

History of the Mines  
in the Texas Mining District  
near Gilmore, Idaho

Victoria E. Mitchell

Staff Report 97-19  
April 1997

Idaho Geological Survey  
Morrill Hall, Third Floor  
University of Idaho  
Moscow, Idaho 83844-3014

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## INTRODUCTORY NOTE

This report was prepared under a cooperative agreement with the U.S. Forest Service, Region IV, as part of a project to identify and describe inactive and abandoned mines in the state of Idaho. Work on this project included preparing detailed histories of mines in Region IV that had significant recorded production. The information in this report is from a number of published and unpublished sources in the Idaho Geological Survey's mineral property files. Where not otherwise noted, most of the mine production data is drawn from the U.S. Geological Survey's (USGS) annual volumes on *Mineral Resources of the United States* (1882-1923) and the equivalent volumes produced by the U.S. Bureau of Mines (USBM) (*Mineral Resources of the United States*, 1924-1931, and *Minerals Yearbook*, 1932 to present). Information on underground workings and mine equipment is generally from the annual reports of the Idaho Inspector of Mines (IMIR), published from 1899 to 1979. After 1974, the Mine Inspector's office was known as the Mine Safety Bureau, a section of the Idaho Department of Labor and Industrial Services. Detailed accounts of mine operations are, for the most part, drawn from the annual reports prepared by the companies for the State Inspector of Mines; these reports were required by law and the information contained in them formed the basis of the Mine Inspector's annual reports. Reports of recent developments are taken from the Idaho Geological Survey's (IGS) annual reports on the developments in mining and minerals in Idaho (from 1984 to present) or from similar reports produced by the Survey's predecessor, the Idaho Bureau of Mines and Geology (IBMG) from 1975 to 1984. Other published sources are referenced in the text. A complete bibliography is included at the end of the report. Where direct quotations are taken from source materials, the original spelling and grammar are preserved even in cases where they do not conform to currently accepted usage.

# History of the Mines in the Texas Mining District near Gilmore, Idaho

Victoria E. Mitchell<sup>1</sup>

## INTRODUCTION

The Texas district is in Lemhi County on the east side of the Lemhi Range near the townsite of Gilmore (Figures 1 and 2). Most of the mines in the district are lead-silver replacement deposits in the Jefferson and Saturday Mountain Formations (Figure 3), although one mine produced from a gold-bearing vein and two others produced lead-silver-gold ores.

Many of the claims in the Texas district (Figure 4) were located in the early 1880s in response to the discovery of ore in the Spring Mountain district to the south in 1880 and at the Viola Mine on the opposite side of Lemhi Valley in 1881 (Umpleby, 1913; Ruppel and Lopez, 1988). A 30-ton smelter was installed in the Spring Mountain district in 1882 at a cost of \$135,000. The smelter made a three-day test run late in 1882 but never operated successfully (Wells, 1983). A smelter was blown in at Nicholia in 1886 and processed ore shipments from the Texas district that year. However, the Viola ores were exhausted by 1887, and the smelter closed in 1889 (Ruppel and Lopez, 1988). The district was 85 miles from the nearest railroad, making transportation costs almost prohibitive. Little further work was done until the

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<sup>1</sup>Idaho Geological Survey, Main Office at Moscow, University of Idaho, Moscow.



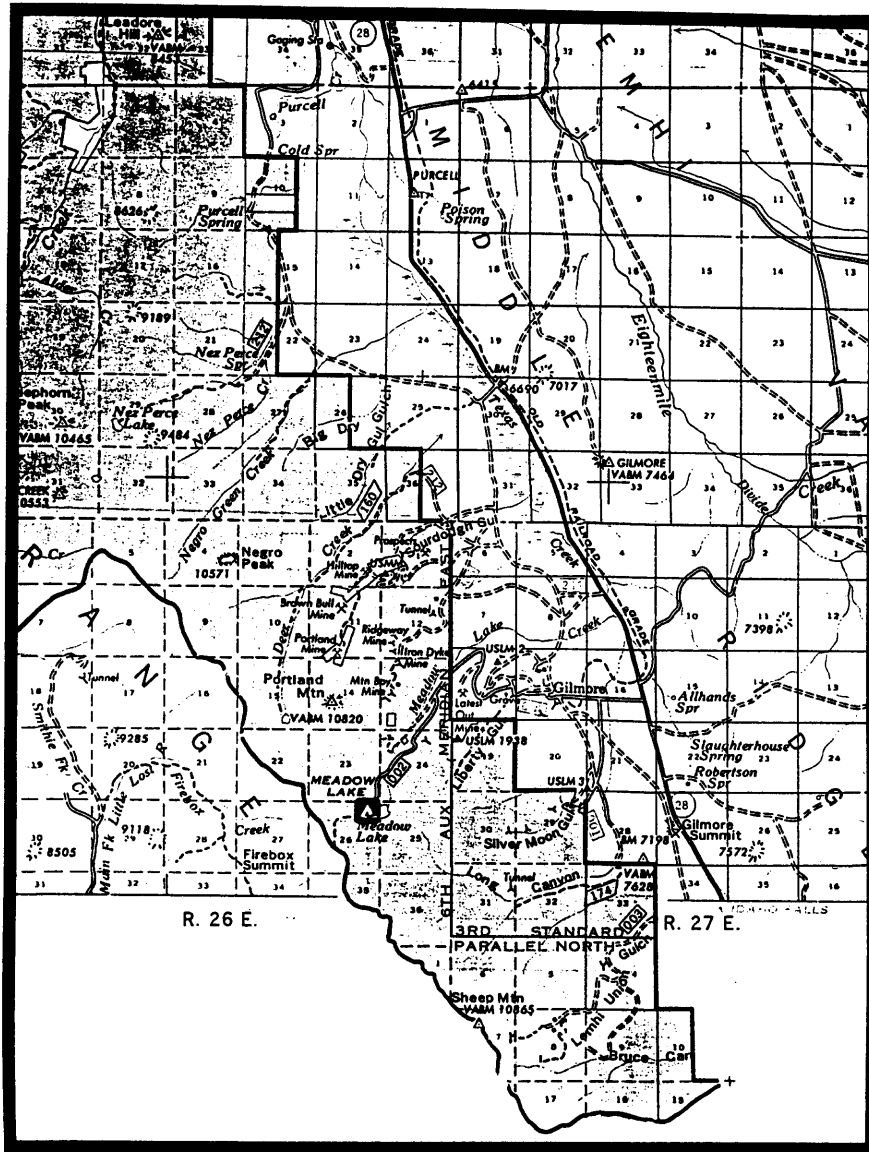


Figure 1. Location map of the Gilmore area in the Texas mining district, Lemhi County, Idaho (U.S. Forest Service Salmon National Forest map, scale  $\frac{3}{8}$  inch = 1 mile).

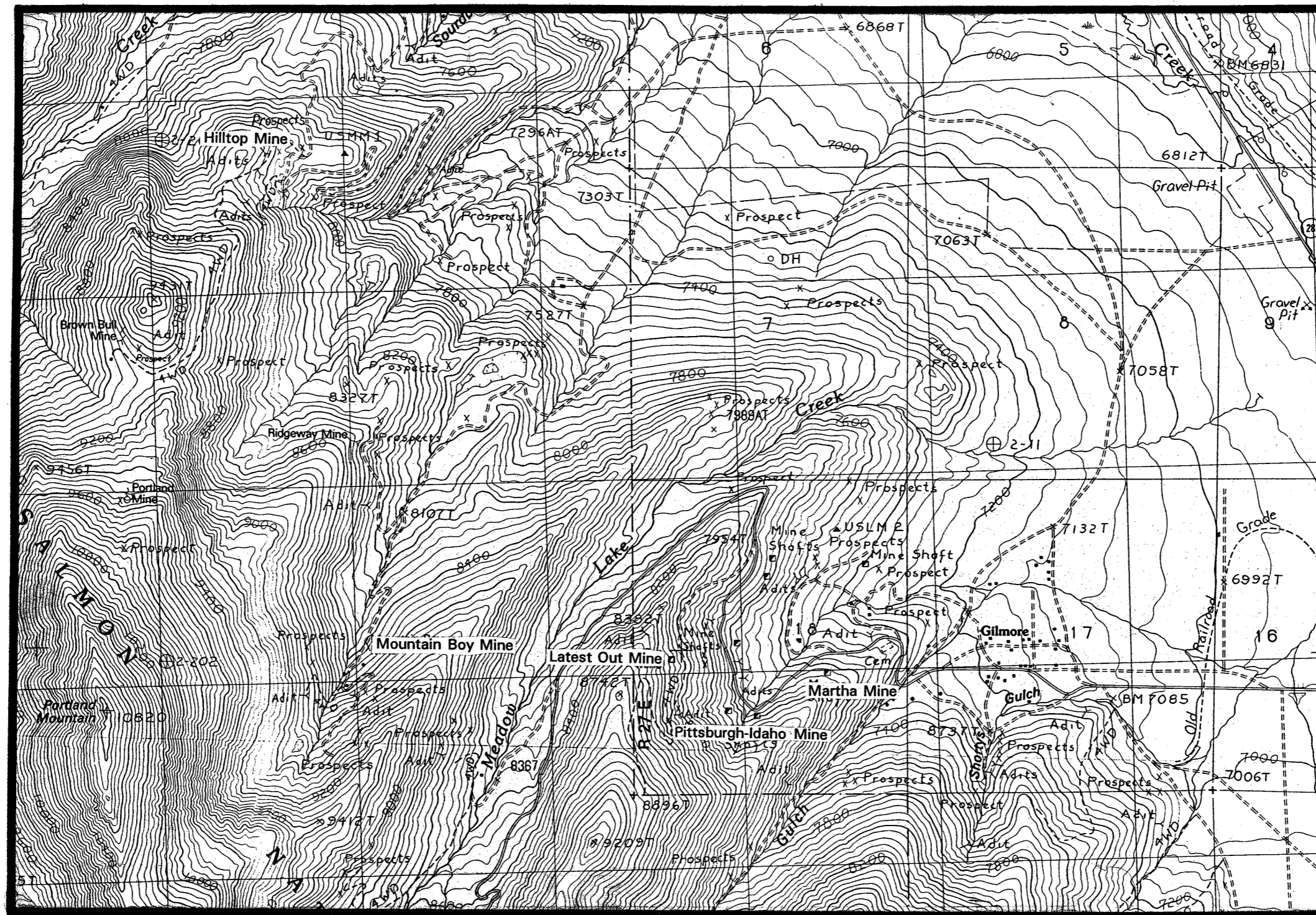


Figure 2. Topographic map of the area near Gilmore, Texas mining district, Lemhi County, Idaho (U.S. Geological Survey Gilmore 7.5-minute topographic map).



Figure 3. Geology of the Texas mining district and vicinity, Lemhi County, Idaho. pCu = undifferentiated metasedimentary rocks of Precambrian Y age; pCbc = Precambrian Big Creek Formation; pCac = Precambrian Apple Creek Formation; pCgs = Gunsight Formation; pCsq = Precambrian Swauger Quartzite; Ok = Ordovician Kinnikinic Quartzite; Osm = Ordovician Saturday Mountain Formation; Sl = Silurian Laketown Dolomite; Dj = Devonian Jefferson Formation; Dt = Devonian Three Forks Limestone; Mmg = Mississippian McGowan Creek Formation; PMu = undifferentiated Upper Mississippian and Pennsylvanian rocks; Tcv, Tct = Eocene Challis Volcanics; Tgd = Tertiary quartz diorite and granodiorite; Tmls = Tertiary Medicine Lodge sedimentary deposits (lines with double arrowheads are axes of folds); Tt = Tertiary tuff and tuffaceous conglomerate; QToa = older alluvium (Pliocene and Pleistocene); Qf = Pleistocene alluvial fans; Qg = Pleistocene glacial deposits; Qsr = Quaternary Snake River Basalt, undivided; Qal = Quaternary alluvium. Heavy lines are faults; sawteeth mark the upper plates on thrust faults (Rember and Bennett, 1979).

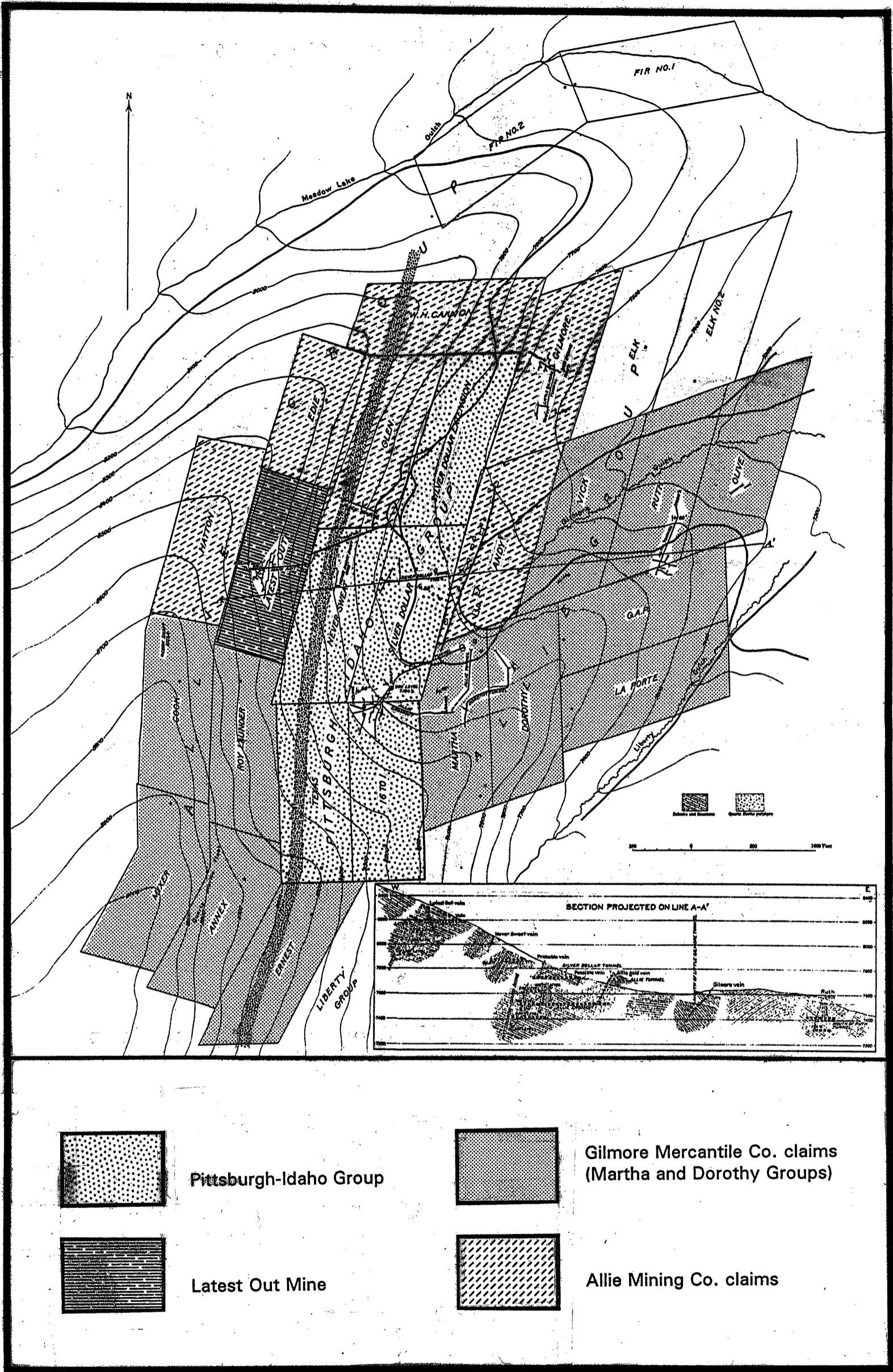


Figure 4. Map showing claims in the Gilmore division of the Texas mining district (Plate XV from Umpleby, 1913).

five most productive claims (which would become the core of the Pittsburgh-Idaho mine) were purchased by an eastern investor in 1902.

Ore produced in 1903 was hauled to the railroad at Dubois using trains of four wagons each. The trains were pulled by ten to sixteen horses, and the average load was about a ton per horse (Ruppel and Lopez, 1988). The IMIR for the year noted that a number of properties in the region had "good shipping records," but that none of them were developed below the oxidized zone.

The 1904 IMIR gave this history (p. 101-102):

During the period of the Viola's active production, the Texas-Spring Mountain Districts, covering fifteen miles of the slopes of a lofty range of mountains, that form the opposite side of the broad Birch Creek Valley from Nicholia, were discovered, and a hundred promising claims were located, and probably two dozen of them made shipments ranging from a wagon load to several carloads of high-grade lead-silver, silver-lead and rich dry silver ore.

These prospects were pecked at for several years, but no serious amount of intelligent development work was done on any of them, and with the sudden exhaustion of the Viola, and the low price of lead under the Cleveland administration, interest in this district waned, and a majority of the claims were abandoned.

Most of the ore shipped from the district must have been carefully hand-picked to make certain little waste and as much high grade ore as possible went into the wagons (Ruppel and Lopez, 1988). The 1904 IMIR stated (p. 106-107):

The camp of Gilmore is situated in a prettily timbered horseshoe-shaped cove, near the foot of the main mountain uplift that towers to elevations of 10,000 to 11,000 feet above sea level behind it to the southwest [Figures 5 and 6].

These mountains are built up of deeply fractured and faulted masses of quartzite, limestone, dolomite and eruptives, and in spite of their lofty elevations and deep snows, aside from occasional small springs, carry no flowing surface creek, but form a desert range of the Great Basin type for forty miles to the southeast, where they suddenly terminate as low "hog-backs," in the Snake River desert. This structural peculiarity would indicate that the desirable oxidized condition of the ores of this district will be maintained to very considerable depth.

A postoffice has been established at Gilmore, and quite an array of substantial buildings erected, including a well-stocked general store. Water has been brought in from a nearby spring gulch; several other properties are being developed in the near vicinity that give the place quite an appearance of thrift and permanency, which, together with its accessibility and grand surroundings of mountain and valley landscapes, forms a healthy and desirable place to live.

There are quite a number of small development operations in progress at the present time, along the range east and west of Gilmore, and during the past year, ore shipments of from one to four cars were made from half a dozen different properties.

The IMIR noted that the cost of hauling ore to Dubois was \$10 a ton. The route was "a smooth, hard desert road, with a very gradual fall all the way from the

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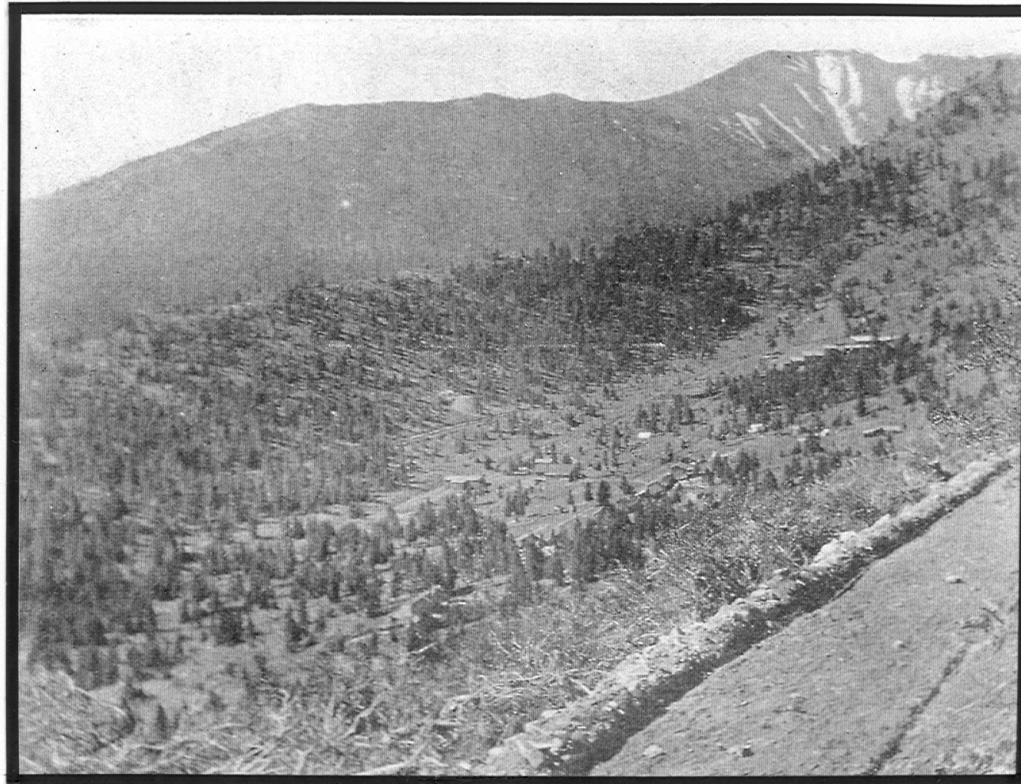


Figure 5. Gilmore camp, mine, and mill (c. 1905) (opposite page 105 in Bell, R.N., 1907, Eighth Annual Report of the Mining Industry of Idaho for the Year 1906).

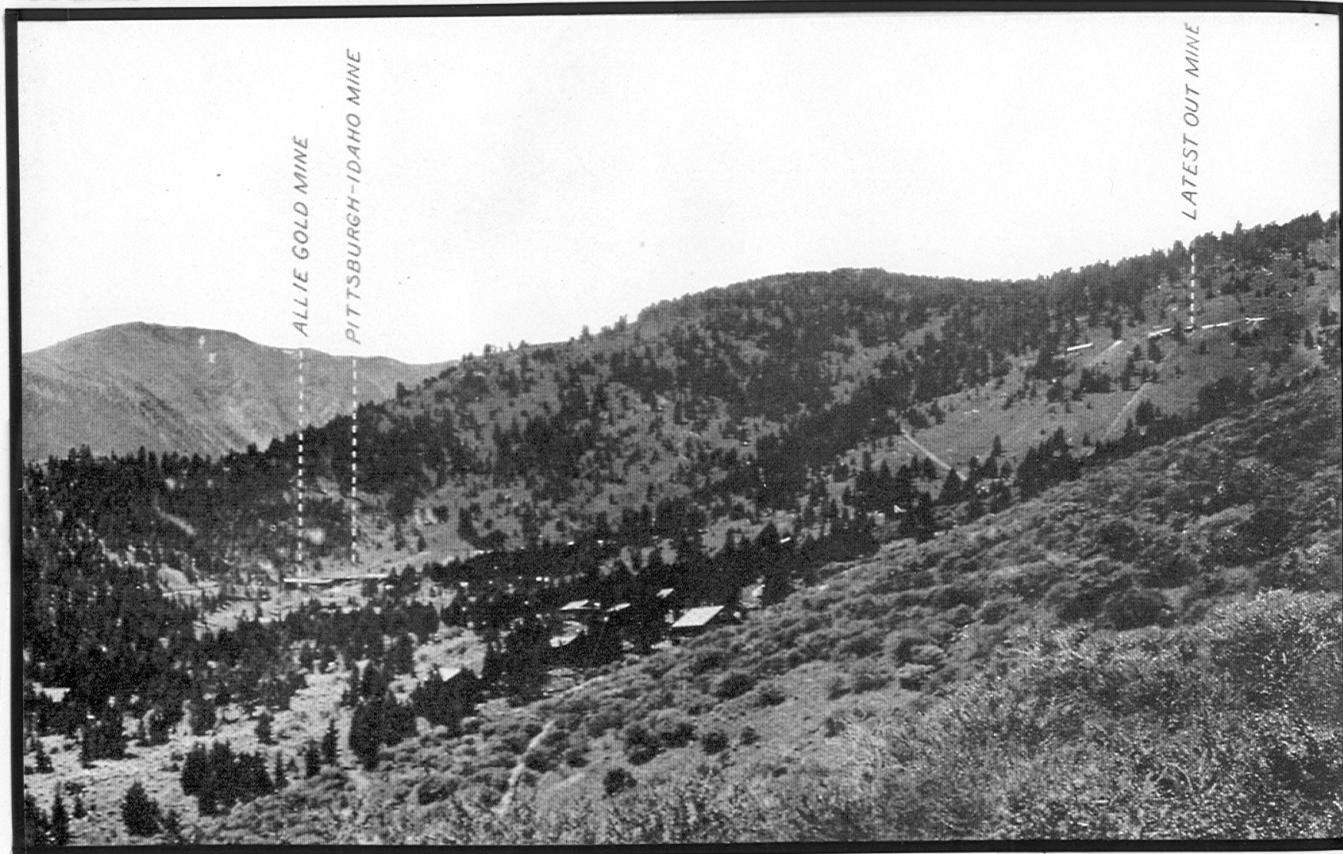


Figure 6. Mining camp of Gilmore (c. 1910), viewed from the northeast (opposite page 90 from Umpleby, 1913).

mine to the railway" (1905 IMIR, p. 91). Wagon haulage to Dubois was used during the open season for four years. However, the road was so destructive that it was almost impossible to keep the wagons in operating condition (Umpleby, 1913).

