

CORTEZ DISTRICT

The Cortez district is in the vicinity of Mt. Tenabo (elevation 9,240 feet), at the south end of the Cortez Range, and near the middle of the boundary line between Eureka and Lander Counties. It is accessible by automobile from Beowawe, a station on the Southern Pacific and Western Pacific Railroads 36 miles north. The district includes Mill Canyon, 4 miles north.

In the early '60s, prospectors from Austin found Indians gathering silver float in the gulches southwest of Mt. Tenabo, and by tracing the float to the cliffs above found the St. Louis lode. A number of locations were made in 1863 and, shortly after, Simeon Wenban, one of the original locators, sold half his holdings to George Hearst. Operating under the name of the Tenabo Mill and Mines Co., Wenban and Hearst acquired the principal properties, including the Garrison, St. Louis, Mt. Tenabo, Fitzgerald, and Arctic mines, embracing 690 acres of mineral land and 520 acres of mill sites and water rights. Wenban purchased Hearst's interest in 1867, and the profit realized by Hearst on this sale is said to have been an important factor in the founding of the Hearst fortune. At first, the rich ore was hauled 60 miles by pack train to Austin for treatment, but in 1869 an 8-stamp mill in Mill Canyon was acquired, which was later enlarged to 16 stamps and 4 roasting furnaces.

In 1886, a new mill was constructed near the Garrison mine; the treatment process involved a chloridizing roast followed by leaching with sodium hyposulphite solution (Russell process). This mill was a model installation at that time, and the extraction of silver ranged from 85 to 90 percent. From 1889 to 1892, the Tenabo Mill and Mines Co. was operated under the name of Cortez Mines, Ltd., by the Bewick-Moering Syndicate of England; the property reverted to Wenban in 1892. Following Wenban's death in 1895, his heirs continued operations until 1903, after which a small amount of mining was done by lessees up to 1919, when the property was acquired by the Consolidated Cortez Silver Mines Co. The Garrison tailings dump, reported to contain 125,000 tons, was retreated by cyanidation from 1908 to 1915.

The Consolidated Cortez Silver Mines Co. erected a 125-ton-daily-capacity cyanide plant at Cortez in 1923, which operated continuously until the latter part of 1927, when the mill was remodeled and converted into a 150-ton flotation plant. Operations were continued until January 1930, when the mill closed down because of the low price for silver and depletion of the ore reserves. Subsequently, the company went into the hands of a receiver. In September 1937, the receivership of the properties was terminated and the receiver, John F. Coleman of New York, was instructed to accept an offer tendered by the Cortez Metal Co., a Nevada corporation, whereby 900,000 shares of the 2,000,000 shares (par value 5 cents per share) of the Cortez Metal Co. was distributed to the creditors of the old company.

In recent years the only activity at Cortez has been small-scale leasing operations.

TABLE 3. - Gold, silver, copper, and lead production from the Buckhorn district, Eureka County, Nevada, 1910 - 1936, in terms of recovered metal.
(Compiled by Charles White Merrill, Mineral Production and Economics Division, Bureau of Mines.)

Year	No. of mines	Ore, short tons	Lode								Total value	Average recoverable value of ore per ton ¹ /
			Gold		Silver		Copper					
			Fine ounces	Value	Fine ounces	Value	Pounds	Value				
1910	1	54	282.31	\$5,836	2,660	\$1,447	19	\$2	\$7,285	134.91		
1911-13	-	-	-	-	-	-	-	-	-	-		
1914	1	73,000	13,485.00	278,760	107,248	59,308	-	-	338,068	4.63		
1915	1	103,528	14,026.00	289,943	106,081	53,783	-	-	343,726	3.32		
1916	1	15,000	2,702.68	56,014	24,327	16,007	-	-	72,021	4.80		
1917-30	-	-	-	-	-	-	-	-	-	-		
1931	1	164	132.21	2,733	978	284	-	-	3,017	18.40		
1932	1	2/	2/	2/	2/	2/	-	-	2/	2/		
1933-35	-	-	-	-	-	-	-	-	-	-		
1936	2	2/	2/	2/	2/	2/	-	-	2/	2/		
Total	-	195,010	31,289.79	655,429	246,643	134,735	19	2	790,166	4.05		

¹/ Not to be confused with average assay value of ore.

