sets of structures--a north-south series of faults, previously described, and an east-west vein system of which there are at least two easily recognized members, the Bristol-May Day zone, and the east-west vein indicated near 14000 north coordinate of the maps. A third system represented by only one member is the north-south iron vein near the west side of the district. This vein, while parallel to the fault system of the district, contrasts strongly in outcrop appearance with the outcrops of north-south faults. Moreover the iron vein is easily distinguished from the numerous so-called Gypsy fissures of the Bristol mine, a subordinate north-south component system of the Bristol-May Day zone. Other systems might be read into the northeast and northwest fractures which occur through the district, but the outstanding structures of importance in the ore geology are the east-west veins, the north-south faults, and the Iron vein.

MINERALIZATION

The district is characterized by oxidized ores valuable for their silver, lead and copper content. And the high iron, lime and manganese add special value to the ores as a flux for the more siliceous ores coming to the smelters. Much the larger portion of the tonnage from the Black Metals mine was moved because of its fluxing value. However, zinc oxides, also common in the district, call for a penalty when present in excess of smelter specifications.

While no generalization has been established regarding a zonal or other distribution of the minerals, the following items may be worthy of note. Lead, copper and silver occur in the ores throughout the entire district. Manganese, while common through the district, is decidedly more abundant in the outcrops to the east of the line of outcrop of No. 2 Fault, or in general on the east side of the range. Abundant iron in outcrops is practically limited to the outcrop of the iron vein. No quartz whatever was noted throughout most of the district, but was found frequently in proximity to the iron vein in the footwall of the vein and was noted in abundance and often free of the other mineralization in a belt to the south of a line drawn through coordinate 8200-N.

Calcite is universally present in the outcrops, with the possible exception of the quartz belt to the south where introduced mineralization is chiefly quartz. Dolomite is common but the outstanding dolomitic area occurs in the vicinity of the Hillside work--here the country rock is dolomitized for hundreds of feet in the footwall of the vein. Marble on the surface is confined to the footwall of the iron vein where marbelization has destroyed all primary distinctions of the rock. And underground marbelization comes in to occur throughout the whole of the 1500 level workings that lie in the hanging wall of the May Day vein structure.

PROSPECTS IN BRISTOL DISTRICT

In view of the extended fissure systems that exist in the district, the strict limitation of past mining and prospecting operations to the vicinity of outcropping orebodies at once suggests the extensive development that might be done on potentially productive structures. Because of this circumstance a special effort was made during the field examination to select the most favorable sites on which to continue prospecting or to establish new prospecting operations.

Notwithstanding the favorable structures and local mineral showings that might be mentioned on the Ida May, Pioche Bristol, Bamberger, Avon, Black Metals and other claim groups, comparable mineralogical and structural indications lie unprospected in the Bristol-May Day vein zone and on the Iron vein within easy reach of the underground working of the Bristol mine. We, therefore, confine the remaining portion of this report to the discussion of the prospects on the Bristol and Iron veins, both lying in close proximity to existing workings of the Bristol.

From the standpoint of future prospecting, the most important fact disclosed in the mapping is the great lateral extent of the Bristol vein zone. This east-west system was followed from the Valley Fault on the west across the range to be lost only on approaching the float covered foothills at the east side of the range. Although locally expressed in rather weak looking structure and occasionally obscured under the float from adjacent cliffs through its essential continuity and its specific disturbance of the enclosing rocks, the identity of the vein can be established for a total distance of some 7,200 feet.

The elements of the so-called Bristol vein zone are the May Day, Tempest and Gypsy fissures, named from their type localities in the old May Day, Tempest and Gypsy workings. The special physical characteristics distinguishing these elements are responsible for the local classification of all recognized fractures as either a May Day, a Tempest or a Gypsy structure. The May Day is the type footwall fissure characterized by a N 70° E to east-west strike with a flat 30° to 50° south dip. The May Day and its equivalent forms the sharp footwall limit of the vein system and is the locus of a normal fault movement of from 400 to 600 feet. The Tempest fissures, of which there are two or three well recognized members in the Bristol area, lie in the hanging wall of the May Day with which they are parallel in strike but dip 60° to 70° south. The Tempests have little, if any gouge, no recognized faulting and open or pinch to mere cracks, depending on the formation traversed. Regardless of the tendency to appear locally as tight cracks, experience shows that long range projections of the Tempests are dependable.

The Gypsy fissures have a north-south strike and steep dip either east or west. Like the Tempests, the Gypsy fissures locally open or pinch and are believed to be a subordinate component fracture system within the walls of the east-west system. However, the true nature of the Gypsy fissure is often obscured by their coincidence with the north-south faults of the district.