In 1906, a new system of hauling ore to Dubois was attempted (1906 IMIR, p. 100-101):

During the past summer a separate corporation was formed to handle the ore to Dubois. This is known as the Dubois and Salmon Transportation Company. It has put a "Best" California traction train on the road consisting of a traction engine of one hundred ten H. P. and four steel wagons of fifteen tons capacity each [Figures 7 and 8]. The road between the mine and the railroad, with a little bridging across the creeks and irrigating ditches, is an ideal one for this service. The engine was put to a very severe test and made to ford these streams without bridging. It completed four round trips between the mine and the railroad before winter closed in, in four days running time to the trip, pulling a forty ton load. The train travels night and day, using a large acetylene head light. It requires a crew of three men on each shift, the off shift sleeping in a sheep wagon trailed behind the ore cars.

The road followed is a flat valley bottom and desert plain presenting an old lake bed surface of fine gravelly and gritty soil and sage brush.

There is one hill putting into the mine<sup>1</sup> from the valley three-fourths of a mile long with an average grade of eight to ten per cent. The engine climbs this with a train of empties without difficulty when the ground is dry, but unfortunately, this grade was laid out on the shady north slope of the gulch in which the mine is situated and became too slippery for the traction bars to get a hold with the advent of the first snow in the fall.

The engine used, under present conditions, about four tons of coal a day, which is distributed in bins along the route at convenient intervals on the back trip, and finds watering stations at intervals of not over fifteen miles, its tank capacity being good for that distance.

Some strong bridges are being constructed across the creeks, and with these improvements on the present road it is believed by the management that the cost of hauling the ore with this traction train can be reduced to five dollars per ton and still show a handsome margin of profit.

However, the performance of this system during the following year did not meet the initial optimistic predictions. According to the 1907 IMIR (p. 128-129):

The traction engine haulage enterprise inaugurated by this company in 1906, after getting the road well bridged and otherwise improved at considerable cost, proved a failure, and its use was discontinued during the summer.

The engine, which is of the "Best" company's make, and of 110 H. P., was very successfully handled, and traveled 2,000 miles during the season, back and forth, between the mine and the railroad.

The chief weakness developed in the train was the constant breaking of the axles under the ore wagons. These wagons were all steel, with 4-inch steel axles, and had a capacity of 15 tons of ore each. There were 4 of them in the train and they were loaded

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<sup>1</sup>The Pittsburgh-Idaho.



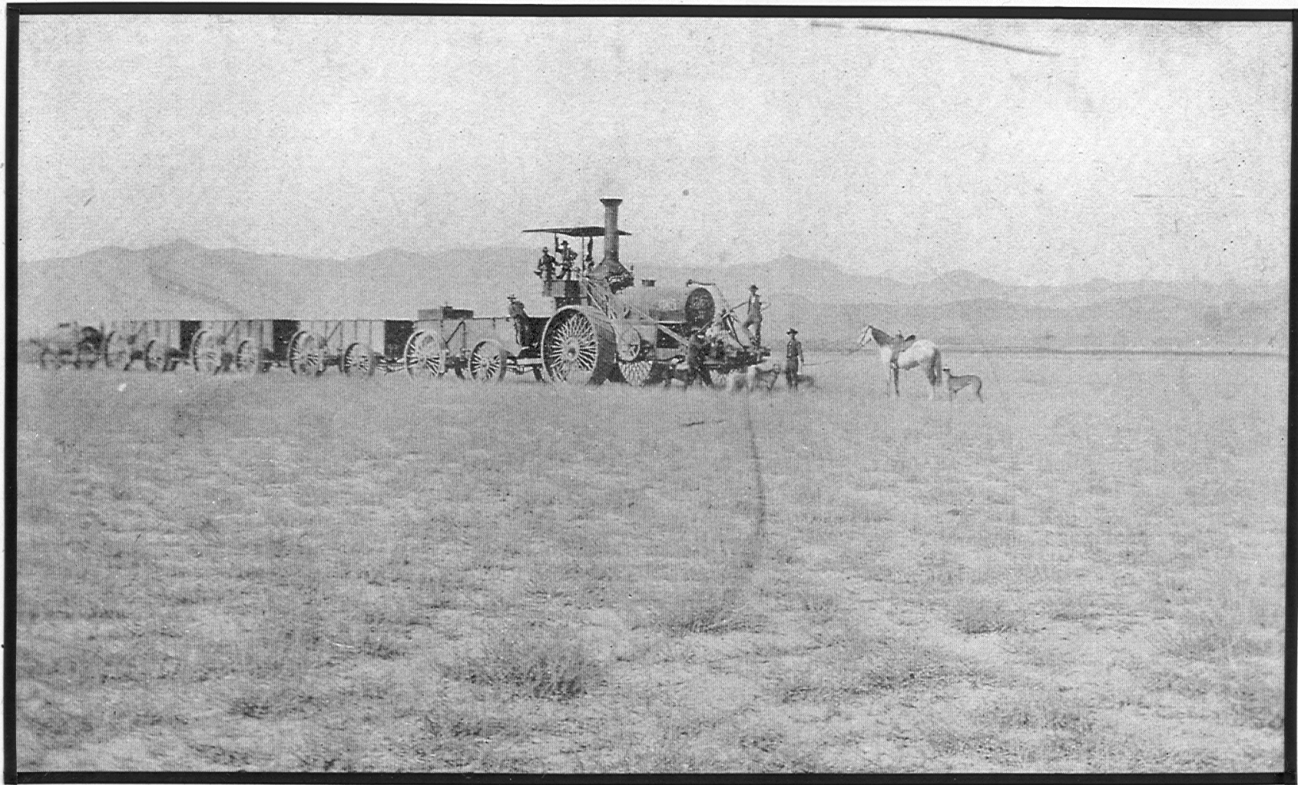


Figure 7. Dubois and Salmon Transportation Company's Best traction engine on the road to Gilmore (opposite page 100 in Bell, R.N., 1907, Eighth Annual Report of the Mining Districts of Idaho for the Year 1906).



Figure 8. Dubois and Salmon Transportation Company's traction engine, shown pulling an ore train across a creek (opposite page 101 in Bell, R.N., 1907, Eighth Annual Report of the Mining Industry of Idaho for the Year 1906).

with 10 tons each. The constant jar of the load seemed to crystallize the steel in the axles, and they would repeatedly break off at the shank and let down the load.

There were no extra wagons, and the train became so badly crippled towards the close of the summer, and involved the loss of so much time to the crew and cost in repairs that this method of hauling had to be abandoned.

All told, the traction engine made only a dozen trips to Dubois before it was abandoned (Umpleby, 1913).

Plans were already under way to build a railroad into the area. In 1906 (p. 101), the Idaho Mine Inspector reported that a company had been formed to build a branch line "through a very easy pass in the main divide" to connect with the Oregon Short Line at Armstead, Montana (near Dillon). By the end of 1909, the Gilmore and Pittsburgh Railroad Company had laid rails from Armstead over the Continental Divide at Bannock Pass and into Idaho. Also in 1909, a 50 ton-per-day (tpd) smelter was built at Hahn. Several of the smaller mine in the district sent minor amounts of ore there to be processed (Umpleby, 1913).

By January 1910, the railroad reached Leadore, a new town near Junction, on the Lemhi River. (The torturous switch-back route from Leadore up Railroad Canyon to Bannock Pass was responsible for the local nickname of this railroad, the Get Out and Push (Ruppel and Lopez, 1988).) A southern branch of the railroad reached Gilmore in September, and the main line north to Salmon was also completed by the end of the year.

The 1911 IMIR described the town of Gilmore, founded in 1903, as follows (p. 82):

Gilmore & Pittsburgh Railway terminates at the foot of the mountain on the west border of the Lemhi Valley, where the new townsite of Gilmore has been established and laid out on modern lines. It already has a water supply system and a dozen substantial business houses, and numerous residences with a population of several hundred people, and a daily train service. It is desirably situated within a mile of the main producing mines, and an extensive tributary mineral district to the north, south and east and seems destined to become quite an important mining center within a few years.

The next few years were the high point of activity in the district, with ore shipments declining after 1920. (See Table 1 for total production from the major mines in the district.) Regular train service to Gilmore was discontinued in 1935, and the last train out was filled with departing residents. The Gilmore and Pittsburgh Railroad discontinued service to the Lemhi Valley in 1939, and the track was salvaged for scrap in 1940. The Gilmore Mercantile Co. (owner of the Martha Mine) retained a local manager in Gilmore (the last resident of the mining camp) until 1965 (Ruppel and Lopez, 1988).

Table 1. Total production from the major mines in the Texas district.

Mine	Ore	Old Tailings	Gold (ozs.)	Silver (ounces)	Copper (pounds)	Lead (Pounds)	Zinc (pounds)
Pittsburgh-Idaho Mine (1902-1981)	203,887	27,647	5,628	2,156,744	667,540	92,342,343	824,994
Martha (Allie) Mine (1913-1949)	30,005	---	8,635	154,338	62,949	7,327,780	---
Allie (Andy) Mine (1911-1916)	2,576	---	2,477	1,668	373	9,482	---
Latest Out Mine (1908-1953)	81,427	204	2,704	952,033	274,624	43,711,145	130,325
Mountain Boy (1916-1962)	1,286	---	116	9,225	17,786	685,738	6,500
Hilltop Mine (1915-1968)	9,186	---	1,836	127,109	62,977	2,781,103	86,866
<b>Total</b>	<b>328,367</b>	<b>27,851</b>	<b>21,396</b>	<b>3,401,117</b>	<b>1,086,249</b>	<b>146,857,591</b>	<b>1,048,685</b>

## PITTSBURGH-IDAHO MINE

The Pittsburgh-Idaho Mine is located at an elevation of about 7,800 feet in the central part of the Texas district near Gilmore (Figure 2). The deposits are lead-silver replacement veins and irregular replacement bodies in dolomite in the lower part of the Jefferson Formation (Figure 3). Mineralization probably extends into the underlying Saturday Mountain Formation, but the mine workings are not deep enough to reach the contact. Most of the veins in the mine trend about N. 10°-15° E. and are divided into two sets. The steep veins dip 70°-90° W. and the flat veins dip 40°-60° W. The largest and most productive orebodies were in the steep veins above their intersections with the flat veins (Umpleby, 1913; Ruppel and Lopez, 1988).

The mineralization was formed by late-stage hydrothermal activity related to the Gilmore stock. Dikes in the mine are compositionally similar to the stock and were apparently emplaced before mineralization (Ruppel and Lopez, 1988). The veins and dikes in the mine are repeatedly offset by northwest-trending faults that dip 35°-45° NE, parallel to the bedding in the Jefferson Dolomite. These faults consistently drop the orebodies to lower levels to the east (Ruppel and Lopez, 1988). The original discoveries were made on small gossans and limited outcrops of iron-stained rocks. The dominant ore mineral was cerussite, with lesser amounts of anglesite, smithsonite, hemimorphite, and cerargyrite in a gangue of earthy hematite, limonite, and manganese oxides. Primary sulfide minerals, usually galena, pyrite, and sphalerite, were rare in the upper levels but were found in increasing amounts below the 700-level (Ruppel and Lopez, 1988).

The claims that formed the core of the Pittsburgh-Idaho Group were located some time before 1900, but the exact date is unknown. It is likely that the mine was staked in the early 1880s, and it may have been one of the properties that shipped small amounts of ore to the Nicholia smelter; however, existing records are indefinite on these points. (Information in the 1904 IMIR supports this inference, but does not provide specific facts.)

In 1902, Edgar C. Ross, C.T. Mixer, and F.G. Lauer (or Laver) purchased the Texas, Never Sweat, Sixteen-To-One, Silver Dollar, and Silver Dollar Extension claims (Figure 4) from James Forrester for \$3,500. (Table 2 shows the companies and individuals operating at the mine.) Ruppel and Lopez (1988) state that Forrester was hand-panning lead-silver concentrates when Ross met him and purchased the claims. The new mining venture was known as the Gilmore Mining Company.

Development work was started on the claims. In describing the 1903 work at the mine, the 1904 IMIR (p. 102-103) said:

[A] cross-cut tunnel was decided on, to be run 300 feet, with a view of tapping the vein, on whose shallow surface showing of mineral the purchase was made, at a depth of something under 200 feet.

At a point ninety feet in from the portal of this cross-cut a blind vein was struck and has since developed all the ear marks of a veritable bonanza.

A drift has since been carried along the course of this blind vein to the south for 400 feet, which proved to have a continuous pay shoot of shipping ore, all the way, varying in width from one to five feet, with a succession of lateral fractures or feeders, whose junction with the vein usually formed an enlargement of the ore body (see diagrammatic ground plain at adit level, and vertical cross section, Gilmore mine, illustrating the vein structure and ore occurrences here described [Figures 9 and 10]). One of these spurs was followed out into the hanging wall to the southwest, and carried a wider body of ore than the main vein.

A raise was put up near the center of this ore shoot, and followed a good body of continuous shipping ore to its apex, which was found to be covered with a few feet of surface soil and debris. This raise broke through at a point on the mountain side seventy feet above the level, where one of the old time prospectors had leveled off a place for a bed, the shallow hole still containing the withered fir boughs he had lain on.

During the summer of 1903 this fine showing of mineral was neglected for the purpose of attending to the acquisition of new territory and other surface work, and only seventeen cars of ore were shipped.

Ruppel and Lopez (1988) noted that the "seventeen cars" of ore was an uncertain amount and estimated that it actually totaled 200 to 250 tons. This ore averaged over 55 percent lead and contained significant amounts of silver and gold. The company staked eighteen new claims surrounding its five original claims.

Work continued on the mine as follows (1904 IMIR, p. 103-106):

During the summer of 1904, the development work on this vein was also very limited, and amounted to sinking a fifty-foot incline and vertical shaft, 100 feet deep below the tunnel level. Also a short drift at the bottom of the incline.

Table 2. Companies and individuals operating at the Pittsburgh-Idaho Mine.

Company Name	Officer	Date Incorporated	Charter Forfeited	Year(s) at Mine
James Forrester	---	---	---	?-1902
Gilmore Mining Company	F.G. Lauer	unknown	unknown	1902-1906
Pittsburgh-Idaho Company, Ltd.	G.W. Provost, President-Manager	Aug. 18, 1906; reinstated July 1, 1922	Dec. 1, 1921; Nov. 3, 1923	1906-1922
(in receivership)	---	---	---	1922-1924(?)
U.S. Smelting, Refining, and Mining Co.	<sup>1</sup>	1	1	1922-1924
United Idaho Mining Co.	C.A. Hight, President; Roger V. Pierce, President	Oct. 18, 1924	out of business: May 26, 1972	1924-1972
Mining Developments, Inc. (lessee)	Roger V. Pierce, President	Oct. 31, 1956	Nov. 30, 1964	1958(?) - 1964

<sup>1</sup>Information not available in IGS's files.

From this limited development and a trifling amount of stoping, the Gilmore mine shipped during the season of 1904, 2,000 tons of crude ore, without preliminary dressing, that averaged 45 per cent lead and twenty-two ounces of silver per ton [Figure 11]. This ore is an ideal smelting mixture, consisting of almost straight carbonate of lead, and soft brown oxide of iron, high in iron and very low in sulphur, silica and zinc; it is desirable and in good demand by the smelters for its fluxing effect on more refractory mixtures.

The vein is a true fissure in blue limestone wall rocks, and the ore a replacement of the limestone, which in consequence appears rough and irregular when the ore is removed, but in places is locally smooth and slickensided, showing distinct vertical and diagonal scratches, or striation marks that indicate movement in two directions, also indicating in connection with the great length of the vein at the surface, a very profound and deep-seated fissure.

The complex of veins and spurs of ore and their intervening bodies of lime in the vicinity of the two shafts or winzes rapidly changes below the level, and the proportion of ore has materially expanded at a fifty foot station below the cross-cut level, where a drift has been extended seventy feet, all in big ore; at the 100 foot station the intervening limestone has been entirely dissolved out and replaced with a body of clean, shipping mineral, thirty feet wide at right angles to the strike. While this remarkable showing of

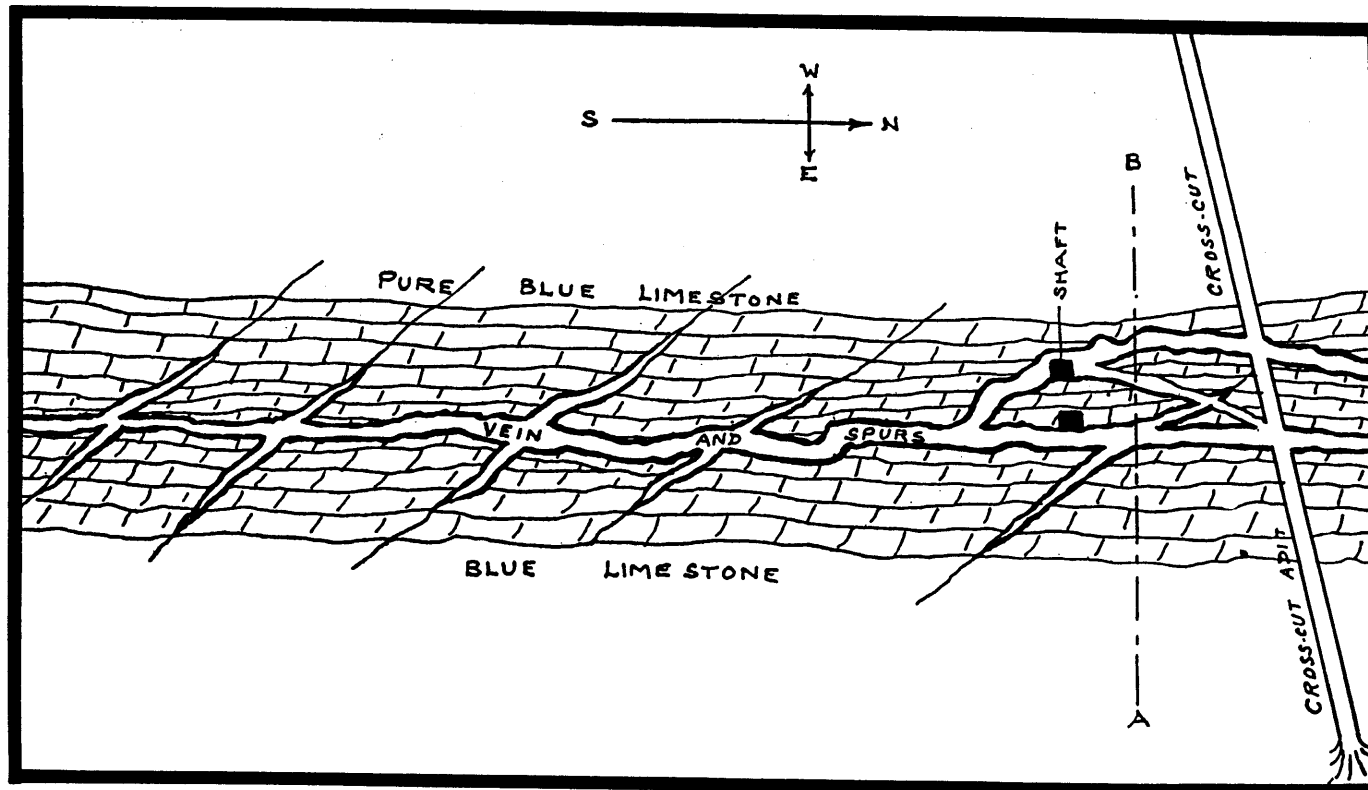


Figure 9. Plan of the 70 foot level of the Pittsburgh-Idaho Mine through the Gilmore vein (page 104 from Bell, R.N., 1905, Report of the Mining Districts of Idaho for the Year 1904).

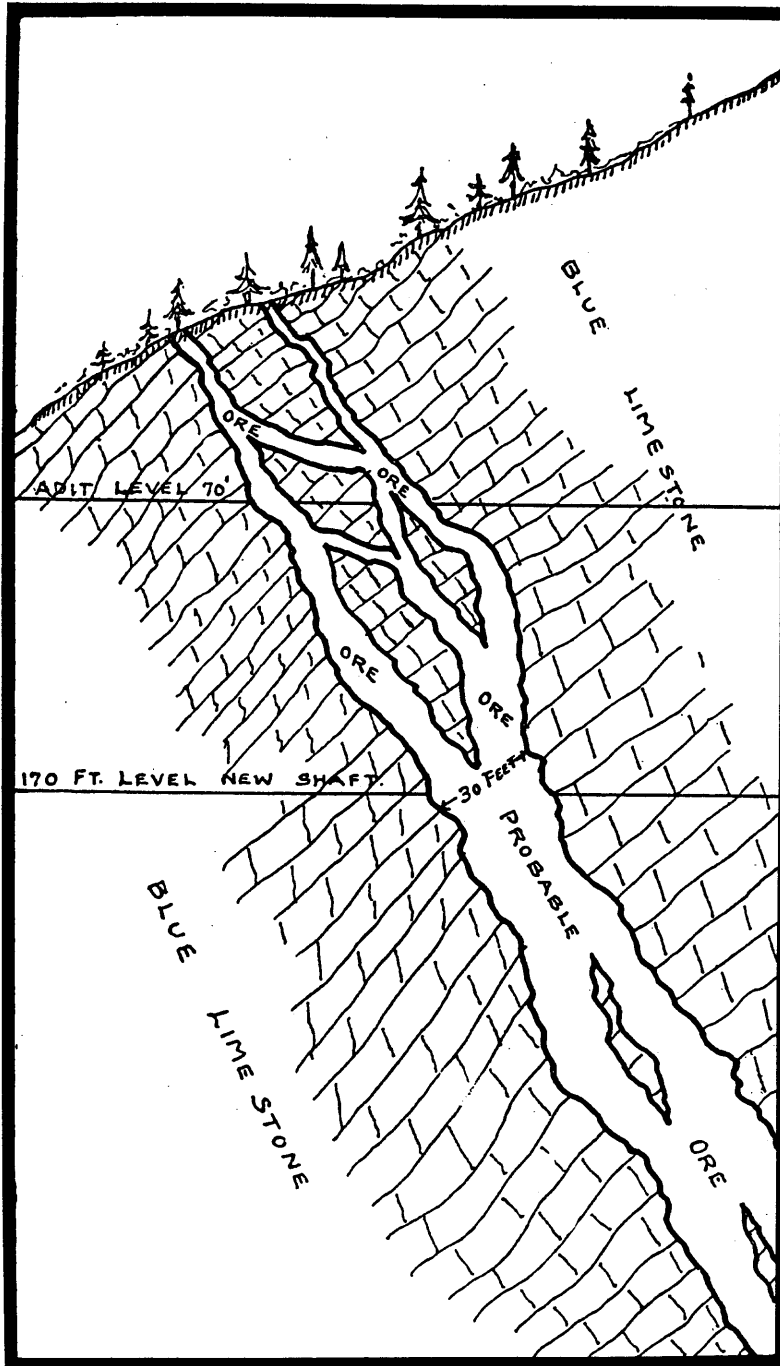


Figure 10. Vertical cross-section through the Gilmore vein along line A-B in Figure 9 (page 105 from Bell, R.N., 1905, Report of the Mining Districts of Idaho for the Year 1904).