²/ Bureau of Mines not at liberty to publish figures, but concealed figures included in totals.

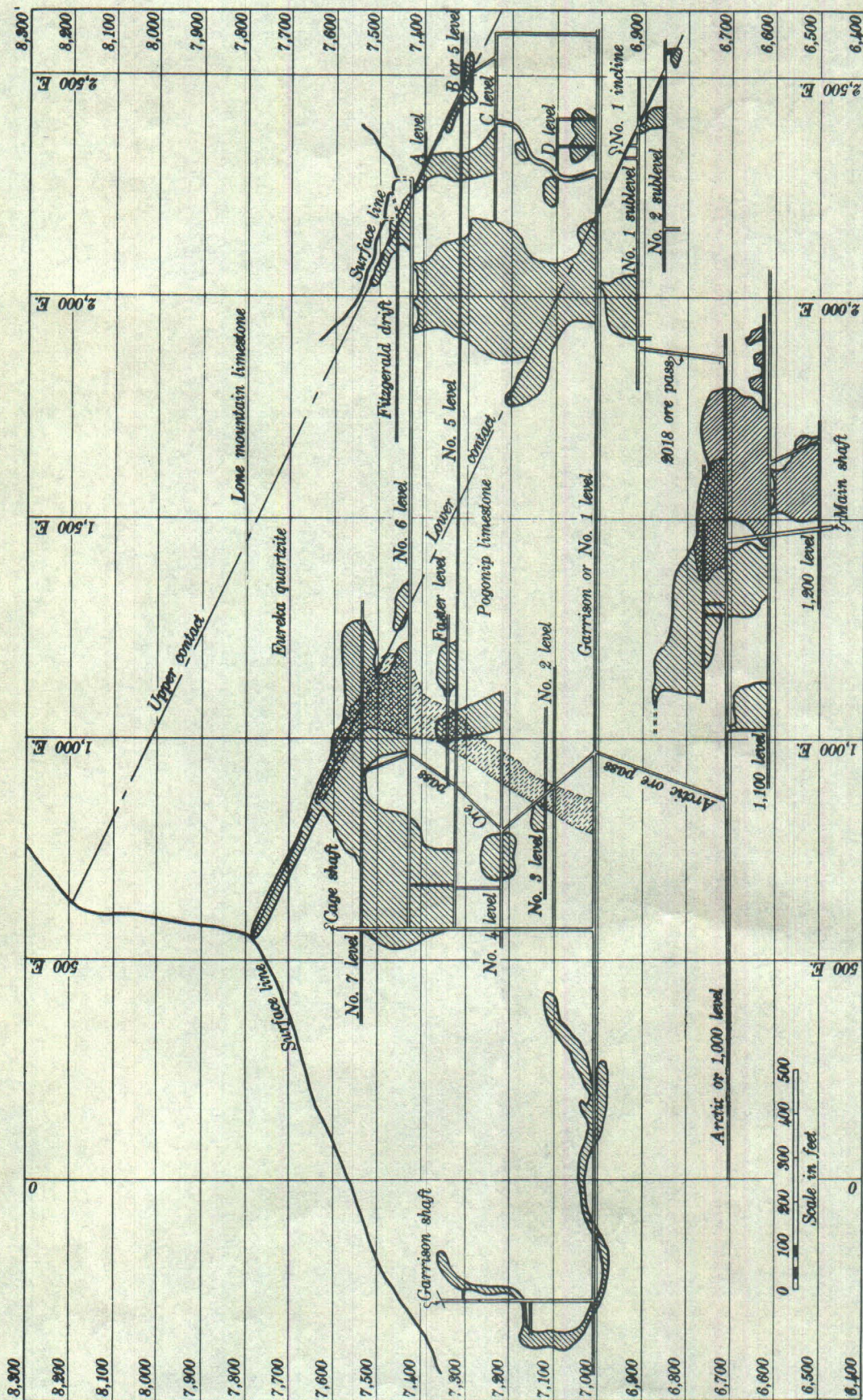