As the east-west trend of the mineralization in the Bristol area reflects the influence of the major structure of the Bristol vein zone, likewise a study of the stoping indicates that the concentration of the ore into shoots is coincident with certain geometrical properties of the structures within the vein system. Because of its considerable development, we turn to a study of the conditions localizing the ore shoots at the Bristol mine with a view to applying this experience to the undeveloped portions of the vein system.

STRUCTURE AND ORE SHOOTS AT BRISTOL MINE

Turning to the Bristol maps (see especially Plate 6 and 7), we find the old May Day stope of the May Day vein following the plane of the vein along the trace of its intersection with the original Gypsy fissure, and the Gypsy stope of the upper levels lying along the plane of the Gypsy fissure near the influence of a Tempest structure. These old stopes of the upper levels pinched in the vicinity of the 600 level and the mines were temporarily abandoned.

Later, with little more than optimism to encourage the development, the workings were pressed through the lean zone to discover the large orebodies worked out in the shrinkage and other stopes below the 700 level. It will be noted that the coming in of the orebody at the 700 level coincided with the converging dips of the May Day and a Tempest structure. The generalization might well be stated here that any May Day-Tempest convergence on dip results in an intersection, the trace of which is approximately a horizontal line, while the trace of an intersection of either a May Day or Tempest with a Gypsy would appear as a vertical line on the longitudinal sections of the vein.

Below the May Day-Tempest intersection at the Bristol 700 level, the dip of the vein zone is controlled by the Tempest dip to a point below the 1100 level, but at the 1200 level flat-dipping May Day structure reappears to form the footwall of the vein zone.

At first thought the considerable extension of the stoping into the hanging wall below the 700 level strongly suggests a stratigraphic influence on the deposition, but the abundance of north-south fissures, bedding slips, tight folding brecciation and other evidences of deformation suggest a mechanical explanation. For instance, if the hanging wall of the May Day structure has moved downward in accord with the displacement indicated in the throw of the chert beds on the surface, the hanging wall block of ground above the flat portion of the fault could adjust itself to the steepening dip only in the formation of a considerable component system of fault planes, bedding movements, etc. From this we might explain the contrast between the sharply defined footwall contact of the flat portions of the vein and the poorly defined footwall in the steeper portions, as due to a lack of friction contact along the steep segment during the fault movement. And further, the mechanics here set down would explain the difficult correlation of the upper level May Day with the strong May Day structure of the 1200 and 1500 levels.

If we can look to the probable continuation of this strong zone of deformation below the horizontal line representing the intersection of the May Day-Tempest fissures in the vein system to the east, a considerable light will have been thrown on the nature of the prospecting below the level of intersection. To complete the discussion of influences localizing the ore shoots at Bristol, we find the so-called porphyry dike fissures near the south limits of the Bristol workings. At the intersection of these dikes and north-south fissures, we have the south stope of the mine extending from the 1100 to terminate up dip at the flat bedding fault near the 700 level. The rather sharp termination of this stope at the bedding fault suggest a possible prospect above the fault plane; especially in view of the surface mineralization directly in line with the upward projection of the porphyry fissures. These dikes occupy fractures of identical strike and dip with the Tempest fissures, a fact indicating the probable transition from vein to dike along the same structural plane.

As shown on the section (Plates 6 and 7), stoping down the dip at Bristol terminates at about the 1200 level where the mineralization consists of an abundance of iron oxides. The occurrence of a hard dolomitic formation throughout a large portion of the 1200 level coincident with the decline in the grade of ore, for a time encouraged the belief that a formational change at the 1500 level might again restore the metal values. However, the 1500 level not only failed to show an improvement in the metals, but the whole level is characterized by an intense marbelization of the limestone, and a considerable increase in the number of porphyry dikes, both factors indicative of the close approach to some larger porphyry mass. In short the known ore shoots at the Bristol have all bottomed in low grade material near the 1200 level.

With the closing of the line around the known productive block of ground, through its failure in depth, the only insurance against the threatening decline in production is a rather extensive program of development. Because of the great distances involved we cannot subscribe to a sinking program contemplating the objectives below the present levels of the mine. Rather, we recommend expansion of the present levels laterally to the east to further develop the Bristol vein and to the west to develop both the Bristol vein and the Iron vein. The latter dipping east toward the mine workings is one of the strongest veins of the district, and has had no previous development in the vicinity of Bristol work. Before recommending the extension of the workings to specified objectives, we present certain tabular data relative to the economics of the Bristol operations. In these figures showing grade of ore, costs, net returns, etc. we have some basis to judge the value of the ores expected in the future development. The only figures available to the writer are set out in the tables below.

RECOMMENDATIONS

Note: Costs have been estimated at $10.00 per linear foot.

No. 1 - Bristol Vein System-May Day Tunnel Level (See Plates 5 and 6)

(A) Crosscut south from the present face of the May Day Tunnel to cut the Tempest Vein and drift east on the vein to No. 1 Fault; turn north on the east or hanging wall side of No. 1 Fault to recover the vein and drift east on the vein below the old Hillside stopes. Continue drifting east on the Hillside vein to a point below the good surface showing on the North Star claim.