Figure 11. Ore pile at the Pittsburgh-Idaho Mine. This pile contains about 1,500 tons of ore containing 50 percent lead and 25 ounces of silver per ton (opposite page 108 *in* Bell, R.N., 1905, Report of the Mining Districts of Idaho for the Year 1904).

rich mineral may prove to be a local chamber or swell, the conditions are exceptionally favorable for it to prove the inception of a monster shoot of the Viola type, with the advantage of standing nearly on end in the formation.

The property is undergoing quite extensive development this winter, and should make a fine shipping record during 1905. The ore is hauled by wagons to the nearest railway point, which is Dubois, eighty-five miles distant, but over one of the finest natural roads in the world. The cost of this wagon haul is \$10 per ton, and a ton to the animal is the normal load; there is not a single hill on the road from the mine to the railway, and the 1,500 feet difference in elevation is so evenly distributed and gradual that the grade is not noticeable on the return trip.

The Gilmore was the largest producer in the county in 1905. The mine had a 300-foot shaft, which was sunk from the end of a 300-foot tunnel 70 feet under the surface. A small jig plant and crusher were used to process the lower grade ores and could produce about 13 tons of concentrate per day. According to the 1905 IMIR (p. 90-91):

The largest single producer of mineral in Lemhi County during 1905 was the Gilmore Mine, situated in the Texas Mining District near the head of the Lemhi River. Its output for the year approximated 2,600 tons of lead-silver ore.

This property is developed with a cross-cut tunnel that taps the vein about ninety feet deep, from which an extensive drift has been run and a fine ore body disclosed. This ore body has been developed from the tunnel level with a vertical shaft 200 feet deep. The ore deposit occurs in a nearly vertical fissure vein, in walls of pure blue limestone, and varies in width from 1 to 30 feet. The ore seems to be a replacement of the limestone wall rock and some lateral fractures and joint planes.

The property is equipped with a rather crude jiggling plant that has a capacity of 300 to 400 tons of concentrates per month. This plant is likely to be improved with additional machinery in the near future, for finer crushing and closer concentration, as the expensive wagon haul doesn't warrant shipping too much waste.

The mine is being well handled and has a large reserve of ore in sight, said to approximate ten thousand tons, containing crude values of something like 30 per cent lead and 15 ounces silver, together with a little gold. Its ore shipments are temporarily suspended, owing to an unexpected freeze up in the water line that supplies the mill. Efforts are being made to remedy this defect at the present time, and the mill will probably be gotten in commission at an early date for a continuous run during the balance of the year, as the ore reserve and the physical condition of the mine warrant this anticipation.

The management are now dropping the shaft down an additional 200 feet, from which point another level will be run that should afford an additional extensive reserve of high-grade mineral.

The ores of this mine are largely lead-carbonates, associated with nubbins of galena and a good percentage of iron oxide, and they are eagerly sought after by the smelting companies for their fluxing qualities.

On January 1, 1906, the original five claims (the Texas, Never Sweat, Sixteen-To-One, Silver Dollar, and Silver Dollar Extension) were sold to the Pittsburgh-Idaho Company for \$80,000. (The surrounding claims were retained by

Ross and his partners. Some of the claims were later sold to the Gilmore Mercantile Co., while the rest remained under the control of Ross' Allie Mining Co.) The jig plant, which had a capacity of about 60 tpd, was in constant operation. The ore shipped to the smelters averaged 35 percent lead and 17 ounces of silver per ton, and contained 10 to 20 percent iron. The 1906 IMIR described the mine as follows (p. 98-100):

The Gilmore mine, in Lemhi county's important lead belt, near the head of Lemhi Valley, has continued to maintain its record as the most important mineral producer in this county throughout the year. This is a lead-silver deposit of unusual interest and of great future promise. It has been operated steadily for the past three years and is said to have produced and shipped lead and silver ore to the gross value of something like three hundred thousand dollars, and has at the present time probable ore reserves of a similar value.

This interesting mine is opened on a pronounced replacement fissure in pure blue limestone between two parallel dikes of intrusive diorite. It is developed to a depth of three hundred seventy-five feet through a cross-cut tunnel which intersects the vein at seventy-five feet deep and then through a vertical shaft three hundred feet deep. The most important ore showings of the mine is now exposed between the two hundred and three hundred foot level. At this considerable depth the mine is as dry as a bone and so far has never made a bucket of water.

The ore shoot is four hundred feet long with a core forty to sixty feet long that is from five to sixteen feet wide of clean hard carbonate of lead galena and brown oxide that averages thirty per cent lead and fifteen ounces of silver per ton. Several other important mineral blossoms on this property promise other rich ore shoots when properly developed. This ore is hoisted and all development of the property carried on with a small ten H. P. gasoline hoist. The milling equipment consists of four home made jigs and a small breaker set to crush the harder material to about twenty mm. size.

The power is furnished by a small steam plant which rounds out the total milling equipment. The mineral is hand fed all through and handled over several times in the process of treatment.

This crude plant makes sixty per cent lead concentrates that run thirty ounces silver. The big dump of coarse tailings below the mill runs sixteen per cent lead and seven or eight ounces silver, while the rich fines are allowed to run to waste down the gulch.

Fifteen hundred tons of mineral was shipped from this property during the past year that is reported to have averaged sixty per cent lead and thirty ounces of silver per ton. The property represents a very small capital investment. It has paid its way since the first few months of its development, and justifies much more extensive development than it has received.

The handsome bodies of rich ore disclosed in the bottom level are likely to continue, or be repeated to an indefinite depth in a fissure of such strength and in such completely oxidized and altered condition. The lime formations inclosing it have been rotted and digested by the solution that brought in the ore minerals and present soft easy ground to work that does not swell and is easily retained with light timbers. Sinking in these formations could be cheaply done and the showing is well worth following to considerable depth, as the prospects are very flattering for the development of one of the important lead ore bodies in the State.

The present total development on the mine is twenty-five hundred feet, of which five hundred forty-five feet were run during the year.

The mining costs at this district are given as follows: Shaft sinking, fifteen dollars per foot; drifting, seven dollars per foot; mining timbers, five cents per running foot; lumber, twenty dollars per thousand; cost of transporting supplies from the railroad is twelve dollars per ton; the cost of transporting ore to the railroad is ten dollars per ton.

The mine is employing thirty-five men. Miners are paid \$3.50 per day, trammers \$3.00, timbermen \$3.50, laborers \$3.00, all eight hours shift; firemen \$3.50, twelve hours shift; blacksmiths, \$4.00, nine hours shift; shift bosses \$4.00, nine hours shift.

During the summer, a railroad route was surveyed between the southern part of Lemhi County and the Oregon Short Line at Dubois. At the same time, the Dubois and Salmon Transportation company was organized to ship ore from the Texas district to Dubois. The company's traction engine and four steel wagons made four trips during the fall.

The Pittsburgh-Idaho was the most important producer in the county in 1907. The mine shipped lead-silver concentrate and crude ore direct from the stopes to Utah smelters. The traction engine was used to transport the ore to market for part of the year, but after about a dozen trips, the equipment was in such poor condition that it could no longer be used. The company returned to horse-drawn wagons to get the ore to the railroad. A second railroad route was surveyed during 1907, this one from Armstead, Montana, over the Continental Divide and then to Salmon, with a branch line to run up the Lemhi Valley to the Gilmore area. The mine was described as follows in the 1907 IMIR (p. 126-127):

The Gilmore mine is the principal operation of this district and made an output of 40 cars of high grade lead-silver mineral during the past year, about half of which was crude ore shipped direct from the stopes. This output could have been doubled had the teams been available to haul it to the railroad, as the ore resources of the mine have developed up in a very handsome manner during the past season's operation.

This property is opened on a nearly vertical fissured zone of altered blue and gray limestone, and carries 2 parallel dikes of diorite at a distance of 200 to 300 feet away from the ore. The development is through a vertical shaft and an adit tunnel. The shaft is 400 feet deep from the adit tunnel, and from it 3 short levels have been run. The last 100 feet of the shaft was sunk during the past year, and the vein has not been cut or drifted on from that point as yet. The total output of the mine during 1907 came from between the 200 and 300 foot levels. At the 300-foot level a flat dipping vein, ranging from 6 inches to 16 feet wide, was opened by a drift a year ago and made a very handsome showing of mineral, from which the larger part of the production during 1907 has been taken. The dip and shape of this ore body was in such contrast to the position of the ore in the levels above as to make the superintendent in charge suspicious that it was not the proper ore channel on which the mine had been previously developed, and in working out his doubts on the subject he picked up a thin, brown iron stained seam in the footwall side of the drift and followed it out a short distance, which resulted in the development of a nearly vertical ore shoot 125 feet long that ranges from 5 to 25 feet wide and averages about 12 feet wide, nearly all clean 35 per cent lead carbonate ore, carrying about 20 ounces of silver and 50 cents gold per ton, with excess of free brown

iron oxide. This handsome body of mineral has been raised on through to the next level and remains practically intact, giving such a strong showing to the property in its bottom level as to indicate that a very important resource of ore may be put in sight at a couple of hundred feet of further development in depth, and that the flatter dipping ore course on the third level may simply be a web connecting with another steep pitching parallel ore body in the hanging wall country, as indicated by the diagram of this deposit I published in my annual report of 1904 [Figures 9 and 10]. A short crosscut west in the hanging wall country from the No. 2 and No. 3 levels would readily prove this idea and is well warranted.

The mine was shut down in October owing to the difficulties of transporting ore to the smelter and because of decreases in the price of lead and silver.

The mine remained idle in 1908. During 1909, the mine was "nonproductive," but considerable development work was apparently done (1909 IMIR, p. 71-72):

The most important ore development in this district is found at the Gilmore mine. This property has been developed to 400 feet in depth by a vertical winze sunk from a tunnel about 100 feet under the surface. The hoist station at the collar of this winze was lost during the past year by a squeeze of the ground, being in close proximity to the vein, so that it had to be abandoned, but a lower tunnel is being driven which will tap the shaft at the 100-foot level, below the old collar. A commodious hoist station is being excavated, and as soon as this is completed the 12 horse power gasoline hoist which was formerly used will be installed and the property will again be put on an operating basis. There are drifts at the 200, 300 and 400-foot levels.

The ore manifestation in this property is found in a complex replacement fissure, in blue limestone, between intrusive dikes. The ore occurs in short but thick and rich shoots, and, on the 300-foot level, two parallel shoots were encountered and developed which converged when raised upon. Practically all of the ore of shipping grade has been mined above the 150-foot level, but below this point it remains intact. The ore on the 300-foot level, found in the two shoots, aggregates about 200 feet in length and runs from 3 to 25 feet in width carrying an average value of from 30 to 35 per cent lead and 15 ounces in silver, with about 75 cents in gold per ton. The ore rakes strongly to the south, and on the 400-foot level an additional 300 feet of drift was necessary and the ore shoot has only been encountered.

This property was at one time equipped with a small jig concentrator and considerable ore shipped by way of Dubois, being transported in 40-ton wagons hauled by a steam traction engine. The tailings from this jig plant have been impounded and will undoubtedly be worked when the property is equipped with a concentrator and has cheap transportation. It is estimated that there is over \$300,000 worth of ore blocked out above the 400-foot level. Mr. James E. Walker is the superintendent of the property.

The Pittsburgh-Idaho began shipping ore in July 1910, and the Gilmore and Pittsburgh Railroad reached Gilmore in September. The mine's output was increased during the latter part of the year until 50 tons of ore were being shipped daily in November. Production for the year was 5,472,000 pounds of lead, 115,200 ounces of silver, and \$4,650 of gold (about 225 ounces at a gold price of \$20.67 per ounce).

In 1911, the mine shipped nearly 2,000 tons per month, and the company paid dividends amounting to \$56,350. The Idaho Mine Inspector (1911 IMIR, p. 78) noted

that, until the railroad reached the district, the mine had shown very little profit "owing to the enormous expense of having to haul this mineral by wagon freight 85 miles to the railway shipping point" [Dubois]. The 1911 IMIR summarized the year's operations as follows (p. 78-81):

Its output for 1911 was about 19,000 tons of lead-silver ore containing an average gross value of something like \$36 per ton. The merits of the property will be appreciated from the statement that this magnificent yield was made without any milling facilities or without producing any second class ore dump, and with an average crew of not to exceed 75 men, and a mine equipment consisting of a prospecting gasoline hoist of 15 H. P. capacity.

Besides this great output of ore mentioned, the year's operation has put in sight an additional 20,000 tons of measureable ore of the same grade, and the new work now in progress at and below the 500-foot level definitely indicates probable ore of twice that volume. . . .

The Pittsburgh-Idaho Mine is developed by shaft work to a depth of 500 feet, and a winze is now rapidly approaching the 600-foot level. Under a new management, which took hold of the property during the summer, the lineal extent of the ore bodies has been increased from 300 to 600 feet, and they are still going strong at both ends. The ground is dry; not very hard and easily mined. The ore at the deepest point encountered is still completely oxidized and consists of a hard and sand carbonate of lead with brown oxide of iron, which makes one of the most desirable of smelting mixtures, and is in great demand at the Salt Lake Valley smelters.

The mine proper carries three distinct ore courses, including the two main steep pitching veins and a flatter web vein that connects and cuts these two, and has been the most productive of the three [Figure 12]. The virtue of the deposit, while the ore occurs in lensey shoots, is the fact that the widest swells, in places up to 25 feet between the walls, carry the cleanest and richest ore. The company's group, in addition to the main central development, has three or four other ore showings, especially in its Silver Dollar tunnel and on the Never Sweat claim, that fully equal the surface manifestations of the main deposit, and if these additional showings open up in any such relation with depth as the original development has, this mine is destined to become one of first magnitude in the matter of lead-silver production.

Umpleby (1913) visited the district in 1910 and 1911. At that time, most of the work at the Pittsburgh-Idaho had been done on the Silver Dollar and Sixteen-To-One claims (Figure 13). On the upper levels, the Silver Dollar was the more productive, but the veins pitched southward with increasing depth. At the time of Umpleby's visit, the entire output of the mine was coming from the Sixteen-To-One. The mine was worked from a double-compartment shaft sunk from the original tunnel. This tunnel had been driven into the hillside about 110 feet below its crest and was completely abandoned. The current working adit was on the 100 level, measured from the original tunnel. From the 100 level, the shaft went down another 300 feet, with a total of 3,000 feet of workings extending off it on the 200, 300, and 400 levels. From the 400 level, a winze went down to the 500 level, which was the deepest level in the mine (Figures 14, 15, and 16). According to Umpleby, the

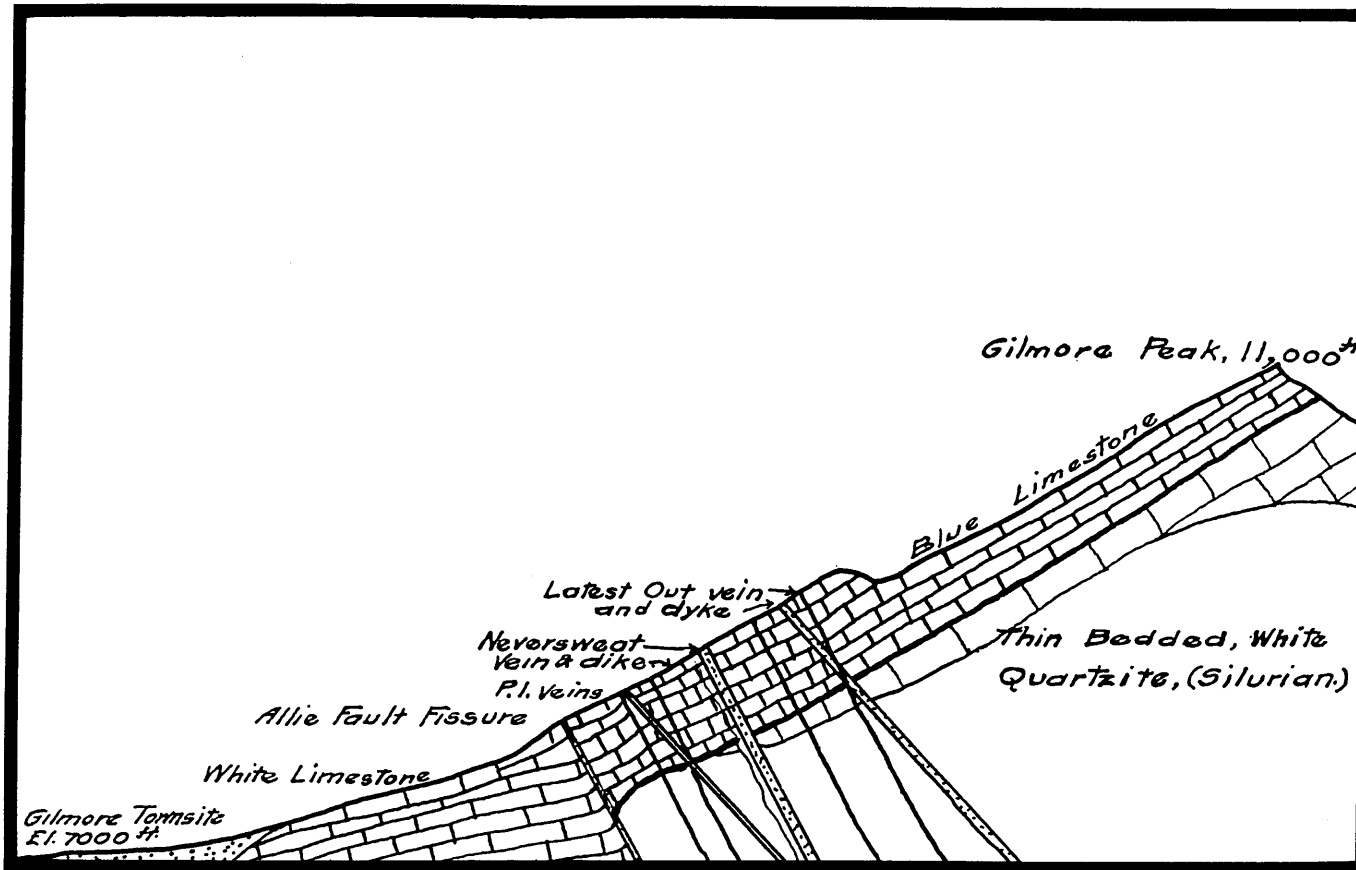


Figure 12. Diagrammatic cross-section of the Texas mining district through the Pittsburgh-Idaho Mine, showing the veins and the rock units (page 80 from Bell, Robert N., 1912, Thirteenth Annual Report of the Mining Industry of Idaho for the Year 1911).

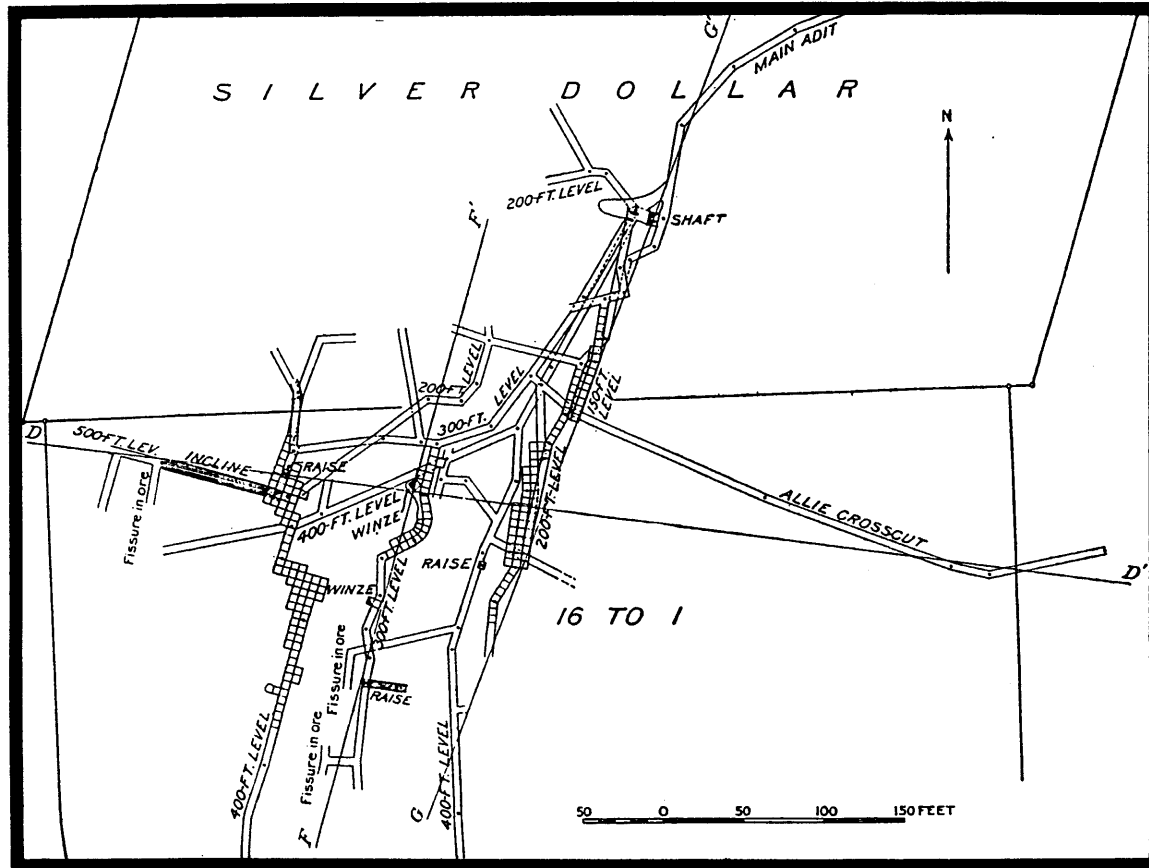


Figure 13. Plan of the underground workings of the Pittsburgh-Idaho Mine (Figure 9 from Umpleby, 1913).