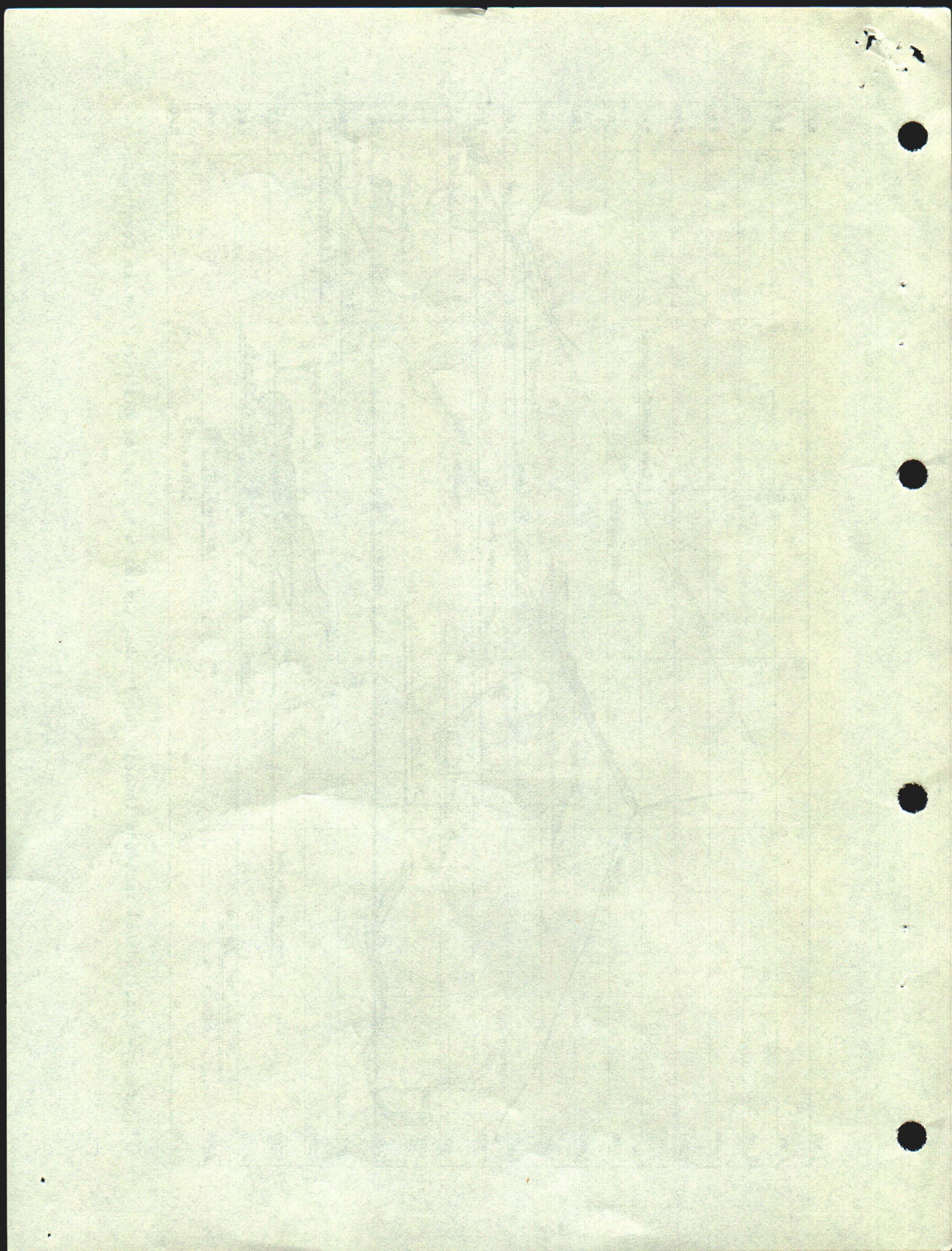


Figure 3.- Longitudinal sections through No. 1 dike, Cortez mine, Cortez district, Eureka County, Nev.