Total Amount of Work	1,600 Feet
Estimated Cost	$16,000

(B) Also extend the workings on the May Day tunnel level as follows: Crosscut north at the present east face of the May Day tunnel approximately 200 feet to cut the May Day vein in the footwall of No. 1 Fault. Then drift east on the vein to its intersection with the No. 1 Fault, turn northerly drifting on the fault and exposing the east or hanging wall of the fault until the faulted May Day vein is recovered in the hanging wall block east of No. 1 Fault zone.

Total Amount of Work	900 Feet
Estimated Cost	$9,000

No. 2 - Bristol Vein System, 700 Level Sublevel East (See Plate 6)

Drift east on the May Day vein on the 700 sublevel east to a point below the Tempest and Hillside ore shoots. It will be recalled that this level should follow the vein near the horizontal trough-like intersection of the converging May Day and Tempest veins at which intersection began the large shrinkage and other stopes in the Bristol Mine. The drift should be extended also to prospect the intersection of the May Day-Tempest trough with the north-south trough formed by the intersection of the east dipping No. 1 Fault and the west dipping No. 3 Fault, which later intersection projects to the vicinity of the 700 Level. In view of the secondary forces which may have oxidized and redistributed the vein minerals the segment of the Bristol vein system caught in the north-south trough should be an extremely likely objective.

In choosing the 700 as the pilot level on which to test the possibilities of the Bristol vein system to the east, the writer has in mind, besides the favorable prospects indicated near this level, the possibility that a tunnel at a favorable site near the east side of the range would later be connected with this level.

Amount of work to reach point below Tempest and Hillside ore shoots and the north-south trough objectives:

Total Amount of Work	2,000 Feet
Estimated Cost	$20,000

<u>No. 3 - Bristol Vein System, 1500 Level (See Plate 6)</u>

Drift east on May Day Vein system on the 1500 level to a point vertically below the stope to the east of the shaft on the 1200 level. This lead carbonate stope is now being worked by winzes to a depth of some 50 feet below the 1200 level.

Total Amount of Work	700 Feet
Estimated Cost	$7,000

<u>No. 4 - Iron Vein and Bristol Vein to the West, 900 Level (See Plate 8)</u>

Crosscut N 50° W from Survey Plug No. 975 to cut the Iron Vein in the footwall of the May Day Vein. The vein should be penetrated in 500 to 600 feet and at a point near the trough formed by the east dipping Iron Vein and the west dipping No. 10 Fault, also near an intersection with a footwall split of the May Day system which on the surface lies in the footwall of the Iron Vein.

Total Amount of Work to Cut the Iron Vein		600 Feet
Estimated Cost	$ 6,000	
Additional to Disclose Footwall May Day		600 Feet
Estimated Cost	$ 6,000	
Total	$12,000	