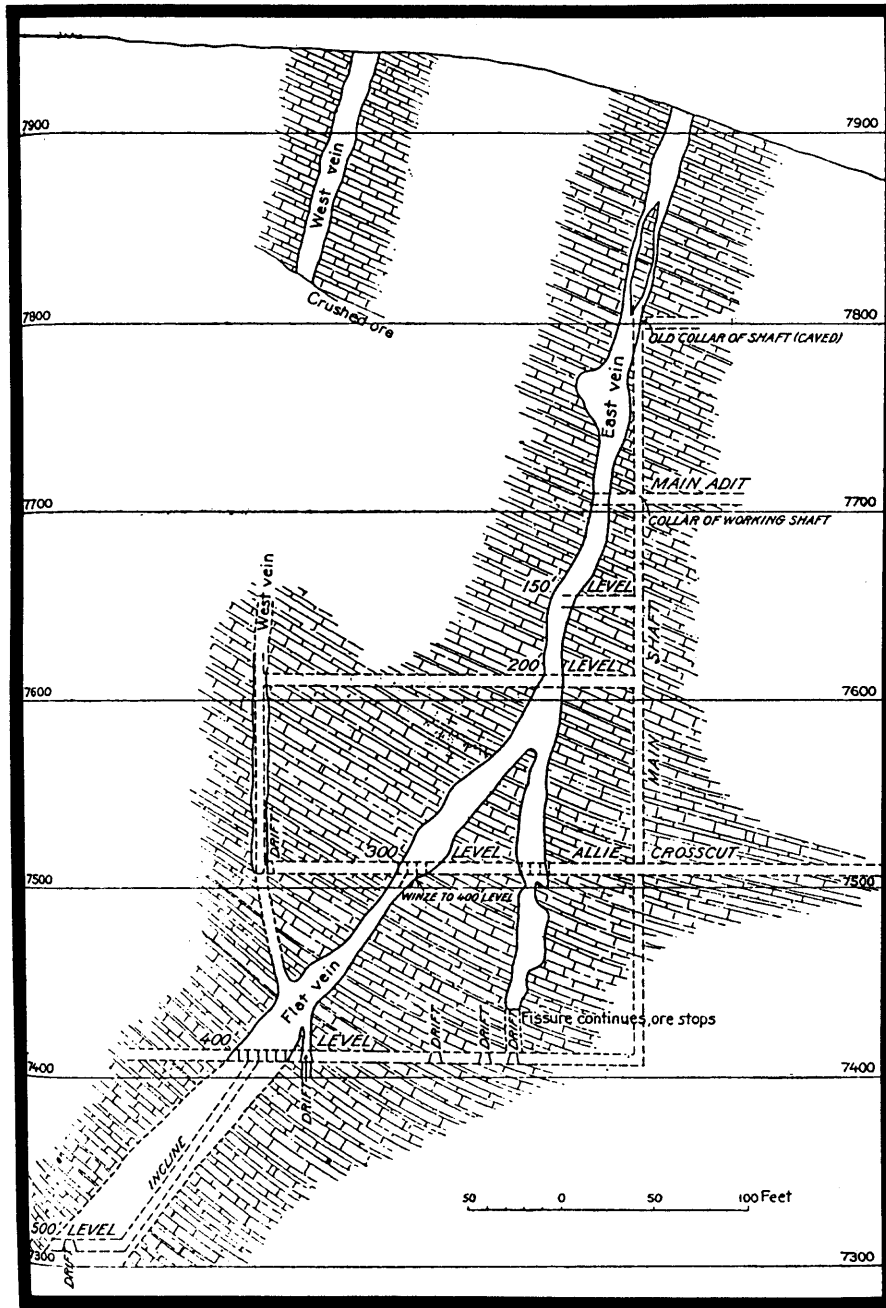


Figure 14. Transverse section through the Pittsburgh-Idaho Mine (Figure 10 from Umpleby, 1917).

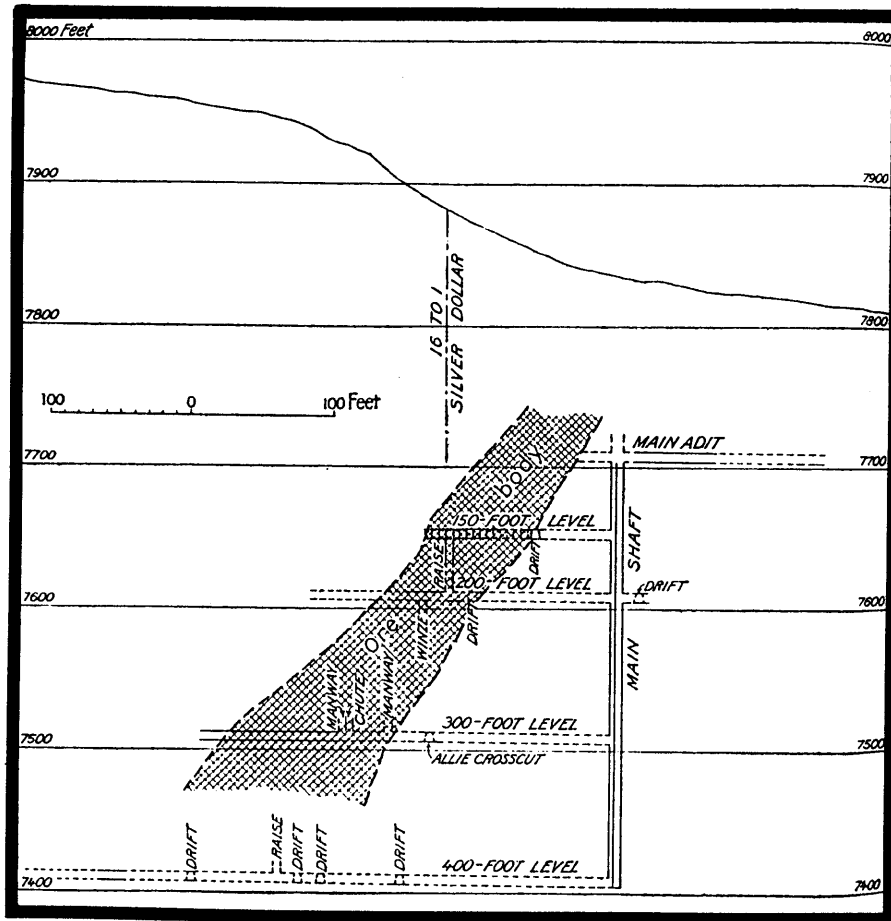


Figure 15. Longitudinal section of the east vein at the Pittsburgh-Idaho Mine (Figure 11 from Umpleby, 1917).

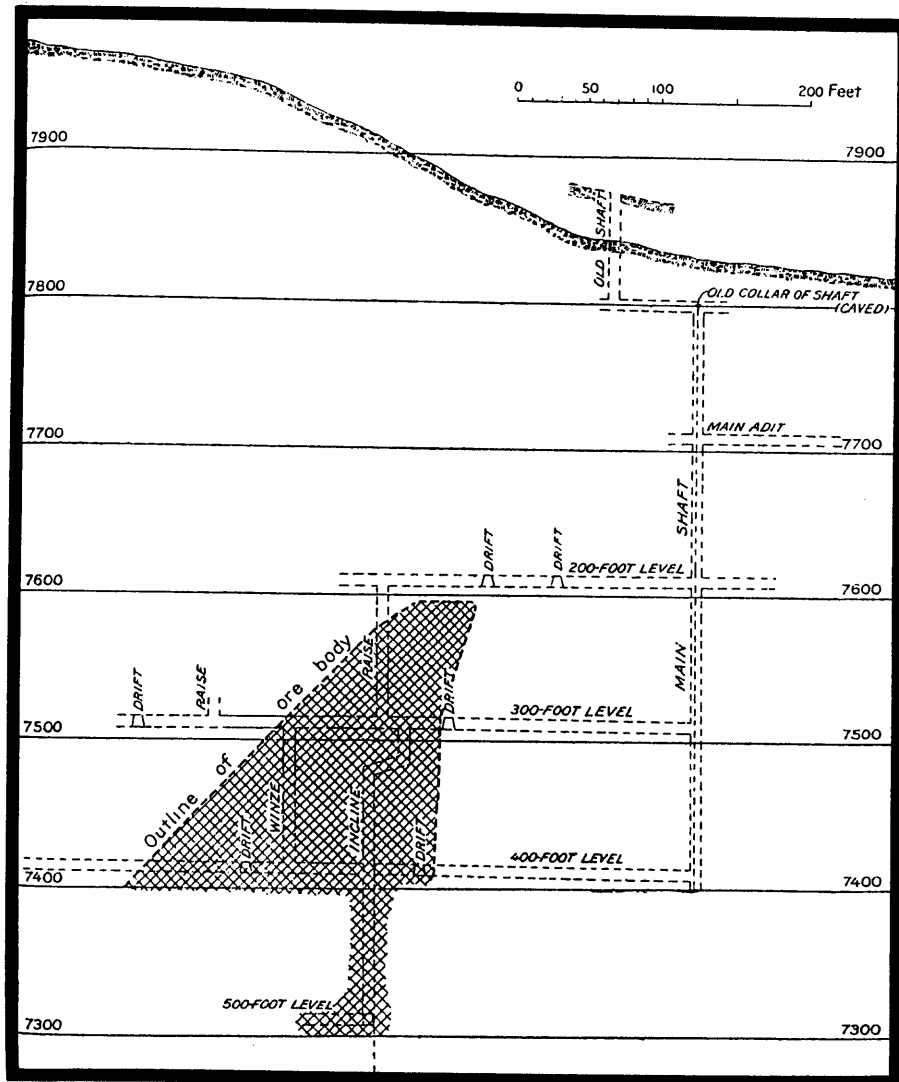


Figure 16. Longitudinal section of the flat vein at the Pittsburgh-Idaho Mine (Figure 12 from Umpleby, 1917).

production of the mine up to September 1, 1911, totaled about 12,000 tons of lead bullion and 500,000 ounces of silver. About 45 percent of that was shipped during the 1910-1911 fiscal year.

The mine operated continuously in 1912 and was the largest producer in the district. Ore was shipped directly to the smelters at the rate of 2,000 tons per month. In combination with the new Gilmore Mining Company (owner of the adjoining Allie Group), the Pittsburgh-Idaho Company began a long adit, called the Transportation Tunnel, to connect the underground workings with the railroad. The 1912 IMIR described this work as follows (p. 125):

The Gilmore Mine . . . adjoins the Pittsburgh-Idaho to the east, and during the past season these two companies joined forces in the construction of a main working tunnel to be 2,500 feet long, which is being driven from two headings, one from the inside of the Pittsburgh-Idaho and the other from the surface near the mouth of the gulch in which these properties are situated.

This work has been prosecuted with machine drills and it is anticipated that it will be completed by early spring.

A spur railroad has been extended from the Gilmore and Pittsburgh railway station up to the mouth of this tunnel, and when it is finished and equipped with the necessary ore bins it will eliminate the present wagon haul cost and materially reduce the handling charges of the ore shipments. This tunnel is also being extended west through a third heading back into the mountains and will ultimately cross-cut the entire fissure system for which these two properties are noted, and also the Latest Out veins and the other important fissures that cross its course to the west.

The Gilmore Mine Company's workings were connected to the Pittsburgh-Idaho through a cross-cut from the 300 level of the Pittsburgh-Idaho. In addition to ore found while driving the Transportation Tunnel, work in the lower levels of the mine reached the water table. Ore discoveries and development work were described by the 1912 IMIR (p. 125-126):

[The Transportation Tunnel] taps the Pittsburgh-Idaho deposit at the 400-foot level and the two inside headings have already disclosed several new commercial ore courses varying from 2 to 5 feet in thickness that are destined to add considerable life to the property, and in connection with the adjoining groups combine to indicate the ultimate development of a big permanent ore resource of relatively high grade smelting ores. The deepest workings in the district have followed the main ore channel of the Pittsburgh-Idaho Mine to the 600-foot level through a winze from the 400-foot shaft level.

The principal ore channels which have produced the largest resource of the mine in the past have been successfully developed on the 600-foot level, but on this horizon a flow of water has been encountered recently, which is the first water discovered in the development of the district, and will involve the installation of a pumping plant and probably a decided sulphide change in the character of the ore, which to date has all been of an oxidized and carbonate character.

The encountering of this water level has stopped development in the bottom of the mine temporarily, as it is undesirable to equip the works with a pumping plant until the new working and drainage tunnel is completed. The encountering of this water level is

a mixed blessing, for while it may result in involving the construction of a concentrating plant in which to treat the ore below that horizon, it temporarily affords the source of a water supply which will come into excellent play by reason of a recent very severe spell of zero weather that has put the present source of water supply for the camp out of commission, which is conveyed by a pipe line several miles long and not sufficiently protected.

In 1913, development efforts at the Pittsburgh-Idaho focused on driving the Transportation Tunnel. The mine shipped an average of 900 tons of ore per month. The IMIR noted the ore grade for the Pittsburgh-Idaho and the adjacent Latest Out Mine was about 30 percent lead, 15 ounces of silver, and 50 cents in gold (at a price of \$20.67 an ounce) per ton. The ore was lead carbonate rich in iron oxide, which was shipped direct. There were no milling facilities on the property. The 1913 IMIR noted (p. 115-116):

In the Pittsburgh-Idaho Mine, permanent water level appears to have been struck in a winze below the 600-foot level, with an accompanying change to sulphide minerals, consisting of coarsely crystalline loose textured galena with a strong mixture of zinc and iron sulphides, very much resembling in character the live ore horizons of the Park City deposits in Utah. The geology, however, of the enclosing formations is almost an exact counterpart of the wall rocks of the Titanic ore deposits in Utah, which have been profitably operated for 50 years and to a depth of over 2,000 feet.

The Idaho Mine Inspector anticipated that the high-grade zinc ore discovered below the 600 level would be a profitable by-product for the mine.

Production at the Pittsburgh-Idaho in 1914 fell to a little over 200 tons a month. Much of the reduction was due to the fall in metal prices that accompanied the start of World War I. (Table 3 gives mine output and economic data for the mine.) The 1914 IMIR described the year's operations (p. 31):

The Pittsburgh-Idaho Mine made a much smaller output of mineral than in former years, which was largely derived from leasing operations in the middle levels. The property has been cleaned up and carefully studied as to its ore courses and faulting system above the No. 6 level, but no extended permanent development at depth was undertaken. The mine had been quite a large and profitable producer of lead-silver ore during the past few years since the railway reached Gilmore, but has been handled in a petty profit sharing policy without regard for its permanent development. The bottom level, at 600 feet, has apparently reached water level with a definite change in the character of ore from straight oxide mineral to straight sulphide mineral, involving pumping and milling facilities. The main ore course, however, is as large and as rich in lead and silver values as at any level above, with the added prospect of a valuable by-product of zinc. The sulphide phase of the deposit consists of coarse friable crystals of galena blend and iron and presents no serious problem in milling separation.

The Transportation Tunnel was 4,764 feet long with a face depth of about 1,000 feet. (Table 4 lists the development work done at the mine.) The mouth of the tunnel was

Table 3. Mine output and economic data for the Pittsburgh-Idaho Mine for selected years, 1914-1929.

Year	Tons of ore	Average value per ton	Total mining cost per ton	Transport and treatment costs per ton	Gold recovered (ounces)	Silver recovered (ounces)	Lead recovered (pounds)	Gross returns
1914	5,000	\$25.00	---	\$4.80 <sup>1</sup>	---	---	---	---
1918	6,226.58	\$40.66 <sup>2</sup>	---	---	192.67	66,755.67	2,987,977	\$253,186.69
1920	7,670.19	\$26.77 <sup>3</sup>	\$27.79	\$15.68 <sup>4</sup>	355.39	88,977.91	3,652,658	\$325,899.01
1928	18,499 <sup>5</sup>	---	\$ 8.13-10.61	\$1.09 <sup>8</sup>	207 <sup>6</sup>	93,753 <sup>6</sup>	3,755,297 <sup>6</sup>	---
1929	4,682 <sup>7</sup>	---	\$10.02	\$1.72 <sup>8</sup>	49 <sup>6</sup>	14,355 <sup>6</sup>	516,518 <sup>6</sup>	---

<sup>1</sup>Transportation costs only.

<sup>2</sup>Average value, f.o.b. Gilmore.

<sup>3</sup>Average gross value per ton was \$42.49.

<sup>4</sup>Total cost of local treatment was \$43,133.06.

<sup>5</sup>The mine shipped 8,020 tons of crude ore and 801 tons of concentrates during the year.

<sup>6</sup>Metals recovered calculated from average ore grade and recovery rate given by company.

<sup>7</sup>The company shipped 1,491 tons of crude ore and 266 tons of concentrates.

<sup>8</sup>Cost of treatment.

Table 4. Development work and operating companies at the Pittsburgh-Idaho Mine, by year.

Year	No. of Men employed	Tunnels (feet)	Sinking (feet)	Cross-cutting (feet)	Drifting (feet)	Operator
1914	50	2,000 <sup>1</sup>	500 <sup>2</sup>	1,500 <sup>3</sup>	---	Pittsburgh-Idaho Co.
1922	35	---	130	500	375	Pittsburgh-Idaho Co.
1925	12	300 <sup>4</sup>	---	860	1,120	United Idaho Mining Co.
1926	87	980 <sup>4</sup>	---	---	1,355	United Idaho Mining Co.
1928	94	---	190	526	1,837	United Idaho Mining Co.
1929	34	---	38	360	1,400	United Idaho Mining Co.
1953	3 <sup>5</sup>	---	57	---	---	Lessees (United Idaho Mining Co.)
1954	3 <sup>5</sup>	---	---	---	100	Lessees (United Idaho Mining Co.)
1955	<sup>6</sup>	600	---	---	---	United Idaho Mining Co.
1956	<sup>6</sup>	600	---	---	---	United Idaho Mining Co.
1957	<sup>6</sup>	---	70	---	70	United Idaho Mining Co.
1960	<sup>6</sup>	---	---	---	100	United Idaho Mining Co./ Mining Developments, Inc.
1961	2 <sup>7</sup>	---	---	100	100	United Idaho Mining Co./ Mining Developments, Inc.
1963	<sup>6</sup>	600	---	---	200	United Idaho Mining Co./ Mining Developments, Inc.

<sup>1</sup>Total development for the year.

<sup>2</sup>Combined figure for sinking and raising.

<sup>3</sup>Combined figure for cross-cutting and drifting.

<sup>4</sup>Work done on raises included with figures for tunnels.

<sup>5</sup>Average number of lessees working on the property "for months worked"; operations were probably seasonal.

<sup>6</sup>Number of men employed is not given.

<sup>7</sup>Men employed were part-time contractors hired on a royalty basis.

connected to the railway terminal by a short inclined tramway. The Pittsburgh-Idaho Company owned a half interest in the tramway and the tunnel.

In 1915, the Pittsburgh-Idaho was again the largest producer in the district. Ore shipments averaged about 1,000 tons a month and ranged from 800 tons in January to 1,500 tons in August. Lessees mined ore containing 10 to 15 ounces of

silver per ton and 30 percent lead from the 400, 500, and 600 foot levels. All production, principally oxidized lead ore, was shipped to various smelters. The IMIR (p. 77) noted that the lessees located "several million pounds of lead" in areas of the Pittsburgh-Idaho and Latest Out mines that company miners had abandoned because they were believed to be worked out. Also from the 1915 IMIR (p. 77-78):

A very interesting condition was encountered at the Pittsburgh-Idaho mine, whose total production has been obtained from crude shipping mineral of an oxidized character in dry ground. At the 600 foot level the first water flow of the mine was encountered and it was believed that it meant permanent water level and the prospect of a change in the character of the ore to sulphide with the resulting necessity of milling operations to separate the zinc, lead and iron. A winze was sunk, however, during the year, 50 feet below the 600 foot level of this mine, which was carried all the way on a beautiful band of mineral three to five feet wide, which has continued to maintain a very high proportion of lead carbonate mineral and gives the richest average results in both lead and silver that has ever been found in the development of the property. Also indicating that the water encountered was naturally in process of deeper circulation and does not mean permanent water level with the attendant anticipation that the favorable carbonate minerals may extend to considerable further depth.

The Pittsburgh-Idaho was the largest producer in the district in 1916. Average production for the year was more than 1,000 tons a month, mostly oxidized lead ore which was shipped directly to the smelters. September smelter returns were \$57,867. The company paid dividends of \$42,494. A new hoist, compressor, and electric power plant were installed during the year.

The mine shipped about 500 tons of ore per month in 1917. Again, the entire product was oxidized lead ore shipped without treatment. Even with the reduced shipments, the company paid dividends of \$65,524 from earnings remaining on hand at the close of 1916. The mine showed an operating loss for 1917 and was idle at the end of the year. The reasons for the loss included transportation difficulties, water in the mine, and delay in the delivery of power machinery. The 1917 IMIR described the company's activities (p. 42-44):

At the Pittsburgh-Idaho Mine a maximum depth of 700 feet has been reached on the flat vein, which has been the largest producer of the group, and at this horizon quite a strong flow of water has been encountered, also the biggest and richest manifestations of ore in the history of the enterprise. This water occurrence, however, retarded production during the year and involved the necessity of larger equipment, which was undertaken by the company, embracing the installation of a 250-horsepower gas engine of the Diesel type [Figure 17]. A new generator and electric driven double drum hoist, compressor and large station pump were also installed.