Mill Canyon, about 4 miles north of Cortez, is generally considered part of the Cortez district. A number of properties have been intermittently active in this area since the early days, but, compared with the Cortez mines, production has been small. The principal properties are owned by the Roberts Mining and Milling Co. This company erected a 25-ton cyanide plant in 1937, which started operation in August the same year. In the early part of 1938 the property closed down because of litigation.

Several deposits of turquoise in the vicinity of Cortez have been worked intermittently in former years, but the production has been small.

The production of the Cortez district from 1863 to 1903, according to the old company records, was in excess of 7,400,000 ounces of silver and \$500,000 in gold, but this does not include many unrecorded shipments. The gross value of the production for this period is probably about \$10,000,000. The production of the district from 1902 to 1936 is shown in table 4.

Cortez Metals Co.

The Cortez Metals Co. owns 44 mining claims (33 patented) and 520 acres of millsites and water rights. This group comprises the properties formerly owned by the Tenabo Mill & Mines Co.

The property has been developed extensively by a number of adits, shafts, and lateral workings totaling approximately 20 miles. Entry to the lower portion of the mine is made by two adits, each about 4,000 feet long, and one inclined shaft sunk from the lowest adit. The portal of the Garrison, or upper, adit is at an altitude of 7,055 feet. The underground shaft, from the Arctic level, has an inclination of 73° and extends 240 feet vertically below the level. From this shaft, two levels have been established, respectively, 98 and 217 feet vertically below the collar. A longitudinal section of the principal workings is shown in figure 3.

Equipment includes a 150-ton flotation mill, a complete mining plant, and camp accommodations for 60 men. Power is supplied by two 4-cylinder, Fairbanks-Morse Deisel engines, 200 horsepower each, direct-connected to a 125-kv-a generator, and one 150 horsepower Deisel engine connected to a Sullivan 2-stage compressor. There are also two Chicago pneumatic 2-stage compressors. Haulage equipment includes a 3-1/2 ton storage-battery locomotive.

Water for mining and milling is available from wells sunk in the valley about 3 miles south of Cortez. A description of the mining methods and costs in 1929 (the last year of company operations) is given by Hezzelwood^{13/}.

In 1936 and 1937 a portion of the mine was leased to J. A. Boitano, who shipped 6 carloads of ore averaging about 85 ounces in silver and \$1.50 in gold.

^{13/} Hezzelwood, G. W., Mining Methods and Costs at the Consolidated Cortez Silver Mine, Cortez, Nev.: Information Circular 6327, Bureau of Mines, 1930.

TABLE 4. - Gold, silver, copper, and lead production from Cortez district, Eureka and Lander Counties, Nevada, 1902-1936, in terms of recovered metal.

(Compiled by Charles White Merrill, Mineral Production and Economics Division, Bureau of Mines.)