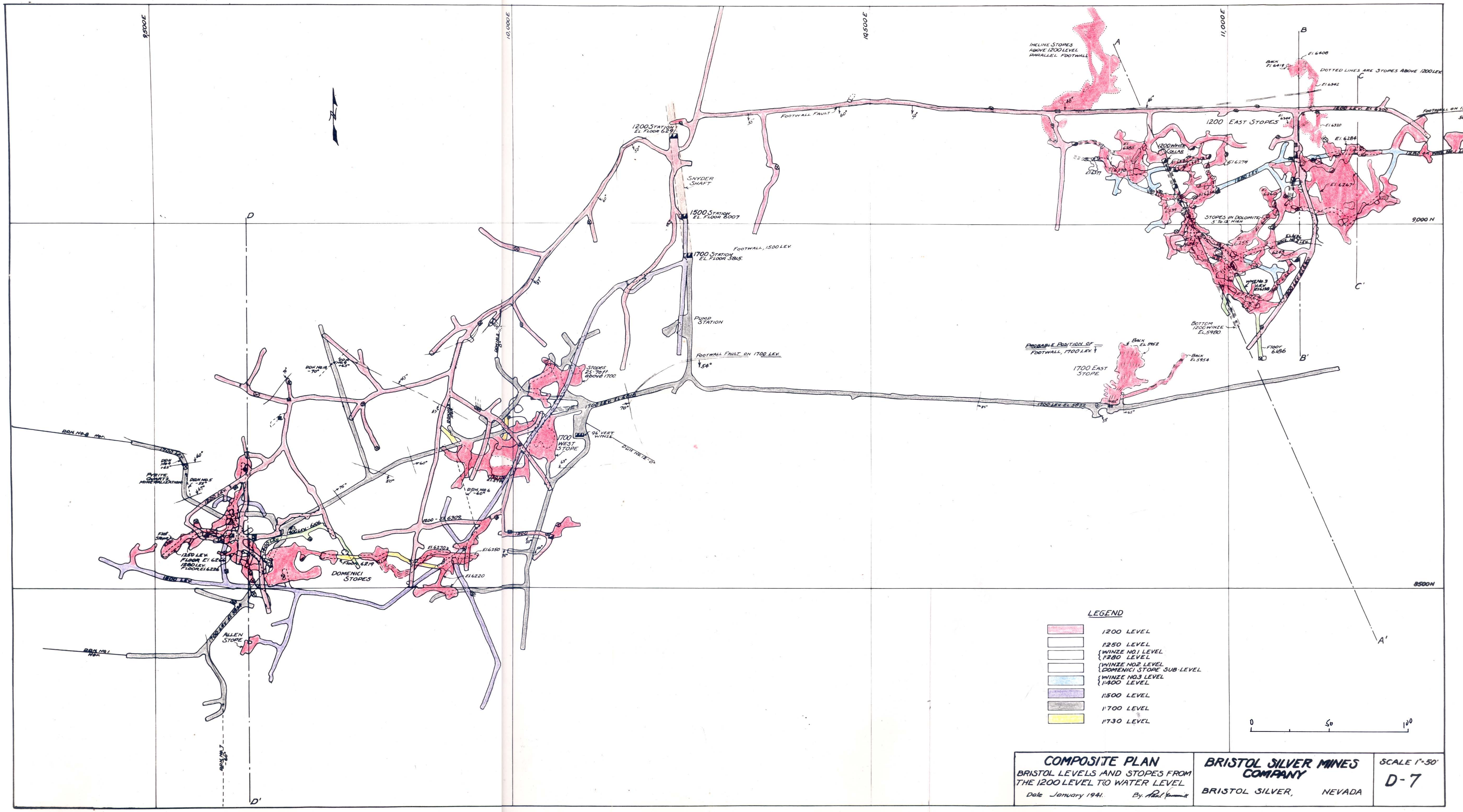
CONCLUSIONS

In support of a recommendation for an expenditure of approximately $50,000 to further develop the Bristol mine, we can point to a period of profitable operation in the years 1927 to 1929, inclusive, and to the considerable new knowledge of the geological structure which adds favorable color to the present prospective outlook. If it be objected that we point only to the profitable years in the past decade of operation, we can say that the operations of the early years of the decade are involved in the transition from the leaser-like prospecting to the modern operation and, therefore, is in no way a fair test of the possibilities of the district. We believe one of the principal factors in the success of the later years is the more efficient organization and equipment of the property and these are available in any future program.

Where the final outcome is based on such tenuous factors as are involved in local ore deposition and in favorable metal prices, we must realize a certain risk to the capital advanced for the development. Risk, however, is the common denominator of all mining development projects, and while we have no means of giving it relative expression, we believe the risk in the development at Bristol is considerably reduced in the clear cut objectives, and the economy of operating at this established site. We, therefore, recommend the Bristol development as comparing favorably with the relatively few meritorious prospects available to the modern mining development company.

Respectfully submitted,

Paul R. Murphy


9,500 E
10,000 E
10,500 E
11,000 E
9,000 N
8500 N
1200 STATION
EL FLOOR 6291
SNYDER SHAFT
1500 STATION
EL. FLOOR 6007
1700 STATION
EL. FLOOR 5815
FOOTWALL, 1500 LEV.
PUMP STATION
FOOTWALL FAULT ON 1700 LEV.
FOOTWALL FAULT
INCLINE STOPES ABOVE 1200 LEVEL PARALLEL FOOTWALL
DOTTED LINES ARE STOPES ABOVE 1200 LEV.
1200 EAST STOPES
1200 WINZE COLLAR
STOPES IN DOLOMITE 5' TO 12' HIGH
BOTTOM 1200 WINZE EL. 5980
PROBABLE POSITION OF FOOTWALL, 1700 LEV.
1700 EAST STOPE
STOPES 25-70 FT ABOVE 1700
1700 WEST STOPE
96' VERT. WINZE
PYRITE QUARTZ MINERALIZATION
DOMENICI STOPES
ALLEN STOPE
LEGEND
1200 LEVEL
1250 LEVEL
WINZE NO.1 LEVEL
1280 LEVEL
WINZE NO.2 LEVEL
DOMENICI STOPE SUB-LEVEL
WINZE NO.3 LEVEL
1400 LEVEL
1500 LEVEL
1700 LEVEL
1730 LEVEL
0
50
100
COMPOSITE PLAN
BRISTOL LEVELS AND STOPES FROM THE 1200 LEVEL TO WATER LEVEL
Date January 1941.
BRISTOL SILVER MINES COMPANY
BRISTOL SILVER, NEVADA
SCALE 1"=50'
D-7