This fine plant of machinery is now nearing completion and is being installed at a cost of approximately \$200,000. The surface plant is placed at the collar of a new 50-degree incline shaft that has been raised from the different levels of the mine extending from the 700-foot level to the surface, and is now nearly completed and should put the property in splendid shape for increased production and deeper development of its



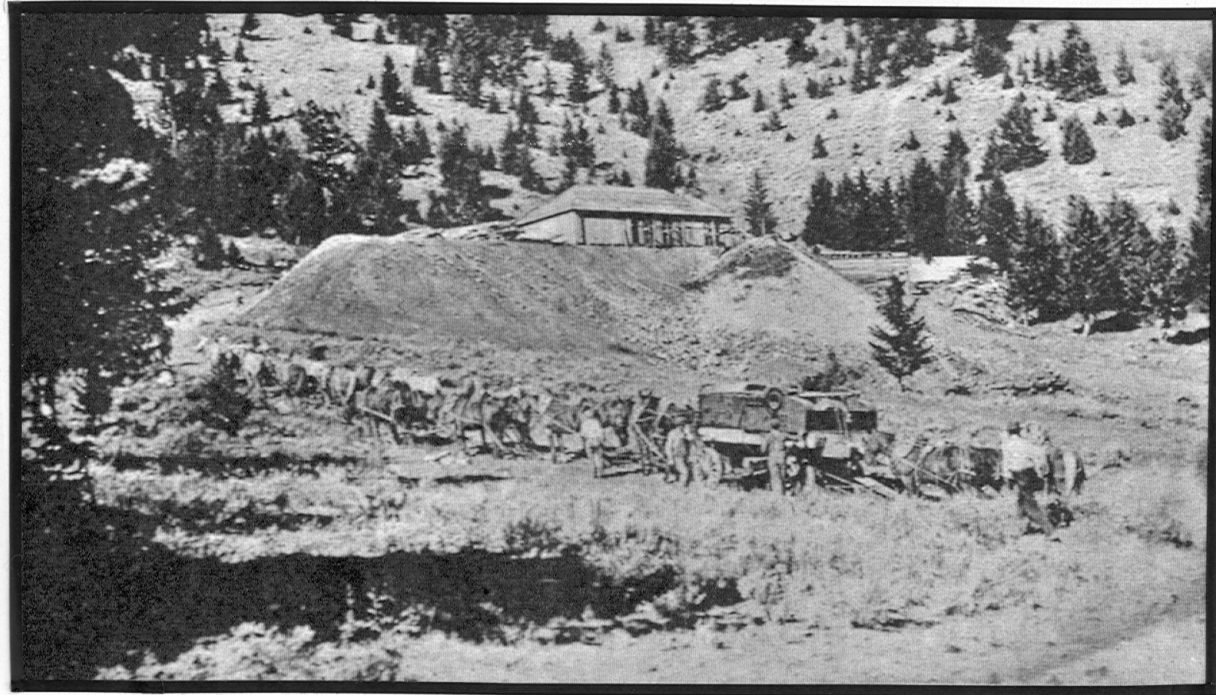


Figure 17. Hauling the 250-horsepower diesel engine to the Pittsburgh-Idaho Mine (page 43 from Bell, R.N., 1918, Nineteenth Annual Report of the Mining Industry of Idaho for the Year 1917).

decidedly promising ore resources, which have shown much greater lineal extent in the bottom levels than at any of the higher horizons. There seems no geologic reason why these values may not be maintained in such strong fissuring conditions through the full thickness of the limestone beds, or that they may be limited in continuing to further depth, into the underlying quartzite in fact, as there are a number of interesting lead prospects in the quartzite formation of the adjacent mountain slopes carrying high silver values with the lead than is found in the limestone.

The water volume encountered at further depth will, of course, prove an important factor in the economy of the operation and the character of the ore. The 700-foot level shows a slight increase in sulphide minerals, but is still largely of the altered oxidized variety carrying locally better values in both lead and silver, and the water at this level must be in circulation.

The Transportation Tunnel was 6,000 feet long and intersected veins on the Pittsburgh-Idaho, Latest Out, and Gilmore (Allie) mines. The IMIR credited the Pittsburgh-Idaho and Latest Out mines with a total combined production of about \$4 million. The average shipping ore ran about 30 percent lead, 15 ounces of silver, and a little gold per ton. There was said to be little "second-class residue" on the dump. The company was sinking a new three-compartment shaft from the surface, which was nearly completed to the 700 level. Plans called for continuing the shaft to the 800 level and for constructing an aerial tram from the shaft collar to the railroad loading station, bypassing the Transportation Tunnel. A new power plant and diesel engine were installed at the collar of this shaft.

In 1918, the Pittsburgh-Idaho shipped less than 300 tons per month. The ore was produced by lessees, who obtained most of their ore from old fills. The company finished installing the new power plant (Figure 18). According to the IMIR (p. 65), the generator "was built by Allis-Chambers Manufacturing Company of Milwaukee, Wis., and is of the full Diesel type. The engine is an 18x27<sup>2</sup> duplex direct connected to an alternating current engine operating at 200 RPM., 3 phase, 60 cycle, 480 volt, and has a sea level rating of 135 KW. The engine is of the four stroke cycle horizontal type with an open fuel nozzle and a low pressure starting system." The 700-foot inclined shaft was completed, and exploration work was conducted on the 700 level. Large amounts of water were found on this level, and the Idaho Mine Inspector speculated that it was draining downward from the Transportation Tunnel, which intersected the Pittsburgh-Idaho on the 400 level.

Production for 1919 was about 400 tons of ore a month, mostly from development work on the 700 level. The work was hampered by heavy water flow and by insufficient power to operate the pumps. The IMIR noted that the mine needed either to add a second diesel engine in the 200 horsepower range to its power plant or to add electric power, which would require running lines from Salmon, 70 miles away. Of the year's work, the 1919 IMIR (p. 57) said:

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<sup>2</sup>The diameter and the stroke, in inches, of the cylinder in the engine.

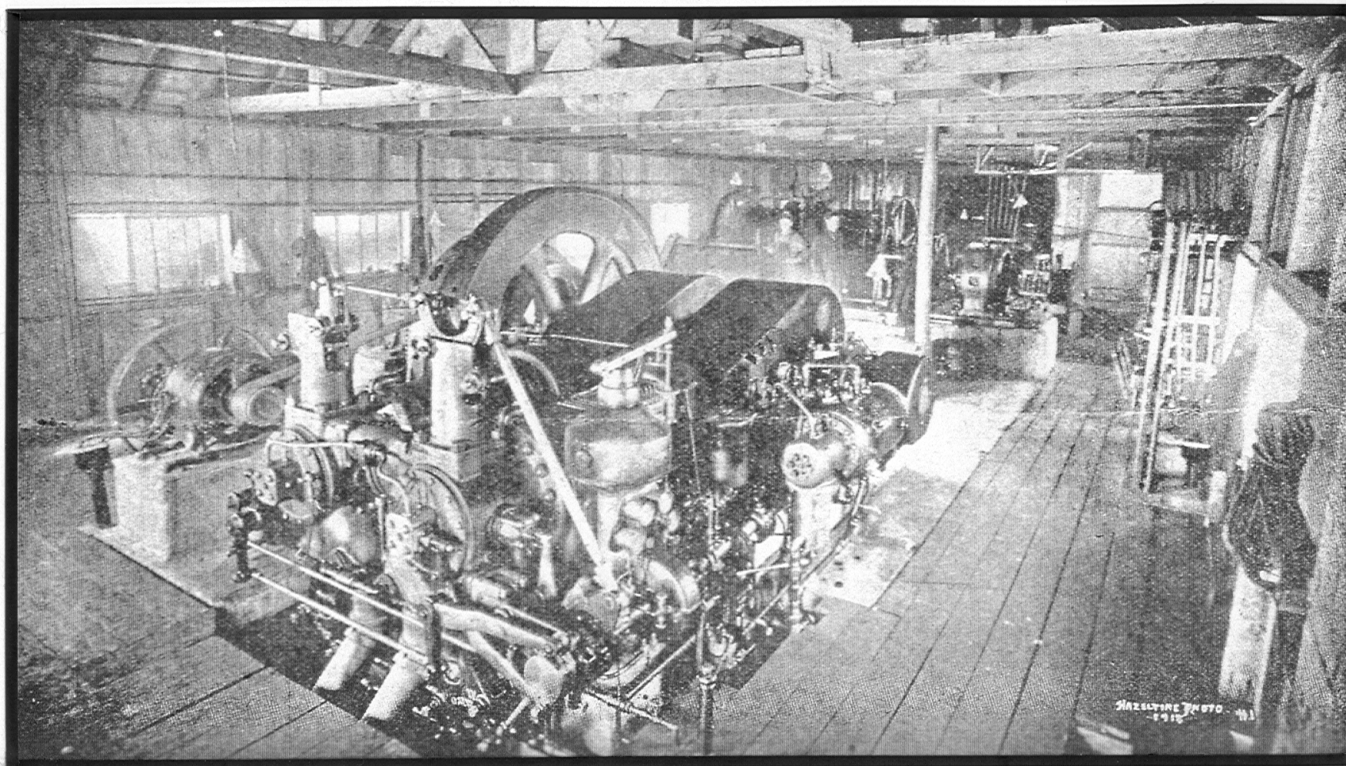


Figure 18. Power plant and hoist at the Pittsburgh-Idaho Mine (1918) (page 66 from Bell, R.N., 1919, Twentieth Annual Report on the Mining Industry of Idaho for the Year 1918).

The 700 level of the Pittsburgh-Idaho still under development continues in completely oxidized ore with only occasional kidneys of coarsely crystalline galena. This level had disclosed long ore shoots and a mineralization of intersecting fissures and cross faults that were barren higher up. It shows better silver and gold values than ever before found in the operation of the mine, is in the most favorable horizon of fossiliferous soluble limestone wall rocks and has the finest prospects for continued expansion of ore resources with further development at depth.

The mine was the largest producer of lead ore in the district in 1920. A 40-ton mill was erected during the year. According to the company, a fire destroyed the upper power house in November. After that, the company only did development work, accompanied by "desultory" ore shipments.

The largest producer of silver and lead in the district in 1921 was again the Pittsburgh-Idaho. Most of the ore (8,292 tons) was reduced to 1,407 tons of concentrate, although some ore was shipped directly to smelters.

In 1922, the mine shipped first-class lead ore and concentrated 4,560 tons of ore to make 570 tons of lead concentrate. In October, the company went into receivership. In December, operation of the property was taken over by the United States Smelting, Refining & Mining Co. of Salt Lake City. Total development of the mine was about 19,960 feet, consisting of 1,700 feet of shafts, 3,600 feet of raises, and 14,660 feet of tunnels, cross-cuts, and drifts. The mine had three tunnels, two shafts, fourteen crosscuts, and thirty-four drifts. The lengths of the main tunnels were: No. 1, 250 feet; No. 2, 700 feet; No. 3, 3,750 feet; and No. 4, 900 feet. The vertical shaft was 400 feet deep, and the inclined shafts were 260 and 1,024 feet deep. The longest of the two inclined shafts had three compartments and reached a vertical depth of 800 feet. Mine equipment included one Allis Chalmers 100-horsepower electric hoist, two electrically driven compressors (a 250-cubic-foot 9x8<sup>3</sup> Ingersoll Rand and a 300-cubic-foot 14x9½x14<sup>4</sup> Chicago Pneumatic), and a 160-horsepower Allis Chalmers diesel generating engine. The mill used jigs and tables.

The Pittsburgh-Idaho was active for most of 1923. The property was operated by a receiver, and both crude ore and concentrate were shipped to the smelter at Midvale, Utah. This mine was the largest producer of lead in Lemhi County, but it had only a small quantity of ore in reserve.

Production in 1924 was below normal, but lead ore and concentrate were shipped to the Midvale smelter. Development work totalling 2,118 feet was done during the year. The property was still in receivership, but the IMIR stated that U.S. Smelting and Refining acquired the mine during the year. United Idaho Mining Co., a

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<sup>3</sup>The diameter and the stroke, in inches, of the piston in the compressor.

<sup>4</sup>The diameters of the low-pressure and the high-pressure cylinders and the length of the stroke of the pistons in the compressor, in inches.

subsidiary of U.S. Smelting and Refining, was organized in October. After assuming control, the new company started an active development program and produced a small tonnage of ore.

The Pittsburgh-Idaho was again the largest lead-silver producer in Lemhi County in 1925, and the United Idaho Mining Co. had the largest payroll in the county. About half of the ore produced was treated in a 40-ton concentration plant, and the remainder was shipped as first-class ore. Shipments averaged about 300 tons a month, and some of the ore was produced by lessees. About 1,000 feet of development work was done.

In 1926, the mine continued to be the largest producer in the county. More than 8,000 tons of first-class lead ore was shipped to Midvale for smelting, and about 13,000 tons of ore was milled in the 50-ton concentration plant. Some of the ore was produced by lessees. Fire destroyed the power plant on October 31, and operations were discontinued for a month and a half while the plant was rebuilt. The company did 1,177 feet of development during the year, but had only a small amount of ore in reserve. According to the company, the mine's haulage system consisted of one horse and forty 1-ton ore cars.

The Pittsburgh-Idaho was the largest lead-silver producer and had the second largest payroll of any mine in southern Idaho in 1927. The mine was the seventh largest lead producer in the state. The company produced a large tonnage of high-grade direct-shipping ore, some of which was mined by lessees. Development work, much of it on the 800 level, located "large" amounts of new ore, and most of the ore shipped by the company was obtained from this work. The company added a 200-horsepower diesel generating unit to its plant during the year.

The mine was still the largest producer in the county in 1928, but its output of lead was only about one-fourth that of the previous year. The mine shipped nearly 3,000 tons of oxidized silver-lead ore and more than 300 tons of lead concentrate. The 50-ton concentrator, which was equipped with jigs and tables, was operated part-time. The company extended its shaft from the 800 level to the 950 level. The orebodies on the 950 level were of greater extent than on the 850 level. A new 200-kilowatt Allis Chalmers diesel engine was installed during the year.

During the first part of 1929, the company did a large amount of development work and produced a "substantial" quantity of ore. Again, the mine was the largest producer in the district for the year. However, about the middle of the year, one of the diesel engines in the power plant exploded. The engine and the power house were destroyed, and the loss of power forced the company to curtail operations. The company was unable to reach an agreement with the mine's principal owners about the installation of a new power plant, so the only activity at the mine for the latter half of the year was the work required to keep the mine open. No concentrate was produced after the accident, but about 700 tons of crude ore was shipped during the year. At this time, the mine had approximately 6,583 feet of total workings,

consisting of 1,200 feet of shafts, 1,260 feet of raises, and 4,123 feet of tunnels, crosscuts, and drifts. There were four tunnels, one shaft, forty-six raises, forty-six crosscuts, and twelve drifts. The lengths of the tunnels were: No. 1, 600 feet; No. 2, 1,000 feet; No. 3, 1,600 feet; and No. 4, 1,300 feet. The two-compartment inclined shaft, which started in the No. 4 tunnel, was 1,200 feet long and reached a vertical depth of 988 feet.

The mine was idle in 1930, but lessees produced some ore in 1931. The IMIR noted that a substantial tonnage of ore was produced in the district, but only a small amount of first-class smelting ore was shipped. The mine was idle in 1932.

In 1933, the company shipped material obtained from cleaning up the mill. The surface buildings and equipment were sold in June. The levels below the 500 level were allowed to flood (Ruppel and Lopez, 1988), and the mine was abandoned. Ruppel and Lopez (1988) stated that lessees continued intermittent mining and prospecting activities on the Transportation Tunnel level (400 level) until about 1941, but this is not substantiated by other records.

Lessees operated the mine in 1951 and produced zinc ore. In 1952, lessees (an average of seven men for four months) treated the old tailings on the property with a portable 500-ton sink-float plant. In addition, they explored the Silver Dollar Extension claim for ore near the surface. This exploration work continued in 1953, and some repair work was done on an old shaft.

Some ore was shipped from the mine by lessees in 1954. In addition, they explored the Silver Dollar vein and did rehabilitation work on the Transportation Tunnel. Roger V. Pierce purchased United Idaho Mining Company in late 1954 or early 1955. Lessees operated the mine for a limited period in 1955 and shipped 80 tons of ore containing 5 ounces of gold, 1,100 ounces of silver, and 48,000 pounds of lead to a smelter. Development for the year consisted of 750 feet of shaft work. Equipment at the mine included a 400-cubic-foot Le Roi diesel compressor, a Mancha trammer with 25 1-ton cars, and a Gardner-Denver mucking machine. The mine shipped one truckload of lead ore in 1956. Limited exploration and development work was carried out in 1957 and 1958, and some leases were active in the mine.

According to the USBM Yearbook, Roger V. Pierce was awarded a Defense Minerals Exploration Administration (DMEA) contract on the "Gilmore" mine on July 27, 1953. The amount of the contract was \$64,145, and government participation was 50 percent. The contract was active through 1955. On June 29, 1956, Pierce was awarded a second contract, this time for \$82,366. Government participation was still 50 percent. This contract ran through 1957. These exploration projects did not locate any economic quantities of ore; this is also suggested by subsequent production, which remained small.

According to Ruppel and Lopez (1988), work between 1953 and 1957 was done on a previously unexplored area on the 400 level which contained the Silver Dollar and Neversweat veins. Over 4,000 feet of the Transportation Tunnel were

rehabilitated in 1953 and 1954, reaching a point west of the Silver Dollar vein. Between 1954 and 1957, the Silver Dollar vein was explored by drifts extending 400 feet south and 300 feet north of the Transportation Tunnel; these drifts exposed only sparse lead mineralization in iron- and manganese-stained gouge and breccia. A crosscut from the north drift explored for extensions of the Neversweat vein, but did not find it. A crosscut from the south drift also did not find any new orebodies (Ruppel and Lopez, 1988). (Some, possibly most, of this exploration work may have been funded by Pierce's DMEA contracts.)

About 200 tons of hand-picked ore was produced in 1959, probably by lessees. In 1960, Pierce's Mining Developments, Inc., was mentioned as having a block lease on part of the mine; when Mining Developments began leasing the property is not known for certain. Operations for 1960 and 1961 were similar to those of 1959, with the company doing some development work and shipping small amounts of hand-picked ore. United Idaho's 1961 annual report to the Idaho Mine Inspector carried the scratched-out comment "Metal prices too low to compete with export fields." Mining Developments' report carried the comment (also scratched out), "Mining done depending on Congress, God help the Lead Miner."

The company continued to conduct limited exploration for the next few years. The USBM Yearbooks reported production in 1963 and 1964; USBM production records show the mine was active through 1966. Production records also show activity at the Silver Dollar in 1981. According to Ruppel and Lopez (1988), most of the workings above the Transportation Tunnel are caved and inaccessible; the levels below the Transportation Tunnel are flooded; and the main, inclined shaft is caved at the collar.

Between 1902 and 1981, the recorded production for the Pittsburgh-Idaho mine was 203,887 tons of ore and 27,647 tons of reprocessed tailings. This material yielded 5,628 ounces of gold, 2,156,744 ounces of silver, 667,540 pounds of copper, 92,342,343 pounds of lead, and 824,994 pounds of zinc. These figures represent a minimum, since Ruppel and Lopez (1988) estimate that the mine produced between 282,000 and 290,000 tons of ore; the average grade for this ore was 27 percent lead, 5-10 percent zinc, 13 ounces of silver per ton, and 0.03 ounce (or less) of gold per ton.

## MARTHA (ALLIE) MINE

The Martha claim is one of the eighteen claims staked by Edgar C. Ross around the Pittsburgh-Idaho Group in 1903 (Figures 2 and 4). The Allie Mining Company was organized in 1905 to operate the claim block (Umpleby, 1913). (Table 5 shows companies and individuals operating at the mine.) In 1912, twelve of these claims (the Martha, Dorothy, La Porte, G.A.P., Vick, Ruth, Olive, Mixer, Cook,

Table 5. Companies and individuals operating at the Martha (Allie; Gilmore) Mine.

Company Name	Officer	Date Incorporated	Charter Forfeited	Year(s) at Mine
Edgar C. Ross	---	---	---	1903-1905
Allie Mining Co., Ltd.	Edgar C. Ross, President	January 3, 1905	1926 (?)	1905-1912
Gilmore Mining Co.	Edgar C. Ross, President/Manager	February 3, 1913	Dec. 1, 1922	1912-1923
Gilmore Mercantile Co.	Edgar C. Ross, President/Manager	August 22, 1925	April 23, 1975	1922-1975
Allie Mine	Owner: Gilmore Mercantile Co.; Edgar C. Ross, Lessee	---	---	1927-1934(?)
Allie Company	A.A. Fagnant, President/Manager	no records	no records	1939-?
Falls Creek Mines, Inc.	A.A. Fagnant, President	no records	no records	1938-1940
Gilmore Mines, Inc.	Irving R. Stratton, President; A.A. Fagnant, Secretary	January 6, 1942	November 30, 1942	1942-1942

Roy Lauer [often misspelled], Annex, and Ernest) were sold to the Gilmore Mining Company and were later owned by the Gilmore Mercantile Company (Ruppel and Lopez, 1988). At various times, the workings on these claims have been referred to by the individual claim names or as the Allie, Gilmore, or New Gilmore mines. The claim blocks included in the latter names (which refer to the companies operating the property at various times) changed depending on which claims were being operated. The most common names for this group of claims are the Allie Mine or the Martha Mine (because of the gold-bearing vein discovered on the Martha claim).

The Martha vein trends N. 10° E. and dips about 65° W. It is in the Jefferson Formation (Figure 3) and closely resembles the deeply oxidized lead-silver replacement veins in the district. However, the vein contains more chalcopyrite than is typical and almost no lead or zinc (Ruppel and Lopez, 1988).

In 1910, the "Martha fissure" was discovered on the Martha and Andy claims. It is the only gold vein in the district. According to Umpleby (1913), 15,000 tons of



ore averaging about \$12 per ton in gold (about 0.58 ounce per ton at \$20.67 an ounce) were blocked out along the vein in 1911. Umpleby described the workings on the property as follows (1913, p. 107):

The ore . . . is developed from the Dorothy ground by a tunnel<sup>5</sup> which taps it about 200 feet below the surface, and 228 feet lower it is reached by a crosscut from the 300-foot level of the Pittsburgh-Idaho mine. From the lower level a raise has been driven 175 feet on the vein and a vertical winze sunk 50 feet with crosscut to the vein. On several levels drifts extend laterally to the margins of the shoot, which as thus outlined averages 12 feet wide by 30 feet long.

The ore is an earthy brown iron and manganese stained mass, very soft, and in places showing casts of small pyrite crystals. Partial analysis shows 49 per cent iron oxide, 5 per cent silica, \$15 in gold, a trace of silver, and no lead. The total absence of lead and the comparatively high value in gold distinguish this vein from the other known deposits of the district. It is thought, however, that it was formed during the same period of mineralization as the lead-silver deposits.

Ore has been exposed on the Ruth claim, though not in commercial quantities. It is of interest chiefly in that it occurs along a well-defined east-west fissure. The fissure is filled mainly with gouge, through which the ore is sparsely scattered as small lenses and irregular bunches.

A promising claim of the Allie group is the Roy Sauer<sup>6</sup>, which joins the Latest Out on the west. It is as yet unprospected, an incline shaft 20 feet deep being the principal opening. This extends down a fissure about 4 feet wide which dips 50° W. It contains heavy iron and manganese oxides and a little lead carbonate.

Early exploration work on the property included a crosscut on the Martha 200 level from the Dorothy tunnel and a crosscut, probably also on the Martha 200 level, from the Pittsburgh-Idaho. Between about 1910 and 1916, the mine was opened on five levels (at 100, 235, 250, 350, and 400 feet) by a winze from the Martha (Allie) tunnel (Ruppel and Lopez, 1988). According to the 1911 IMIR (p. 81-82):

A large group of patented claims entirely surrounds both the Pittsburg-Idaho and the Latest Out mines, and is owned by the Allie Mining Company. Some of its numerous ore showings have been under process of development through the year with a small force of men. One of the most interesting features of this property is a contact vein between blue and white limestone, which has been developed by a cross-cut tunnel 700 feet long, from one of the middle levels of the Pittsburg-Idaho, and by a surface tunnel and a connecting winze, which affords an additional outlet and ventilating course for the Pittsburg-Idaho workings. This connecting winze was sunk on a handsome shoot of brown iron oxide, from which several hundred tons was shipped during the past summer,

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<sup>5</sup>Ruppel and Lopez (1988) refer to a south-trending tunnel first opened in 1908 or 1909 that they call the Martha tunnel. Umpleby's (1913) claim map for the district shows a tunnel, labeled the Allie tunnel, which otherwise fits Ruppel and Lopez's description. It is presumed that both names refer to the same tunnel.