Year	No. of mines	Lode				
		Ore, short tons	Gold		Silver	
			Fine ounces	Value	Fine ounces	Value
1902	1	6,749	289.28	\$5,980	214,094	\$113,470
1903	4	9,709	858.46	17,746	149,343	80,645
1904	3	5,561	489.60	10,121	115,902	67,242
1905	2	1,837	96.75	2,000	37,540	22,674
1906	2	144	66.81	1,381	8,792	5,891
1907	1	125	42.33	875	5,000	3,300
1908	2	1,173	73.00	1,509	18,700	9,911
1909	3	898	283.62	5,863	40,459	21,039
1910	-	-	-	-	-	-
1911	5	135	26.99	558	7,712	4,087
1912	2	13,433	294.97	6,098	52,429	32,244
1913	6	12,968	282.36	5,837	54,196	32,734
1914	3	2,946	192.13	3,972	44,185	24,434
1915	6	15,692	816.84	16,886	67,873	34,412
1916	4	5,534	268.42	5,549	42,139	27,727
1917	10	647	161.50	3,339	26,950	22,207
1918	12	456	101.52	2,098	31,578	31,578
1919	2	133	.78	16	11,387	12,753
1920	5	140	21.98	454	7,872	8,580
1921	2	85	11.70	242	8,416	8,416
1922	3	209	35.09	725	39,386	39,386
1923	1	9,250	272.45	5,632	172,466	141,422
1924	1	32,434	713.78	14,755	423,163	283,519
1925	2	40,315	671.68	13,885	366,350	254,247
1926	2	44,482	742.02	15,339	345,381	215,518
1927	2	37,864	304.25	6,289	544,646	308,814
1928	1	51,167	443.22	9,162	785,980	459,798
1929	4	44,322	515.19	10,650	493,766	263,177
1930	2	1,623	39.55	818	44,423	17,103
1931	3	13	13.53	280	618	179
1932	1	2/	2/	2/	2/	2/
1933	3	371	74.42	1,538	18,424	6,448
1934	2	7	6.72	235	341	220
1935	1	44	2.97	104	3,829	2,752
1936	2	2/	2/	2/	2/	2/
Total	-	340,720	8,267.07	171,786	4,195,128	2,564,972

1/ Not to be confused with average assay value of ore.

2/ Bureau of Mines not at liberty to publish figures, but concealed figures included in totals.

TABLE 4. - Gold, silver, copper, and lead production from Cortez district, Eureka and Lander Counties, Nevada, 1902-1936, in terms of recovered metal - Continued.

(Compiled by Charles White Merrill, Mineral Production and Economics Division, Bureau of Mines.)

Year	Lode					Average recoverable value of ore per ton
	Copper		Lead		Total value	
	Pounds	Value	Pounds	Value		
1902	5,907	\$721	12,564	\$515	\$120,686	\$17.88
1903	3,100	391	20,489	550	99,332	10.23
1904	13,963	1,380	16,726	577	79,330	14.26
1905	64	10	56,827	2,670	27,354	14.89
1906	-	-	21,315	1,215	8,487	58.94
1907	-	-	-	-	4,175	33.40
1908	7,773	1,026	9,095	382	12,828	10.94
1909	1,000	130	10,721	461	27,493	30.62
1910	-	-	-	-	-	-
1911	2,022	253	31,970	1,439	6,337	46.94
1912	803	132	46,893	2,110	40,584	3.02
1913	1,581	245	83,791	3,687	42,503	3.28
1914	402	53	179,599	7,004	35,463	12.04
1915	2,543	444	84,068	3,950	55,692	3.55
1916	1,373	338	36,922	2,548	36,162	6.53
1917	7,434	2,029	148,741	12,792	40,367	62.39
1918	4,614	1,140	160,030	11,362	46,178	101.27
1919	780	145	63,358	3,353	16,272	122.35
1920	1,084	199	45,945	3,675	12,903	92.20
1921	368	48	24,959	1,123	9,829	115.64
1922	2,764	373	26,625	1,464	41,948	200.71
1923	2,216	326	30,705	2,149	149,529	161.65
1924	5,021	658	67,041	5,363	304,295	9.38
1925	2,419	344	46,417	4,038	272,514	6.76
1926	3,308	463	38,580	3,086	234,406	5.27
1927	13,770	1,804	176,959	11,148	328,055	8.66
1928	25,031	3,605	364,617	21,148	493,713	9.65
1929	17,990	3,166	435,990	27,467	304,460	6.87
1930	1,768	230	37,252	1,863	20,014	12.33
1931	-	-	1,636	60	519	39.92
1932	2/	2/	2/	2/	2/	2/
1933	1,368	87	25,640	949	9,022	24.32
1934	-	-	240	9	464	66.29
1935	142	12	1,268	51	2,919	66.34
1936	2/	2/	2/	2/	2/	2/
Total	131,828	19,841	2,311,093	138,364	2,894,963	8.50

^{1/} Not to be confused with average assay value of ore.