<sup>6</sup>This was probably the Roy Lauer, which is shown on Umpleby's claim map as the "Roy Launder."

carrying a high excess in free iron and an average value of about \$14 per ton in gold, but no lead or silver. This ore body occurs in a pronounced fissure, whose further lineal development promises to afford some important resources of this class of ore, which has been shipped, at a very decent margin of profit by virtue of its fluxing qualities, and it is not unlikely that shoots of lead and silver bearing mineral will be found in this particular channel.

Several shipments of ore containing gold and silver were taken from the Dorothy claim on the Allie property in 1910, 1911, and 1912. In 1912 the mine was sold to the Gilmore Mining Co. The company joined forces with the Pittsburgh-Idaho Company to drive the Transportation Tunnel through the Gilmore Mining Co.'s property to reach the Pittsburgh-Idaho workings. The Transportation Tunnel intersected the Martha vein during the year. After that, the mine was worked through the Transportation Tunnel, which was the main production tunnel for ore mined after 1916 (Ruppel and Lopez, 1988).

In 1913, the mine shipped oxidized iron ore containing approximately 0.75 ounce of gold and 0.5 ounce of silver per ton. (Table 6 shows mine output and economic data for the mine.) Total development work on the property was about 8,000 feet. This included an adit that ran 550 feet to the 71 incline shaft. (Table 7 shows development work and employment at the mine.) The shaft was 370 feet deep, with lateral drifts to the north and south on the 100, 200, 250, and 300 levels. The mine was equipped with a 12-horsepower gasoline hoist.

The mine shipped a "considerable quantity" of ore in 1914 and made a few shipments in 1915. About the company's 1914 activities, the 1914 IMIR said (p. 32):

One of the most attractive features of this interesting series of veins, and situated only a few hundred feet east of the main Pittsburgh-Idaho lead-silver vein, is a big fissure ore course ranging from a few inches to 20 feet thick and developed for several hundred feet in depth and length on the joint property of the Allie and Gilmore Mining Companies that only carries small traces of lead and silver and whose exclusive commercial values are in gold and iron. This powerful fissure is filled with a clean, earthy, brown iron oxide mineral which on account of its high fluxing value receives a premium from the smelters. It carries average gold values of \$12 to \$15 per ton and occasionally small bunches or streaks of very rich visible native gold specimen ore; one of these slabs disclosed in the development of this ore course from the 400 level during the past year was 40 feet long and nearly as deep by two feet thick, which produced a 50-ton shipping product that netted the company better than \$300 per ton at the smelters, while the total shipping receipts from the operation of this ore course during the past year produced gold bullion receipts of considerably over \$100,000.

The 1915 shipments included two carloads "of bonanza values in native gold" (1915 IMIR, p. 78) that yielded the company about \$300 per ton. The mine suspended operations on February 16, 1915, but resumed in May. Total mine workings through June 1, 1915, consisted of 901 feet of raises and 5,310 feet of drifts and crosscuts.

In 1916, the company made large shipments of lead ore in addition to gold. Development work, which resulted in the discovery of the lead ore, consisted of

Table 6. Mine output and economic data for the Martha Mine for selected years, 1913-1922.

Year	Tons of ore	Average value per ton	Total mining cost per ton	Transport. and treatment costs per ton	Gold recovered (ounces)	Silver recovered (ounces)	Lead recovered (pounds)	Gross returns
1913	1,227.96	\$13.84	\$2.50	\$5.30 <sup>1</sup>	721.91	---	---	\$16,968.60
1914	4,111.9	\$13.91	\$6.14	\$5.30	2,972.9	1,850	---	\$57,595.10
1915	<sup>2</sup>	\$13.44	---	\$5.16 <sup>1</sup>	---	---	---	\$31,875.30
1918	1,286	<sup>3</sup>	---	---	3	3	3	3
1919	2,280.72	<sup>4</sup>	---	---	4	4	4	19,955.38
1921	189	\$40.00	<sup>5</sup>	\$12.00	7.56	3,591	102,060	<sup>3</sup>
1922	<sup>6</sup>	---	---	---	7.31	4,387.5	164,125	4,944.60

<sup>1</sup>Transportation charges only. Railroad charges were \$4.30 per ton and wagon charges were \$1.00 per ton.

<sup>2</sup>The company reported that it mined no ore during the year. However, the cost for shipping ore and the income derived from its sale are reported.

<sup>3</sup>Information was not given in the company's report.

<sup>4</sup>See Table 8 for detailed breakdown of 1919 ore shipments.

<sup>5</sup>Company did not figure production costs separate from cost of development.

<sup>6</sup>Tons of ore produced during the year was not given. The company shipped 162.5 tons of concentrates, for which the metal values are given.

Table 7. Development work, men employed, and operating companies at the Martha Mine, by year.

Year	No. of Men employed	Tunnels (feet)	Sinking (feet)	Cross-cutting (feet)	Drifting (feet)	Raising (feet)	Operator
1913	12	2,113 <sup>1</sup>	575 <sup>2</sup>	1,538 <sup>3</sup>	---	---	Gilmore Mining Co.
1914	20	2,235 <sup>1</sup>	690 <sup>2</sup>	1,545 <sup>3</sup>	---	---	Gilmore Mining Co.
1918	<sup>4</sup>	1,510 <sup>1</sup>	280 <sup>2</sup>	1,230 <sup>3</sup>	---	---	Gilmore Mining Co./Latest Out Mining Co. (lessee)
1919	7	1,000 <sup>1</sup>	---	---	---	---	Gilmore Mining Co.
1920	12	1,100 <sup>1</sup>	400 <sup>2</sup>	700 <sup>3</sup>	---	---	Gilmore Mining Co.
1921	4	---	---	600 <sup>3</sup>	---	---	Gilmore Mining Co.
1922	3	75	40	90	400	---	Gilmore Mining Co.
1928	12	---	15	203	445	128	Gilmore Mercantile Co.
1942	30	2,000	200	600	800	---	Gilmore Mines, Inc.

<sup>1</sup>Figure is for total development work done during the year.

<sup>2</sup>Combined figure for sinking and raising.

<sup>3</sup>Combined figure for crosscutting and drifting.

<sup>4</sup>Work was done by the Latest Out mining Co., who was leasing the property. Number of men working on the property is not given.

putting in a raise on the Roy Lauer claim and driving a crosscut on the Cook claim to connect with the Latest Out workings. The shaft on the Martha claim was 400 feet deep, and the company owned a half interest in the Transportation Tunnel, which was 5,000 feet long. The 1916 IMIR described the work on the Roy Lauer and Cook claims as follows (p. 26-27):

[T]he Gilmore Mining Company, adjoining the Latest Out, was a brand new producer of lead-silver ore. It entered the shipping list during the middle of the summer in a very substantial manner and had made an output of sixty-two cars of crude shipping ore by the end of the year, from leasing operations from an ore body developed at its 450 foot level, which was discovered and operated under a lease by the Latest Out Mining Company. Above that level this ore shoot had been proven for 200 feet in length with a width varying from a foot to thirty feet of shipping ore carrying about the normal average values of the district.

The Gilmore Company's property is also being developed by a 6,000 foot tunnel, which is now closely approaching the vein at the 1,000 foot level. This tunnel has already passed a narrow companion fissure carrying rich ore at this depth and the mine gives eminent promise, at this time, of shortly becoming as large a producer as its neighbor, the Pittsburg-Idaho, and a valuable added asset to this district's growing importance in the production of very desirable oxidized lead-silver smelting ores.

The company shipped approximately 250 tons of ore per month in 1917. The IMIR credited the Martha vein with a total production of \$150,000 which averaged \$10 per ton in gold. One 30-ton shipment of native gold specimen ore was reported to have netted \$10,000. Of the work on the Roy Lauer claims, the IMIR said (1917, p. 41):

The same vein<sup>7</sup> strikes through the end line of this property<sup>8</sup> into the adjoining Gilmore Company's ground, and has recently been tapped by the 6,000-foot tunnel at a face depth of nearly 1,000 feet. It is now being explored by lineal development at that and intermediate horizons. In fact, some important shipments have already been made on this Gilmore property through a lease, operating from the 450-foot level of the Latest Out Mine, and a production of several million pounds of lead is already credited to the extension of this vein south on Gilmore ground. The future of the Gilmore enterprise as a source of profitable lead-silver ore seems definitely assured as a further extension of its interesting deep development progresses.

Ore produced during 1918 came primarily from the areas leased to the Latest Out Mining Co. Several carloads of high-grade lead-silver ore were shipped from this part of the mine during 1919, as well as iron ore containing considerable gold from the Martha workings. (Table 8 shows tonnage and grade information on the ore produced during the year.) Much of the work done during 1919 and 1920 on the Martha claims was on the 300 and the 350 levels (Ruppel and Lopez, 1988).

Production for 1920, 1921, and 1922 followed the same pattern as 1919. Total workings in 1922 were about 14,000 feet. This included three tunnels, one shaft, two raises, and six drifts. The mine had 450 feet of shafts, 550 feet of winzes, and 13,000 feet of tunnels, crosscuts, and drifts. The tunnel on the Roy Lauer claim was 650 feet long, the Martha tunnel was 400 feet long, and the Transportation Tunnel was 5,000 feet long. The company owned a half interest in the Transportation Tunnel and in the 2,500-foot tramway that connected the tunnel to the railroad loading station. Mine equipment included a 12-horsepower Fairbanks Morse gasoline hoist, and haulage was by mule.

In May 1922, creditors filed a lien against the Gilmore Mining Company for approximately \$45,000 of labor and mining supplies. A judgment was secured against the company, followed by a sheriff's sale on November 16, 1922. The purchaser was the Gilmore Mercantile Company (with a strikingly familiar slate of officers), but a letter to the stockholders of the Gilmore Mining Company dated April 28, 1923, noted that, under Idaho law, the company had one year to redeem the property by paying the sale price plus interest. (The same letter noted that the company's debt as

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<sup>7</sup>The vein on the Gilmore Mining Company's property was an extension of the vein found on the 600-foot level of the Latest Out.

<sup>8</sup>The Latest Out.

Table 8. Ore shipped from the Gilmore Mining Company's property during 1919 (information from company records).

Class of Ore	Tons (wet)	Tons (dry)	Average Assay (per ton)			Sale Value Per Ton f.o.b. Gilmore	Total Sale Value f.o.b. Gilmore	
			Gold (ounces)	Silver (ounces)	Lead (percent)		To Lessee	To Company
Gold	2,391.72	2,058.72	0.629	0.40	<sup>1</sup>	\$ 8.71	---	\$17,931.92
Lead	9.24	8.22	0.057	21.45	14.70	17.49	---	143.83
Latest Out Lease	191.18	169.12	0.018	4.49	14.66	6.40	\$ 974.25	108.24
Robinson Lease	49.79	44.51	0.070	14.8	23.75	17.91	556.61	240.53
<b>Total</b>	<b>2,641.93</b>	<b>2,280.72</b>	---	---	---	---	<b>\$1,530.86</b>	<b>\$18,424.52</b>

<sup>1</sup>Company did not report any lead in this class of ore. However, they received a \$2.32 per ton bonus for the iron contained in the ore.

of January 1, 1923, was approximately \$150,000, with no funds or income available to pay it.) The company granted three leases "to responsible parties" in hopes of making enough money to redeem the mine. About 1,000 tons of first-class ore was shipped from the property during 1923, and a milling test was made on concentrating ore. However, this did not raise enough money to save the company, and the Gilmore Mining Company went out of business.

The Gilmore Mercantile Co. shipped several lots of crude ore and concentrate in 1924 and several hundred tons of ore in 1925. In 1926, the company did about 600 feet of development and shipped more than 1,000 tons of oxidized lead ore.

The 1927 IMIR states (p. 157), "The Allie mine, owned by the Gilmore Mercantile Co. and operated by lessees throughout the year, is developing into one of the largest lead mines in southern Idaho." On the following page, the IMIR lists the "Allie Mine" (company) as leasing the Allie Group from the Gilmore Mercantile Co. The "Allie Mine" does not seem to be an incorporated company, but was instead Edgar C. Ross's personal company, which was leasing the property. (It also appears to be distinct from the Allie Mining Co., which was also controlled by Ross and which owned the Allie/Andy group.) The description of the claims and the existing development work suggests that the property being operated was indeed the Martha and Roy Lauer groups; the lead production indicates that most of the work was probably being done on the Roy Lauer and Cook workings. (References to the "Allie mine" made during the next few years are probably all to this property. The confusion multiplies during the period when the United States Smelting, Refining & Mining Co. leased both the Martha/Allie and the Allie/Andy groups.)

In 1928, the mine was the second largest producer in the district, shipping about 1,700 tons of oxidized lead ore to Midvale, Utah, for smelting. Much of this ore was mined by lessees. The company did 1,400 feet of development, chiefly in drifts and crosscuts. On August 1, U.S. Smelting, Refining & Mining acquired a lease and bond on the property.

During 1929, the company developed the mine through the Transportation Tunnel, which was about 600 feet below the upper workings. Approximately 250 feet of work was done in the tunnel and the inclined shaft, and some ore was shipped. The explosion of the power plant at the Pittsburgh-Idaho in the middle of the year forced U.S. Smelting, Refining & Mining to curtail operations in the district, and the company surrendered its lease in September. The Gilmore Mercantile Co. went into receivership on March 6, 1929. (Alternate reports give the date as March 1, 1930.)

Two groups of lessees worked the mine in 1930 and shipped several cars of high-grade lead-silver ore. Funds to finance some of this development work were said to have been advanced by "one of the large smelting companies." Lessees also did some work during 1931 and shipped a small amount of first-class oxidized lead ore. Metal prices hit all-time record lows in 1932, and the mine was closed. Equipment on the property at the time included a 20-horsepower Junior electric hoist, a Fairbanks Morse gas engine power plant, a 7½-horsepower Junior electric hoist, a 4-horsepower Fairbanks Morse gas engine and blower, and 1,000 feet of 12-inch ventube pipe.

Lessees apparently shipped gold ore from the Martha in 1934. A "man by the name of Taylor" leased a portion of the mine in 1938; the following year, R.M. Taylor was the chief engineer and general superintendent for the mine. In 1939, a ball mill and other machinery were purchased from the Pope-Shenon Mine and moved to the property. Also, a little silver-lead ore was shipped. The mine was being operated by the Allie Company under lease and bond from the Gilmore Mercantile Co., according to the IMIR. However, USBM information suggests this company, headed by A.A. Fagnant, may have actually been Falls Creek Mines, Inc. Gilmore Mercantile was rumored to have been reorganized during 1940, likely a delayed response to Edgar C. Ross' death in late 1937 or early 1938.

In 1940, the mine produced several thousand tons of gold ore, which was treated by cyanidation. Gilmore Mines, Inc., leased the mine from Gilmore Mercantile in 1941. In addition, Gilmore Mines leased the Andy claim (which contained the extension of the Martha gold vein) from Delaware-Idaho Mining Co. The company worked the gold vein during the year, milling the ore with a ball mill and treating it with cyanide. Production for the year was 2,600 tons of gold ore. Total development in the mine was approximately 15,000 feet of workings. The ore mined in 1940 and 1941 was taken from between the 400 and 500 levels (Ruppel and Lopez, 1988).

Roger V. Pierce leased the property in 1954. He equipped the mine with a portable compressor powered by a diesel engine, an electric trammer, fifteen mining cars, and an air trammer. Pierce had three men working to rehabilitate the

Transportation Tunnel and to crosscut for ore veins. Gilmore Mercantile's report noted that the property had not been worked since 1942 and most of the mine had caved. (Pierce was also working at the Pittsburgh-Idaho, and the improvement on the Transportation Tunnel benefitted that operation as well.)

Pierce maintained his lease in 1955 (it expired in August 1956) but concentrated his efforts on the Pittsburgh-Idaho. The property was again under lease to Pierce in 1958, but little work was done. Gilmore Mercantile's 1959 report to the Idaho Mines Inspector noted that Pierce was working off and on with a couple of men to develop one of his own claims (i.e., in the Pittsburgh-Idaho group). This work was intended to make the combined claim blocks more attractive to a prospective buyer.

Between 1960 and 1965, Pierce drove a lower tunnel through Gilmore Mercantile's claims and one of his own. According to Gilmore Mercantile's 1964 report, "He [Pierce] only works 2 men off and on in driving a tunnel thru the claims. He hit a streak of low grade lead ore. He never reported any shipments, if any. As a lessor he has defaulted in several ways, but we have none better in sight." Pierce's lease ran at least through 1966. From 1968 on, the mine was apparently idle.

Recorded production for the mine between 1913 and 1949 is 35,002 tons of ore, which yielded 8,635 ounces of gold, 154,338 ounces of silver, 62,949 pounds of copper, and 7,327,780 pounds of lead. Given the complexities of the ownership and lease situations for most of the property's history, it is likely that at least some ore was not recorded or was recorded with the output of other mines in the immediate area. Ruppel and Lopez (1988) credit the Martha vein with producing about 13,000 tons of ore which averaged about 0.6 ounce of gold and 0.3-0.4 ounce of silver per ton; gold production was about 7,775 ounces. Also according to Ruppel and Lopez, concentrate produced from ore mined in 1940 and 1941 yielded about 7,945 ounces of gold from ore that contained between 0.2 and 1.86 ounces of gold per ton (with an average grade of 0.4-0.5 ounce of gold and 0.3-0.4 ounce of silver per ton). This gives the total gold production for the Martha vein of 15,720 ounces, which is considerably higher than the above figure. However, it should be noted that Ruppel and Lopez's numbers probably include production from the Andy claim, which was under different ownership, as well as from the Martha.

## ALLIE (ANDY) MINE

The Allie Group was among the eighteen claims staked around the Pittsburgh-Idaho Group in 1903 by Edgar C. Ross (Figures 2 and 4). (Table 9 lists companies and individuals operating at the mine.) The group consists of the six claims (Andy, Gilmore, W.H. Cannon, Glen, Edie, and Hatton) which remained in the possession of Ross's Allie Mining Company after the Pittsburgh-Idaho and Martha Groups were sold in 1906 and 1912, respectively.



Table 9. Companies and individuals working at the Allie (Andy) Mine.

Company Name	Officer	Date Incorporated	Charter Forfeited	Year(s) at Mine
Edgar C. Ross	---	---	---	1903-1905
Allie Mining Co.	Edgar C. Ross, President/Manager	January 23, 1905	1926 (?)	1905-1924
Delaware-Idaho Gold Mining Co.	Edgar C. Ross, President/Manager	Feb. 4, 1932; reinstated Nov. 23, 1970	1960; liquidated 1975	1932-
Roger Pierce, lessee	---	---	---	1956-1959

In 1908, 1,200 feet of development work was done on the Andy Consolidated group of the Allie Mining Company. The "Martha fissure," the only gold vein in the district, was discovered in 1910 on the Martha claim (later owned by the Gilmore Mining Company) and the adjacent Andy claim. The Allie (Andy Consolidated Group) shipped oxidized iron ore containing gold and silver in 1911 and 1912.

In addition to production from the Andy claim, the company was working its other claims. According to the 1911 IMIR (p. 82):

At another point on this company's property, on the Little Gilmore Claim<sup>9</sup>, a well defined fissure has been followed for several hundred feet by an adit tunnel, disclosing a continuous streak of lead-silver mineral, which, while usually small, makes some interesting swells, and one of these being opened at the present time by an incline shaft shows 18 inches of good shipping mineral, carrying 30 per cent lead, with half an ounce of silver to the unit of lead. This shoot has made a steady improvement from the surface, and rather indicates a continued expansion, and that another important shipper will be opened at a little further depth on this property.

In 1913, the Allie shipped oxidized iron ore which ran 0.75 ounce of gold and 0.5 ounce of silver per ton. A body of gold ore was discovered on the 400-foot level of the Allie in the latter part of the year. Samples of the ore ran several hundred dollars per ton. On July 1, the company began operations at the south end of the Andy claim line on the 400 level. This work represented the company's contribution to the construction of the Transportation Tunnel.

The Allie shipped ore in the early part of 1914. (Table 10 lists development work and employment at the mine.) The production came from a vein that was said to

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<sup>9</sup>Actually, the tunnel was named the "Little Gilmore"; the claim was the Gilmore.

Table 10. Development work, men employed, and operating companies at the Allie (Andy) Mine, by year.

Year	No. of Men employed	Tunnels (feet)	Sinking (feet)	Cross-cutting (feet)	Operator
1914	8	540 <sup>1</sup>	150 <sup>2</sup>	390 <sup>3</sup>	Allie Mining Co., Ltd.
1915	4	235 <sup>1,5</sup>	50 <sup>2,5</sup>	165 <sup>3,5</sup>	Allie Mining Co., Ltd.

<sup>1</sup>Total development for the year.

<sup>2</sup>Combined figure for sinking and raising.

<sup>3</sup>Combined figure for crosscutting and drifting.

<sup>4</sup>Number of men employed given as "None"; mine was closed at date when report was submitted.

<sup>5</sup>Figure obtained by subtracting previous figures from total development figures given by company.

be 4½ feet wide; an 18-inch section assayed \$1,375 a ton in gold. According to company records, 1,481.5 tons of ore with an average value of \$13.07 per ton was shipped. Transportation and treatment costs were \$4.30 per ton. Mine equipment was listed as fifteen 16-cubic-foot ore cars.

The 1915 IMIR described that year's operations (p. 78):

During the year the Allie Company was confining its development from the deep tunnel to their lead bearing fissures in the strike of the Latest Out vein and found some encouraging evidences of a continuation of the latter property's mineralization along its strike into their territory. This development is being carried at a depth of about 800 feet under the crest of the vein and the intersection of a pay ore shoot at this horizon should mean the addition of a profitable resource of ore to this company's extensive holdings.

Total mine workings were 775 feet.

The mine also shipped a small amount of ore in 1916. However, according to company reports made after 1920, the mine was not worked after 1914, apparently due to fiscal problems. In 1921, after almost five years of nonoperation, the company reported total workings on the mine to be about 3,500 feet. (This discrepancy may represent inclusion of the company's share of the Transportation Tunnel.)

The property was sold at a sheriff's sale on May 27, 1924, and the company failed to redeem the mine in the allotted time. The claims, owned by Edgar C. Ross, were leased to the U.S. Smelting, Refining & Exploration Co. in late 1928. That company was also leasing the adjacent claims of the Gilmore Mercantile Co. and owned the Pittsburgh-Idaho mine through its subsidiary, United Idaho Mining Co. U.S. Smelting, Refining & Exploration developed all its claims through the Transportation Tunnel but did not keep records differentiating what work was done on specific claims. The explosion at the United Idaho power plant in mid-1929 led to the curtailment of all work, and the company surrendered its lease in October 1929.

The Delaware-Idaho Gold Mining Co. was incorporated on December 31, 1931, in the state of Delaware and qualified to do business in Idaho on February 4 of the following year. According to the company, up to that time, the mine had shipped 43 carloads, totaling 2,102 tons of ore, to Salt Lake City for smelting. The average value per ton of the ore was given as \$22.22 for gold, 14 cents for silver, and \$1.47 for iron, for a total of \$23.83 per ton. The smelter value of the ore (net of shipping costs) was \$41,306.92 (Table 11).

On October 1, 1934, Delaware-Idaho acquired a two-year operating lease with an option to purchase on the adjoining Martha Mine. A Delaware-Idaho prospectus stated that the Martha had shipped 15,000 tons of lead-silver ore and 12,956 tons of gold ore. At a gold price of \$19.00 per ounce (the price paid by the smelting company for gold ore shipped f.o.b. Gilmore), the average value of the gold in the ore was \$11.28. The company planned to sell 30,000 shares of stock to finance development in late 1934, but apparently it could not (or would not) satisfy the Securities and Exchange Commission's requirements. The stock remained unsold and the mine remained idle.

In 1935, development on the property consisted of three tunnels, one shaft, one raise, and three crosscuts. The Glen tunnel was 350 feet long, the Gilmore tunnel was 550 feet long, and the length of the Andy tunnel was not given. (The development reported by the IMIR for the Delaware-Idaho property during this period appears to include the workings for the Gilmore Mercantile Co.'s mine as well. However, it is unlikely that this lease remained in effect after its original term because Delaware-Idaho did no work on either property.)

Edgar C. Ross died in late 1937 or early 1938. At the time of his death, the company was being reorganized, and later notations on the company reports made conflicting claims about whether the shares of stock he was supposed to have been given in exchange for his mining claims were ever issued. In 1938, the company cleaned out part of the mine in preparation for starting operations.

In 1939, Delaware-Idaho was working with "a party" to start developing the mine. Gilmore Mines, Inc., leased the Andy claim in 1941. The company produced ore from the Martha vein, and some of the ore may have come from the Andy claim.

In 1943, the company noted that the Latest Out had crossed the side line of its claim on the 600 level and extracted ore from one of the Delaware-Idaho Co.'s claims by mistake. Total development on the property was one tunnel, two inclined shafts, and one raise, totalling about 500 feet of workings. Both shafts were about 100 feet long and the tunnel was 200 or 300 feet long. (These numbers are not consistent with earlier or later reports. They appear to reflect either the accessible workings or the knowledge of the local manager at that time.)

By 1955, most of the workings were caved. In 1956, Roger Pierce leased the property and did a few hundred feet of crosscutting on the Hatton claim, hitting an iron manganese vein with low ore values. His lease expired before the following

Table 11. Smelter settlements for ore shipped from the Allie Mine prior to February 1932 (from records of the Delaware-Idaho Gold Mining Co.).

Wet Wt.	Moisture	Dry Wt.	Gold \$	Silver \$	Iron \$	Gross \$	Freight Paid	F. O. B. Gilmore
94,520	19,377	75,143	9.79	---	1.56	11.35	301.04	125.40
100,160	17,328	82,832	10.02	.08	2.16	12.26	290.45	217.30
100,960	17,365	83,595	10.26	.08	2.22	12.56	292.78	232.20
105,600	18,797	86,803	9.60	.10	2.27	11.97	253.44	266.08
100,500	18,090	82,410	10.23	.08	2.08	12.99	241.20	294.05
101,180	20,843	80,337	9.31	.08	1.03	10.42	242.83	175.73
87,080	16,545	70,535	8.74	.10	1.54	10.38	208.99	157.09
99,540	19,112	80,428	10.64	.14	1.46	12.24	239.90	252.30
102,000	18,360	83,640	13.44	.10	1.72	15.26	219.30	418.87
100,200	18,036	82,164	7.60	.09	1.03	8.72	216.43	141.80
88,800	15,540	73,260	6.70	.07	.13	6.70	90.92	61.83
99,160	13,585	85,575	5.80	.09	1.57	7.46	216.19	103.00
96,860	14,335	82,525	7.89	.12	1.64	9.65	208.25	189.93
105,340	16,118	89,222	10.50	.06	1.92	12.54	226.48	332.94
100,080	14,812	85,268	13.15	.09	2.01	15.26	215.17	435.43
97,400	16,665	80,745	17.62	.11	1.92	19.65	233.76	559.56
98,820	16,108	82,712	13.40	.14	1.75	15.29	212.46	419.87
102,840	15,528	87,312	13.97	.12	2.40	16.49	221.11	498.78
102,220	16,355	85,865	12.87	.15	1.62	14.64	219.77	408.76
85,160	14,306	70,854	17.15	.11	2.18	19.44	204.38	484.32
103,360	17,364	85,996	23.09	.11	1.96	25.16	325.58	756.25
100,140	20,528	79,612	16.34	.13	1.05	17.52	215.30	482.10
104,340	18,572	85,768	22.90	.15	1.35	24.40	328.67	717.70
110,120	19,820	90,300	12.26	.12	1.32	13.70	236.76	381.80
97,520	17,066	80,454	21.33	.17	.74	22.24	234.05	660.60

Table 11 (continued). Smelter settlements for ore shipped from the Allie Mine.

Wet Wt.	Moisture	Dry Wt.	Gold \$	Silver \$	Iron \$	Gross \$	Freight Paid	F.O.B. Gilmore
94,920	18,510	76,410	10.45	.10	.76	11.31	207.08	225.02
89,640	19,362	70,278	12.54	.12	.47	13.13	192.70	268.65
91,740	17,890	73,850	11.50	.10	.92	12.52	197.24	265.06
96,260	18,096	78,164	12.49	.09	1.72	14.30	206.96	351.91
93,620	16,384	77,236	10.97	.10	1.42	12.49	201.28	281.06
97,900	16,545	81,355	15.87	.12	1.47	17.46	210.48	499.75
96,520	16,890	79,630	14.44	.14	1.47	16.05	207.52	431.51
97,120	19,910	77,210	9.60	.12	1.30	11.02	208.82	216.61
63,660	10,822	52,838	418.00	.66	.01	418.67	---	10,450.75
91,580	16,668	74,912	11.69	.14	1.22	13.05	196.90	291.90
96,800	17,618	79,182	12.97	.16	1.43	14.56	208.12	368.32
96,600	17,678	78,922	158.51	.31	.61	159.43	---	5,561.08
97,020	16,008	81,012	9.03	.09	1.06	10.18	208.59	203.76
57,040	8,841	48,199	12.02	.12	1.51	13.65	122.64	206.32
85,440	15,636	69,804	10.36	.13	.94	11.43	183.70	215.23
93,280	15,204	78,076	15.44	.15	.83	16.43	200.55	400.45
95,080	14,262	80,818	15.82	.14	1.93	17.89	228.19	494.73
186,060	30,514	155,546	12.97	.13	1.54	14.64	400.03	738.57

summer, but it was later renewed. In 1958, Pierce again had a lease and bond on the property and was crosscutting on the Gilmore claim. He did the work with "portable equipment which he uses on and off the ground." He failed to locate any ore on the Gilmore, and no further mention is made of the property after this.

Between 1911 and 1916, the Allie (Andy) group produced 2,576 tons of ore, which yielded 2,477 ounces of gold, 1,668 ounces of silver, 373 pounds of copper, and 9,482 pounds of lead. These figures represent a minimum. Ore produced from

these claims may have been combined into the totals for the Martha (Gilmore Mercantile Co.) Mine or the Pittsburgh-Idaho Mine during the periods when these properties were operated as a single unit.

## LATEST OUT MINE

The Latest Out Mine consists of one claim in the central part of the Texas district on the west side of the Pittsburgh-Idaho at an elevation of 8,300 feet (Figures 2 and 4). It is surrounded on the other three sides by the claims of the Martha and Allie groups. The veins and orebodies are parallel to those in the Pittsburgh-Idaho, and the mineralogy is similar. Even in the deepest orebody, the ore consisted almost entirely of secondary minerals—cerussite, anglesite, smithsonite, hemimorphite, and cerargyrite in a gangue of earthy hematite, limonite, and manganese oxides. The veins were irregular replacement bodies that were as much as 250 feet in length along strike and 40 feet thick (Figures 19 and 20); some of them were stoped over vertical distances of several hundred feet (Ruppel and Lopez, 1988).

The Latest Out was discovered in 1880. During the next four or five years, the mine shipped 1,200 to 1,500 tons of ore to the Nicholia smelter (Umpleby, 1913). Workings up to 1889 included two inclined shafts and a shallow-level drift on the vein. Ralph Nichols purchased a half interest in the property around 1889, supposedly for \$300 and a barrel of whiskey (Ruppel and Lopez, 1988). (Table 12 lists the companies and individuals operating at the mine.) Little work was done until 1908, when Nichols gained control of the property. (The mine remained in the hands of the Nichols family throughout the period it was in operation.) In 1908 and 1909, about 200 tons of ore was hauled to Dubois for shipment to Salt Lake City (Umpleby, 1913).

In 1908 the mine had a 300-foot tunnel. During the year, Nichols started a production adit from the eastern boundary of the claim, driving it west to intersect one of the older inclined shafts (Ruppel and Lopez, 1988). The 1909 IMIR described the work as follows (p. 72-73):

Immediately adjacent to the Gilmore mine<sup>10</sup>, Ralph Nichols is developing a property known as the Latest Out. This property was formerly developed and operated through an incline shaft. From this incline shaft workings it is claimed that over 1,000 tons of high grade ore was shipped to the old Viola smelter at Nicholia; besides this considerable ore was concentrated by former owners in Texas Gulch and the concentrates shipped to Omaha.

Under the present management a lower tunnel has been driven and connected with the old workings. The vein on this level has been prospected extensively and has

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<sup>10</sup>The Pittsburgh-Idaho Mine.

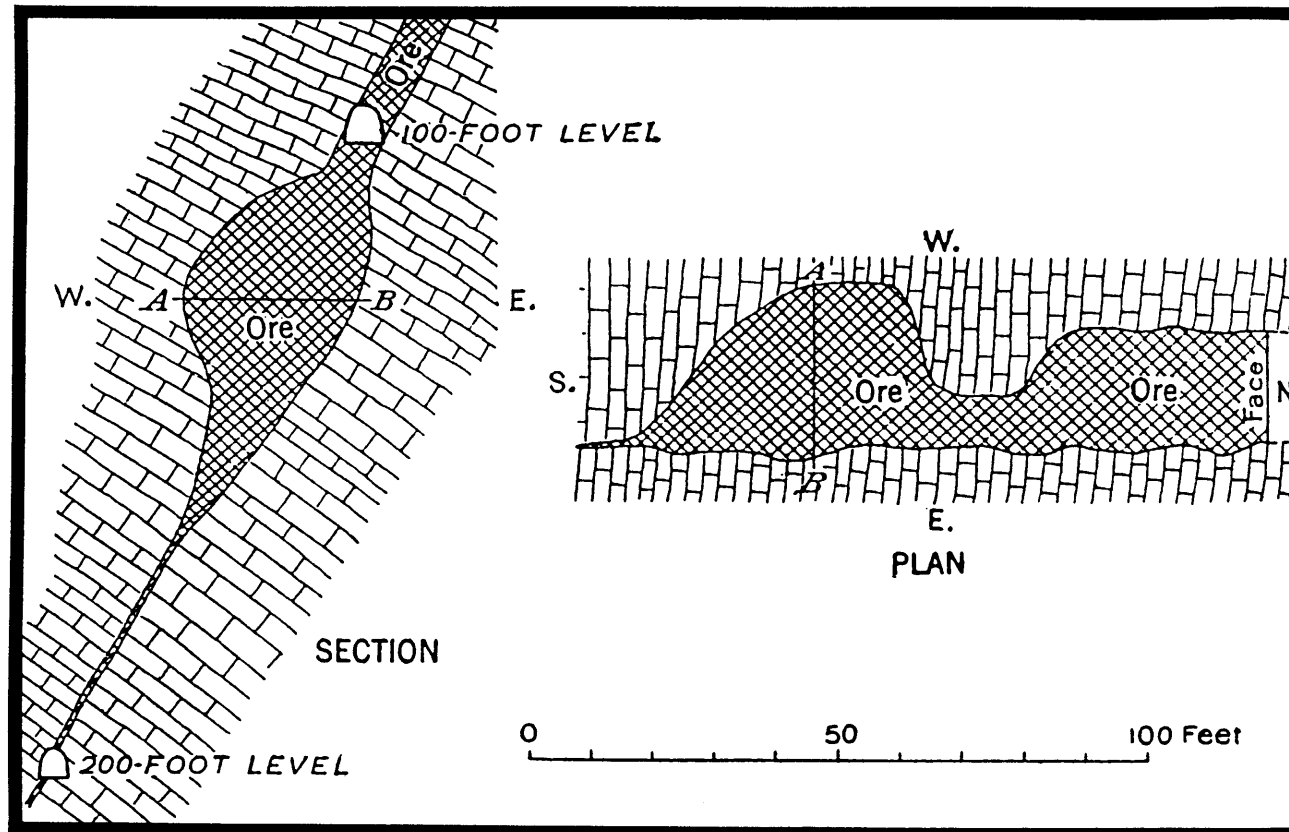


Figure 19. Diagram illustrating replacement phenomena in the Latest Out Mine. The drawing shows the back of the incline between the 100- and 200-foot levels. Line A-B is common to both the plan and the section (Figure 15 from Umpleby, 1913).

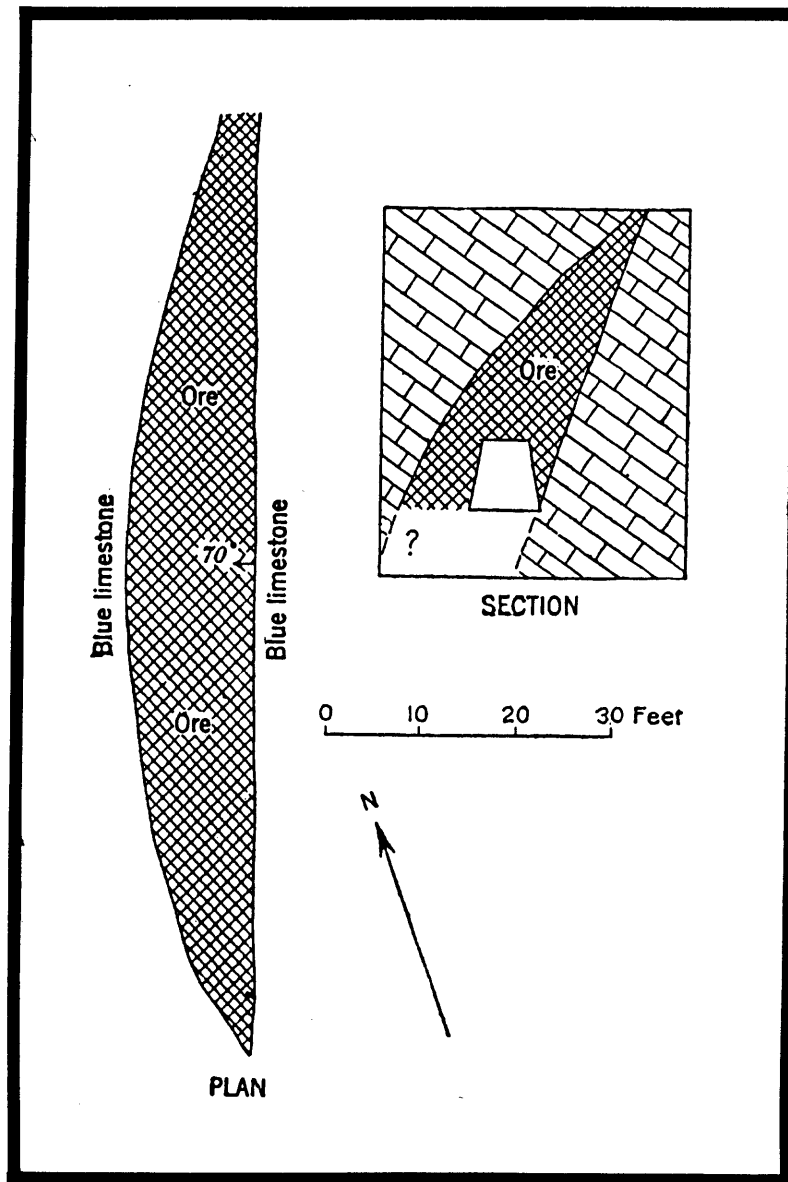


Figure 20. Outline of the orebody exposed in the north drift of the 100-foot level of the Latest Out Mine, showing the lenslike form of the orebody both along the dip and the strike (Figure 14 from Umpleby, 1913).



Table 12. Companies and individuals operating at the Latest Out Mine.

Company Name	Officer	Date Incorporated	Charter Forfeited	Year(s) at Mine
Ralph Nichols	---	---	---	1889-1910
Latest Out Mining & Smelting Co.	Ralph Nichols, President	May 23, 1910	November 30, 1940	1910-1940
Edwina Nichols, owner	Milo Zook, lessee	---	---	1940-1948 (1953?)

opened up two small but promising ore shoots. A 15 horse power gasoline hoisting outfit has been installed, with self-dumping skip, and the sinking of a winze from this level has been commenced. At the time I visited the property this winze was down 110 feet.

The ore occurrence in this property is similar to that of its neighbor, the Gilmore mine, and occurs along a lime porphyry contact. The ore varies from 2 to 10 feet in width and I am informed carries about 35 per cent lead, 15 ounces silver and 50 cents to \$1.50 in gold.

A railroad spur reached the mine in 1910, and the Latest Out made shipments at the rate of 20 tons per day during the last part of the year. Total lead and silver production for the year was valued at over \$130,000.

In 1911, the Latest Out mine shipped ore containing about 33 percent lead at the rate of 600 tons per month. According to the 1911 IMIR (p. 81):

Adjoining the Pittsburg-Idaho group to the west, the Latest Out Mine has developed ore to a depth of 450 feet by cross-cut tunnels and an incline shaft. It has been in steady operation during the year with a force of 30 to 40 men, on a parallel fissure vein, equipped with a 12 H. P. gasoline hoist, and has made an output of shipping ore equal to 50 per cent of that of its neighbor, or about 9,500 tons, of the same grade and character of ore, with probably a little better silver values.

The Latest Out deposit occurs in a steep pitching fissure similar to the steeper veins of the Pittsburg-Idaho, in a zone of fissuring and limestone alterations, 30 to 50 feet wide, which gives it a strong appearance for permanency at depth. This ore course has also been developed several hundred feet in length, and to the deepest point in the mine it has made some notable swells of rich mineral up to 30 feet wide. At two of the levels the ore is cut and displaced just a few feet by a porphyry dike 30 feet wide, and shows rich ore on both sides of the dike at one of these levels.

The ore from both of these mines carry a fairly uniform value of 50 cents gold per ton in addition to their lead and silver values. In fact, this gold association is common to all the ores of this district, and in some instances runs several dollars per ton.

When Umpleby (1913) visited the mine in 1910 or 1911, the main adit, which was driven into the hill at an elevation of 8,100 feet, intersected the vein 340 feet from the

portal (Figure 21). From there, an inclined shaft extended 220 feet. Laterals totalling 800 or 900 feet extended from the shaft on the 100, 200, and 300 levels. Another 300 to 400 feet of workings developed the vein farther up the mountain. The average ore grade, according to Umpleby, was about 18 ounces of silver per ton, 34 percent lead, 10 percent iron, and 5 percent zinc.

Oxidized lead ore was shipped from the Latest Out mine at the rate of about 600 tons per month during 1912. The 1912 IMIR contained the following description of the work at the property (p. 127-128):

The Latest Out Mine, immediately west of the Pittsburg-Idaho and operated on one of the same system of fissures, enjoyed a very successful year of production and new ore development, its operation including an output of 7,500 tons of profitable shipping mineral and 2,000 lineal feet of new work.

Its ore resources have been proven to a depth of 375 feet below the surface. This development has encountered five different ore shoots, which have disclosed a maximum length of 100 feet and as much as 15 feet in thickness of clean shipping mineral, that have shown their strongest manifestation in their bottom horizon.

This mine is opened through a cross-cut tunnel and a steeply incline[d] shaft and the management is undertaking the further development of the deposit in depth. All these ore bodies are on the same vein, while the property contains another parallel vein of considerable promise on which some preliminary development work has been started through an independent shaft sunk from the surface, and the enterprise at this date has a splendid prospect of continued profitable operation and expansion of its ore resources.

The Latest Out continued to ship at the rate of about 600 tons of oxidized lead ore during 1913. (Table 13 shows mine output and economic data.) The ore was sent to International Smelting & Refining Co. in Tooele, Utah. Total development at the mine was about 7,000 feet, including a 350-foot crosscut tunnel and a 320-foot inclined shaft with levels 100 feet apart. (Table 14 shows development work and operating companies at the mine.) The property had three gasoline engines (4-, 12-, and 15-horsepower), a 750-foot gravity tramway, a blacksmith shop, a timber shed, boarding houses, and bunk houses. The company paid \$40,000 in dividends during the year. According to Ruppel and Lopez (1988), total production through 1913 was between 30,000 and 32,000 tons.

Shipments from the Latest Out were greatly reduced in 1914. According to the 1914 IMIR (p. 31):

[T]he Latest Out Mine enjoyed a profitable year's operation, but its output was greatly restricted by low markets. The development of this mine, however, is showing its strongest manifestations of mineral at the bottom level, 600 feet deep, but still 600 feet above the bottom level of the adjoining Pittsburg-Idaho Mine, which outcrops lower down the same steep mountain slope on which they are both situated.

Most of the work done in the mine from June 1913 thorough June 1914 was development work, which included sinking new shafts and crosscutting and drifting

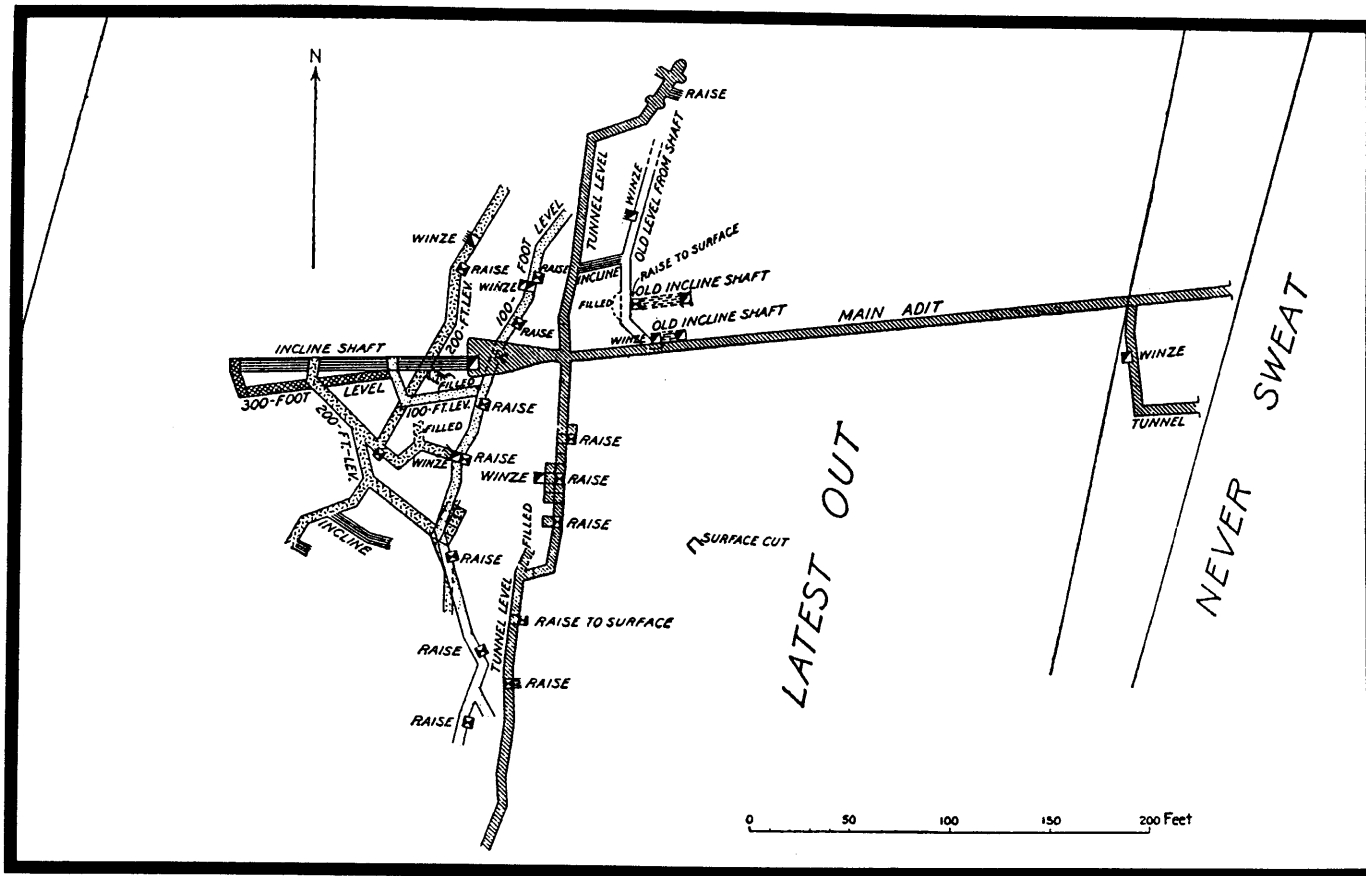


Figure 21. Plan of the underground workings of the Latest Out Mine in 1910 or 1911 (Figure 13 from Umpleby, 1913).