^{2/} Bureau of Mines not at liberty to publish figures, but concealed figures included in totals.

The geology of the district has been described by Emmons^{14/}.

In the vicinity of Cortez, the prevailing formations are a series of limestone beds and quartzites that have been uplifted by granitic intrusives. The limestone and quartzite dip conformably about 23° S. 80° E. and are cut by a series of eight porphyry dikes, highly altered, striking S. 80° E. and dipping to the north about 75°.

The ore occurs as irregular replacement deposits (1) along bedding planes of the limestone, (2) in limestone and quartzite in and near a dike fissure (only one dike has been explored), and (3) in fissures in limestone approximately parallel to the dikes. The latter type of deposit has been the most productive. The fissure ore bodies dip from 45° to 80° and range from 1 to 20 feet in width, averaging about 7 feet. The vertical range of the ore bodies from the highest point on the surface to the lowest depth mined is about 1,600 feet. The most productive area was between the 5th and 7th levels, or from 100 to 300 feet below the surface. The largest ore body was 630 feet long, 5 to 15 feet wide, with a maximum vertical extent of about 220 feet.

The unoxidized ore minerals are silver-bearing quartz, galena, pyrite, tetrahedrite, sphalerite, chalcopryite, and stibnite. The oxidized ore is composed of silver chloride, copper carbonates, and iron and manganese oxides. Values are chiefly in silver. As an indicator of the silver values, galena is superseded by tetrahedrite at depth.

Roberts Mining & Milling Co.

The Roberts Mining & Milling Co., Miss Belle McCord Roberts of Long Beach, Calif., president, is a closed corporation organized in 1930. The company's holdings are a consolidation of virtually all the principal groups of claims in Mill Canyon, including the Erwin, Falconer, Bullion Hill, Berlin, Cross Fissure, and Emma E. groups, totaling 48 claims, 9 of which are patented. The first locations in this area were made about the same time the Cortez mines were discovered, or about 1863. A stamp mill was erected in Mill Canyon in 1868, which operated for a number of years principally on ores from the Cortez mines. In 1900, a gravity concentrator was erected in Mill Canyon to treat ores from the Erwin and Falconer properties, but it operated only a short time. About 1928, the Majestic Mines Corporation was organized to work several properties, but only a small amount of development was done and the holdings of the company were acquired by the Roberts Mining & Milling Co. In 1936 and 1937, this company opened a deposit of gold ore on the Emma E. claim and in the latter part of 1937 erected a small cyanide mill, which began operations August 27, 1937, but closed down because of litigation after operating a few months.

The various claims in Mill Canyon have been worked intermittently on a small scale for many years, principally by lessees. The bulk of the production, estimated at \$200,000, has been shipping ore.

^{14/} Emmons, William H., A Reconnaissance of Some Mining Camps in Elko, Lander, and Eureka Counties, Nev.: Geol. Surv. Bull. 408, 1910, pp. 99-110.

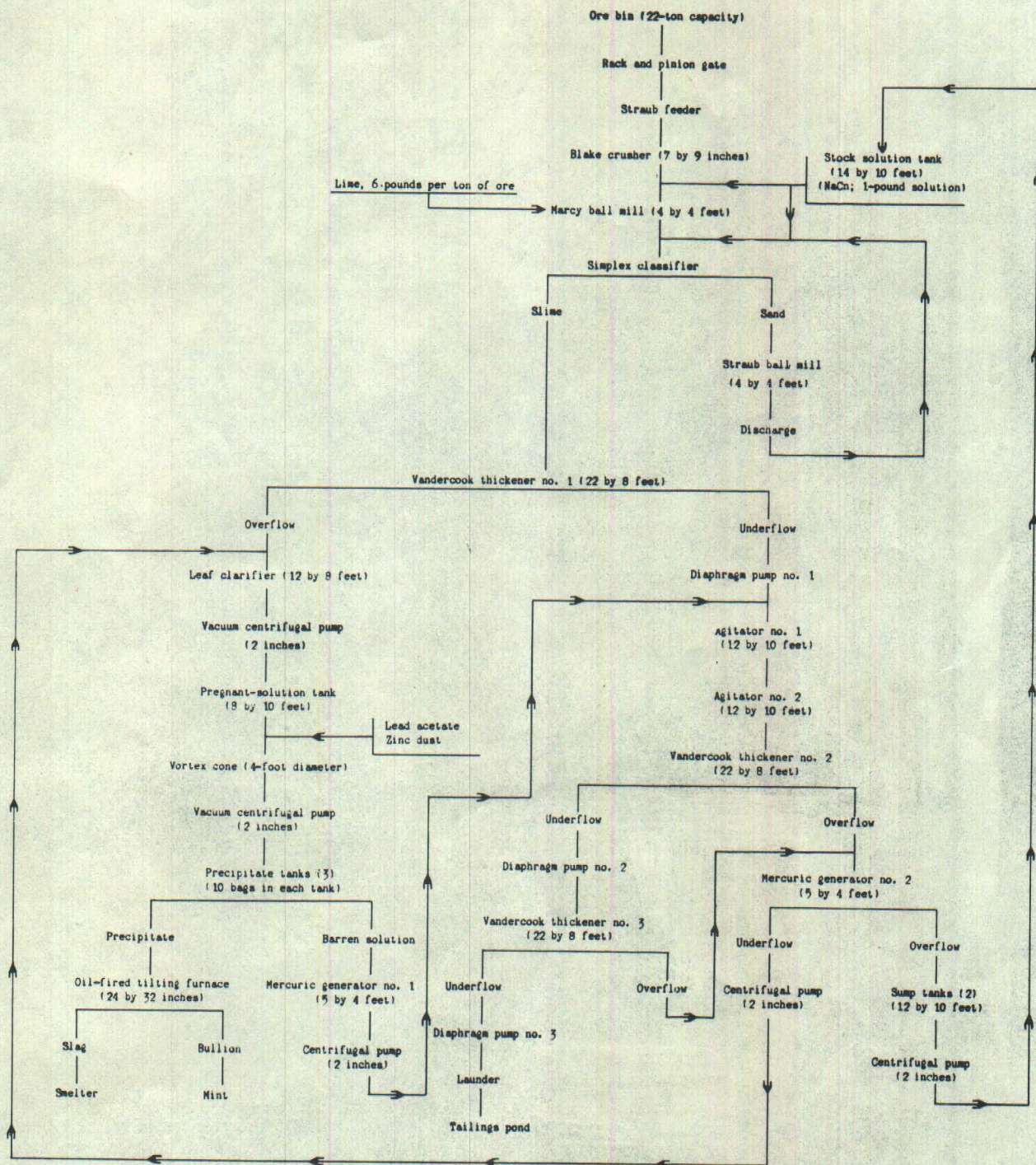


Figure 4.- Flow sheet of 20-ton-daily-capacity cyanidation mill, Roberts Mining & Milling Co., Cortez district, Eureka County, Nev.

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Property is developed by a number of scattered adits and other disconnected workings totaling about 5,000 feet. Equipment includes a Sullivan portable compressor; an Ingersoll-Rand, 630-feet-capacity, stationary compressor; Sullivan drill sharpener; rock drills, blacksmith shop; gravity-type tramway, 1,250 feet long; two automobile trucks; a 20-ton cyanide mill; assay office; and camp accommodations for a crew of 30 men. Power for milling is supplied by a 100-horsepower, Fairbanks-Morse, 2-cylinder, Deisel engine direct-connected to a 220-volt, 3-phase, 60-cycle, 75-kv-a generator.

The mill flow sheet is shown in figure 4. The mill was designed for a capacity of 50 tons per day but, due to the limited capacity of the crushing and grinding units, only 20 tons per day could be treated. The only unusual feature of the plant is the installation of the two mercuric generators, the function of which is not understood by the writer. About 1 ounce of mercury is used in the two generators per week. At the time of the writer's visit, the mill heads averaged \$40 per ton and the tailings loss was about 90 cents per ton. The milling cost was reported to be \$2.50 per ton.