Table 13. Mine output and economic data for the Latest Out Mine for selected years, 1913-1923.

Year	Tons of ore	Average value per ton	Total mining cost per ton	Transport and treatment costs per ton	Gold recovered (ounces)	Silver recovered (ounces)	Lead recovered (pounds)	Gross returns
1913	11,679.12 <sup>1</sup>	\$22.00	\$ 8.30	\$ 7.00	274.67	105,807.92	5,716,882.66	\$257,191.46
1914	3,312.32 <sup>1</sup>	\$20.00	<sup>2</sup>	\$ 6.00	62.73	29,795.43	1,416,755.16	\$47,304.24 <sup>3</sup>
1915	3,535.68 <sup>1</sup>	\$10.74 <sup>4</sup>	\$12.60 <sup>5</sup>	\$ 5.85	114.87	35,312.3	1,570,434.9	\$37,981.85
1916	2,432	\$25-30	\$16.00	\$10.00	68	23,281	990,512	\$62,645.38
1918	6,213	\$30.00	\$21.00	\$ 6.50	151	61,579	2,610,958	\$183,921.45
1919	4,898	\$22.10	\$20.34 <sup>6</sup>	\$6.66 <sup>7</sup>	129	40,841	2,329,877	\$108,244.61
1920	5,631	\$28.00	\$13.80	\$ 8.50	170	38,769	2,291,587	\$155,131.94
1921	398	\$35.00	\$18.00	\$ 9.00	17.7	4,322	191,843	\$13,931.98
1922	2,666	\$16.50	\$11.00	\$ 4.60 <sup>7</sup>	106.6 <sup>8</sup>	21,861 <sup>8</sup>	1,199,700 <sup>8</sup>	<sup>9</sup>
1923	7,043 <sup>1</sup>	\$28.00	\$28.00	\$ 5.30 <sup>7</sup>	314	63,127	2,961,259	\$198,666.52

<sup>1</sup>Wet weight of ore shipped.

<sup>2</sup>Total mining costs not given. Most of work done by company during the year was development.

<sup>3</sup>Smelter returns less freight charges.

<sup>4</sup>Net value of ore after subtraction of railroad freight and smelter charges.

<sup>5</sup>Total mining cost includes cost of development done during the year.

<sup>6</sup>Combined figure for mining and treatment costs.

<sup>7</sup>Figure for transportation costs only.

<sup>8</sup>Metals recovered calculated from average ore grade given by company.

<sup>9</sup>Not given.

Table 14. Development work, men employed, and operating companies at the Latest Out Mine.

Year	No. of Men	Tunnels (feet)	Sinking (feet)	Cross-cutting (feet)	Drifting (feet)	Operator
1913	35	2,500 <sup>1</sup>	1,000 <sup>2</sup>	1,500 <sup>3</sup>	---	Latest Out Mining & Smelting Co.
1914	30	3,000 <sup>1</sup>	1,000 <sup>2</sup>	2,000 <sup>3</sup>	---	Latest Out Mining & Smelting Co.
1915	20	2,000 <sup>1</sup>	500 <sup>2</sup>	1,500 <sup>3</sup>	---	Latest Out Mining & Smelting Co.
1916	25	2,000 <sup>1</sup>	600 <sup>2</sup>	1,400 <sup>3</sup>	---	Latest Out Mining & Smelting Co.
1918	30	2,000 <sup>1</sup>	700 <sup>2</sup>	1,300 <sup>3</sup>	---	Latest Out Mining & Smelting Co.
1919	35	2,000 <sup>1</sup>	800 <sup>2</sup>	1,200 <sup>3</sup>	---	Latest Out Mining & Smelting Co.
1920	25	2,000 <sup>1</sup>	500 <sup>2</sup>	1,500 <sup>3</sup>	---	Latest Out Mining & Smelting Co.
1921	20	1,000 <sup>1</sup>	300 <sup>2</sup>	700 <sup>3</sup>	---	Latest Out Mining & Smelting Co.
1922	20	---	30	365	325	Latest Out Mining & Smelting Co.
1923	22	---	---	400	700	Latest Out Mining & Smelting Co.
1924	23	---	750	1,000	---	Latest Out Mining & Smelting Co.
1925	25	---	---	700	300	Latest Out Mining & Smelting Co.
1926	2	400	100	500	---	Latest Out Mining & Smelting Co.
1940	10	---	---	---	600	Latest Out Mining & Smelting Co./ Milo Zook, lessee

<sup>1</sup>Figure is for total development for the year.

<sup>2</sup>Combined total for sinking and raising.

<sup>3</sup>Combined total for crosscutting and drifting.

for the main orebody. A 40-horsepower gasoline engine was added to the mine equipment. The company paid \$30,000 in dividends during the year.

In 1915, ore shipments averaged about 400 tons a month. A leasing program was instituted in the upper levels of the mine, and the lessees located significant new reserves in areas the company had passed over as exhausted. Development totaled about 10,000 feet of workings.

The mine shipped about 300 tons of ore a month in 1916. The ore was taken from the lowest level of the mine and was richer than previously shipped ore. Most of the work during the year was on the 600 level. The company also discovered a rich vein on the 450-foot level of the adjacent Roy Lauer and Cook claims, which were

owned by the Gilmore Mining Co. By the end of the year, the Latest Out's leasing operations on this vein were said to have produced 62 cars of crude shipping ore.

The Latest Out again shipped ore at the rate of 300 tons per month in 1917. The Pittsburgh-Idaho Transportation Tunnel was 6,000 feet long, although it was several hundred feet south of the Latest Out and about 150 feet lower; the Latest Out was later connected to the Transportation Tunnel through raises. Of the year's operations, the 1917 IMIR said (p. 41):

The 600-foot level of the Latest Out Mine, still dry and completely oxidized, shows the largest, most persistent and best grade ore occurrence in the development of the property. The same vein strikes through the end line of this property into the adjoining Gilmore Company's ground, and has recently been tapped by the 6,000-foot tunnel at a face depth of nearly 1,000 feet. . . . In fact, some important shipments have already been made on this Gilmore property through a lease, operating from the 450-foot level of the Latest Out Mine, and a production of several million pounds of lead is already credited to the extension of this vein south on Gilmore ground.

The Latest Out Mining & Smelting Co. noted that it was not reporting the ore mined from this lease because the ore should have been reported by the Gilmore Mining Company.

The mine was the biggest producer in the district in 1918, shipping about 400 tons a month. The mine, like all the other mines in the district, was short of men because of World War I. However, the development work continued to show good reserves on the lower levels. The company paid \$50,000 in dividends during the year.

In 1919, the Latest Out produced about 300 tons of oxidized lead ore a month. Toward the end of the year, the company developed a body of ore on its deepest 600-level that was the largest discovered in the mine's history. The inclined shaft was 650 feet deep, and the levels extending off it were 150 feet apart. The company paid \$10,000 in dividends during the year.

The mine produced oxidized lead ore in 1920 and planned to open the 700 level. Equipment included a 40-horsepower gasoline-driven hoist and a 12-horsepower gasoline engine to power the tram. A fire in September damaged the power plant, requiring the company to rebuild the hoist, replace some of the power generating equipment, and construct a new power building. Total development was about 26,000 feet.

Production in 1921 was comparatively small because the company was replacing equipment and repairing the damage done by the fire. The ore was shipped to Midvale, Utah. The inclined shaft was 740 feet deep.

In 1922, the mine shipped about 500 tons of oxidized lead ore per month. Approximately 1,000 feet of development work was done during the year. Equipment added to the plant included a 40-horsepower Fairbanks-Morse oil-driven hoist, a 145-cubic-foot, gas-driven Ingersoll-Rand compressor, and a 3-horsepower lighting plant. The mine also had a 750-foot gravity tram for haulage. The gasoline and kerosene

used to power the equipment cost \$50 per horsepower per year. Total workings at the mine was 28,000 feet, including 1,100 feet of shafts, 10,900 feet of raises, and 16,000 feet of tunnels. Development during the year greatly expanded the mine's reserves.

The mine maintained capacity production in 1923. Several thousand tons of ore was shipped, and 2,000 feet of development was done. The mine was said to have 40,000 tons of low-grade ore reserves. A dividend of \$20,000 was paid.

In 1924, shipments from the Latest Out averaged about 20 cars per month. The company did 2,000 feet of development work and was reported to have reserves of 25,000 tons of ore containing 25 percent lead. The mine was the largest producer in the county for the year. Total development now measured about 32,000 feet of workings, which included one tunnel, two shafts, seventy-five raises, sixty-five crosscuts, and sixty-five drifts. The tunnel was 365 feet long, and the combined length of the two inclined shafts was 1,100 feet. The vertical depth of the mine was 700 feet.

The mine produced more than a million pounds of lead in 1925. Shipments averaged about 200 tons of first-class ore per month, which made the mine the largest producer in the county for the second year in a row. About 2,000 feet of development was done.

The Latest Out was "practically closed" on June 20, 1926. The company kept two men working at the mine, taking out a few hundred tons of lead ore, which paid the cost of keeping the mine open. (The statement by Ruppel and Lopez (1988, p. 103) that "it [the Latest Out] apparently was closed about 1926 and seems to have remained mostly idle, perhaps intermittently leased, until 1948 when it was leased to Milo Zook" is contradicted by all other sources of information.)

Lessees operated the mine in 1927, doing some development work and shipping a small amount of ore. In 1928, lessees produced two cars of smelting-grade oxidized lead ore. The company did no work because it was involved in litigation. The details of the lawsuit are not known.

A small amount of ore was shipped in 1929. The mine was worked by five groups of lessees during 1930, who produced and marketed a little ore. A large smelting company was rumored to have advanced money to some of the lessees to cover the cost of their development work. Lessees did a small amount of work in 1931. The mine shipped some ore, but most of the ore produced in the district was stockpiled to wait for higher prices.

The mine was idle in 1932 and 1933. One car of lead ore was shipped in 1934. At the end of the year, the company reported that it was insolvent.

Milo Zook, who worked the Latest Out under lease and bond for the next 18 years, shipped ore from the mine in 1935. The following year, his output increased and he made regular shipments to the smelter. Zook's operation was the largest in the district in 1937. In addition to shipping ore in 1938 (although at a reduced rate from

previous years), Zook and his crew sank a shaft on the property. Shipments in 1939 were larger than those of the previous year.

The Latest Out Mining & Smelting Co. was dissolved in May 1940, and the property was deeded to Edwina Nichols, the former secretary of the company. Milo Zook continued to work the property, employing a crew of ten and completing 600 feet of drifting during the year. The mine shipped 939 tons of crude silver-lead ore in 1941. In 1942, it was the principal producer in the district, shipping 820 tons of ore. About 300 tons of ore was shipped in 1943, 725 tons in 1944, and 719 tons in 1945.

Zook operated the mine nearly all year in 1946 and shipped 751 tons of oxidized zinc-lead-silver ore to smelters in Utah. The mine shipped ore in 1947 and 1948. Production in 1949 was 280 tons of lead-silver ore.

The mine also shipped ore between 1950 and 1953. According to Ruppel and Lopez (1988), most of the work between 1948 and 1952 was on the 600 level. The mine has not been worked since the early 1950s and is currently inaccessible. Figure 22 shows an overview of the property as it appeared in 1994.

Between 1908 and 1953, the Latest Out produced 81,427 tons of ore and reprocessed 204 tons of old tailings. This material yielded 2,704 ounces of gold, 952,033 ounces of silver, 274,624 pounds of copper, 43,711,145 pounds of lead, and 130,325 pounds of zinc. Umpleby (1913) reported production of between 1,200 and 1,500 tons of ore (with no mention of the metals contained in the ore) between 1880 and about 1885. No records exist for production between that time and 1908, although Umpleby credited the mine with producing about \$350,000 of ore before September 1911.

## MOUNTAIN BOY (ORIOLE) MINE

The Mountain Boy is located at an elevation of about 8,600 feet on the northeast flank of the ridge between Meadow Lake Creek and Portland Mountain (Figure 2). The ore occurs as lead-silver replacement veins in dolomite of the Saturday Mountain Formation (Figure 3). Two main sets of veins were explored on the property. One trended about north and dipped 65° W.; the other trended east and dipped 60° S. The major orebodies were at the intersection of the two sets of veins. Ore minerals were cerussite, anglesite, smithsonite, and hemimorphite in a gangue of earthy limonite and manganese oxides (Ruppel and Lopez, 1988).

The mine was first worked sometime around 1905 (Ruppel and Lopez, 1988). When first mentioned in the literature, it was being operated by the Oriole Mining Company. According to the 1907 IMIR (p. 129):

Adjoining the Gilmore mine to the southeast the Oriole Mining Company is working a force of 10 men on development. This property is traversed by the same





Figure 22. Overview of the mine dumps at the Latest Out Mine (1994) (Idaho Geological Survey photograph by Falma J. Moye).

system of veins as the Gilmore group and has a number of fine surface indications which are being investigated in an intelligent manner, and it is not unlikely that similar important ore shoots will be found to those now disclosed on the Gilmore mine.

Lead ore was shipped from the mine in 1910. The Oriole Mining Co. went out of business sometime after 1910.

The Mountain Boy shipped ore in 1916, 1917, 1918, and 1921. According to the 1917 IMIR (p. 44), "the Mountain Boy Mine and other operations produced and shipped 15 cars of ore during the year, with the normal average shipping values of the larger mines in lead and silver."

Extensive development was carried out between 1910 and 1916. This work included a lower working adit which trended S. 15° E. and was probably at least 500 feet long, an upper adit which was about 200 feet above the lower adit, and a connecting raise with intermediate levels. The workings totaled about 2,500 feet. Most of the ore from the Mountain Boy was mined between 1916 and 1918 (Ruppel and Lopez, 1988).

In 1929, the Mountain Boy property (referred to as the Iron Dyke) was equipped with a Sullivan compressor. Three hundred feet of drifting was done during the year. Ruppel and Lopez (1988) state that some ore was shipped at this time. The Gilmore-Mountain Boy Mining Co. (G. Grover Tucker, Secretary) was incorporated on October 1, 1928; the company forfeited its charter in 1931.

The mine produced lead-silver ore in 1948, 1961, and 1962 and has apparently not been worked since then. The workings are caved and inaccessible. Figure 23 shows the portal of the Mountain Boy adit in 1994.

Recorded production from the mine between 1916 and 1962 is 1,286 tons of ore, which yielded 116 ounces of gold, 9,225 ounces of silver, 17,786 pounds of copper, 685,738 pounds of lead, and 6,500 pounds of zinc. Ruppel and others (1970) state that the Mountain Boy produced between 5,000 and 7,000 tons of ore. According to Ruppel and Lopez (1988), total production from the Mountain Boy was worth about \$200,000. They cite ore grades of 24 percent lead, and 6.5 ounces of silver and 0.05 to 0.1 ounce of gold per ton for ore shipments made between 1916 and 1918. The discrepancies in these figures suggest that a significant percentage of the production from this mine was either unreported or reported under names that did not allow identification with this property.

## HILLTOP MINE

The Hilltop Group includes seven adjoining patented claims (the Rosebud, McClellan, Alex Stevens, Glendale, McKinley, Jumbo, and Fairview) and twenty-one unpatented claims. The mine is near the crest of a south-facing slope at an elevation of about 8,450 feet (Figure 2).



Figure 23. Portal of the Mountain Boy adit (1994) (Idaho Geological Survey photograph by Falma J. Moye).

The Hilltop is a lead-silver-gold replacement vein that trends northwest and dips steeply southwest. In places the vein bulges into replacement deposits in the adjacent rocks. The mine is in the lower part of the Jefferson Formation in the steeply dipping west limb of an overturned syncline (Figure 3). The vein was explored for 700 feet along strike and 600 feet down dip, and included two large ore shoots and several smaller ones. The principal shoot was a lenticular body about 50 feet long, up to 6 feet thick, and was stoped from the 400 level nearly to the surface. The ore consisted of argentiferous galena, sphalerite, and very minor pyrite and chalcopyrite in a gangue of jasperoidal hematite and white quartz (Ruppel and Lopez, 1988).

The mineralization in this area was discovered around 1880, and the Alex Stevens is believed to have shipped ore to the Nicholia smelter in the 1880s. The mine is also said to have shipped ore in 1901 (Ruppel and Lopez, 1988). According to the 1904 IMIR (p. 107-108):

The McClellan-Stevens claims, a short distance above the Democrat, have a strong, well mineralized vein, and every promise of developing some very valuable ore shoots. These claims, from shallow, surface gouging, produced some important shipments of ore during the early days, that were high-grade in both silver and lead and are locally very highly thought of.

Ore was shipped from the Fairview claim in 1912. Of it and several nearby properties, the 1912 IMIR said (p. 128-129): "Each of these properties carry attractive showings of rich lead-silver ore, and their further development is very likely to result in the opening up of additional profitable resources of shipping mineral." A small shipment was made from the Jumbo claim in 1916, and the Alex Stevens shipped ore in 1918, 1921, and 1922.

The property was renamed the Hilltop in 1943 (Cather and Rains, 1988). The mine shipped 145 tons of lead-silver ore to a smelter that year. Production was 53 tons in 1945, 226 tons in 1946, and 589 tons in 1948. The Hilltop also shipped ore in 1947.

Joe Hamilton operated the Hilltop mine all year in 1949. He shipped 1,038 tons of ore which contained 258 ounces of gold, 12,738 ounces of silver, 7,743 pounds of copper, 296,575 pounds of lead, and 60,000 pounds of zinc. In 1950, Hamilton shipped 2,713 tons of lead ore which contained 448 ounces of gold, 39,901 ounces of silver, 27,148 pounds of copper, 922,397 pounds of lead, and 13,610 pounds of zinc.

The Hilltop was one of the main producers in the Texas district in 1951 and 1952, and it was the principal producer in the district in 1953. In 1954, lead ore was shipped from the mine by Rosebud Mines, Inc., and Joseph Hamilton. Rosebud Mines also shipped ore from the mine in 1955 and 1956. (Rosebud Mines, Inc., was incorporated on April 28, 1954, and forfeited its charter on November 3, 1956.) The mine (the "Rosebud") also produced ore in 1961 and 1962.

The mine has been idle since then, although in 1980 the 500 level was entered through a raise from the adjacent Democrat (Ruppel and Lopez, 1988). In 1987, it was rumored that the mine might reopen, but nothing happened.

The property was explored by six shafts, ten adits, and at least thirty prospect pits and trenches. Five of the shafts are from 8 to 100 feet deep, but the main development shaft is caved. The five open adits range from 15 to about 70 feet long, and the five caved adits are estimated to have been from 20 to 100 feet long (Cather and Rains, 1988). According to Ruppel and Lopez (1988), the main shaft inclined 60°-70° west-southwest and reached a total depth of 510 feet by 1955. Levels on the vein extended from the shaft at intervals of 75 to 95 feet and totaled more than 3,300 feet of workings. The deepest workings were in an exploration winze that reached 70 feet below the 500 level. The collar of the shaft is caved, and the mine is inaccessible from the surface. Figure 24 shows the mine buildings in 1994.

Total recorded production from the Hilltop Mine between 1915 and 1968 is 9,186 tons of ore, which yielded 1,836 ounces of gold, 127,109 ounces of silver, 62,977 pounds of copper, 2,781,103 pounds of copper, and 86,866 pounds of zinc. Given the lack of records for the early production of the mine and the different names under which production could have been reported, these numbers must be considered a minimum.



Figure 24. Derelict buildings at the Hilltop Mine (1994) (Idaho Geological Survey photograph by Falma J. Moye).

## References

- Cather, E.E., and R.L. Rains, 1988, Mineral resources of the Lemhi Range study area, Lemhi and Custer counties, Idaho: U.S. Bureau of Mines Mineral Land Assessment Open File Report 8-88, 53 p.
- Idaho Geological Survey's mineral property files (includes copies of company reports to the Idaho Inspector of Mines).
- Idaho Geological Survey's (IGS) annual reports on Regional Developments in Minerals, Mining, and Energy in Idaho, 1975-1992.
- Idaho Inspector of Mines' (IMIR) annual reports on the Mining Industry of Idaho, 1899-1970.
- Nichols, Ralph, 1914, Lead-silver mines of Gilmore, Lemhi County, Idaho: American Institute of Mining Engineers, Transactions, v. 46, p. 937-939.
- Rember, W.C., and E.H. Bennett, 1979, Geologic map of the Dubois Quadrangle, Idaho: Idaho Bureau of Mines and Geology Geologic Map Series, scale 1:250,000.
- Ruppel, E.T., and D.A. Lopez, 1988, Regional geology and mineral deposits in and near the central part of the Lemhi Range, Lemhi County, Idaho: U.S. Geological Survey Professional Paper 1480, 122 p.
- Ruppel, E.T., K.C. Watts, and D.L. Peterson, 1970, Geologic, geochemical, and geophysical investigations in the northern part of the Gilmore mining district, Lemhi County, Idaho: U.S. Geological Survey Open-file Report 70-282, 56 p.
- Umpleby, J.B., 1913, Geology and ore deposits of Lemhi County, Idaho: U.S. Geological Survey Bulletin 528, 182 p.
- U.S. Geological Survey (USGS)/U.S. Bureau of Mines (USBM) Minerals Yearbook chapters for Idaho, 1900-1990.
- Wells, M.W., 1983, Gold camps and silver cities: nineteenth century mining in central and southern Idaho: Idaho Bureau of Mines and Geology Bulletin 22, 165 p.