The prevailing formations in the vicinity of Mill Canyon are limestone and granodiorite intrusives. The ore deposits are of three types - (1) fissure veins in granodiorite carrying silver-lead, and gold, (2) silver-lead replacement deposits in limestone, and (3) ferruginous deposits of gold ore in limestone. In former years, the fissure veins were the most productive, the most prominent being the Rhoda and Aurora veins on the Bullion Hill group of claims. These two veins are parallel and about 200 feet apart on the surface, striking nearly north and south, with prevailing steep dips. The portions of the veins economical to mine are generally narrow. The sulphide ore is composed of galena, sphalerite, pyrite, argentite, tetrahedrite, stephanite, stibnite, and gold in a quartz-calcite gangue. The silver values predominate.

The principal silver-lead replacement deposits in limestone occur on the Erwin and Falconer claims. The limestone has a strike of N. 45° W. and an average dip of N. 30° E. On the Erwin ground, the limestone is considerably disturbed by faulting, due to the proximity of granodiorite intrusive. The ore is sulphide in character and occurs along bedding planes and fissures in the limestone.

The principal gold-ore deposit is on the Emma E. claim. Here the values are chiefly in gold, with minor amounts of silver in a gangue composed largely of ferruginous material and calcite. At the time of the writer's visit, an ore body had been opened for a length of 200 feet and approximately 100 feet in depth. The width of the ore ranged from 1 to 18 feet, averaging about 8 feet, and the values ranged from \$20 to \$60 per ton, chiefly in gold. The ore makes along a fissure, and its continuity is interrupted, both along the strike and dip, by several faults.

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Turquoise

The White Horse turquoise deposit is about 3 miles westerly from Cortez. It has been known for many years and a small amount of gem material has been mined. The turquoise occurs in small seams in a decomposed igneous rock, probably rhyolite.

In 1929, J. A. Boitano of Cortez found turquoise in Cortez Canyon, several miles from the camp of Cortez. In 1930 and 1931, Boitano prospected the deposit by several open cuts and during the course of this work produced 600 pounds of crude turquoise that was sold for \$5 per pound. Here the turquoise occurs as nodules and seams in thin-bedded limestone striking S. 40° E. and dipping about 20° to the southwest.

DIAMOND DISTRICT

The Diamond, also known as the Phillipsburg, district is on the west slope of the Diamond Range, 21 miles north of Eureka. The first mineral discovery was made here in June 1864, by a man known as Phillips. In 1866, a few tons of ore from the Mammoth claim were hauled to Austin for treatment, after which the district remained virtually abandoned until 1873, when a small smelting furnace was erected at the Champion mine by the Champion Silver Mining Co. This venture was unsuccessful, and later a second furnace was built at the Phillips property. There is no record of production, but from the size of the slag pile, the extent of the underground workings, and reported value of the ore, the district has not produced more than \$50,000.

In 1922, the Eureka Silver Mines Co., a Utah corporation, attempted to concentrate, by gravity methods, the dump material at the Phillips property, but the results were discouraging. Subsequently, lessees worked the mine and the dumps with indifferent results. In 1937, the only activity in this area was on the Silver Bell group of claims situated about 1 mile west of the Phillips property.

Phillips Group

This property consists of a group of three patented and one unpatented lode claims owned by H. A. Culloden of Los Angeles, Calif. Development consists of an adit 300 feet long, about 1,000 feet of drifts, and other workings, totaling in all about 1,500 feet. There is no usable equipment on the property.

The prevailing formation is silicified limestone. The Phillips vein, on which most of the work has been done, strikes nearly north and south, has a dip of 35° to 55° to the west, and a width ranging from 1 to 6 feet and averaging 3 feet. Approximately 400 feet of the vein has been stoped above the adit level, but, since the vein outcrops on a gently sloping hill into which the adit has been driven, the stoping distance from the level to the surface is small. In several places the vein has been explored below the adit level.