History of the Goldstone Mine, Lemhi County, Idaho

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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 The information in this report is from a number of published and unpublished sources in the Idaho Geological Survey's mineral property files.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 Goldstone (Climax) Mine, Lemhi County, Idaho

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The Goldstone Mine is in the Sandy Creek mining district (an area that is sometimes included in the Pratt Creek district) at an elevation of 8,800 feet (Figures 1 and 2). It is less than a mile from Goldstone Pass on the Continental Divide. At various times, the mine was called the Goldstone, the Gold Stone, the Gladstone, the Climax, and the Dark Horse Group. The latter name is distinct from the Dark Horse Mine just over the state line in Montana. The deposit consists of a vein of coarsely crystalline quartz containing scattered pyrite, galena, and chalcopyrite in a complex fracture/fissure zone in rocks of the Yellowjacket Formation (Figure 3). The width of the vein averages 30 inches, but ranges from a few inches to 9 feet (Tucker, 1975). The gold content of the ore increased with the percentage of sulfides, particularly chalcopyrite. The ore averaged 0.5 to 0.6 ounce of gold per ton (Anderson, 1957).

The mine was discovered in the early 1890s and changed ownership several times. A 10-stamp mill was built in 1896 and 1897; by 1910, it had treated about 1,000 tons of ore (Umpleby, 1913). The mine was acquired by the Climax Mining Company around the turn of the century. (Table 1 lists the companies operating at the mine.) The 1905 IMIR described the mine (p. 88):

Following the range to the northwest the old Gold Stone Mine at the head of Pratt Creek is making preparations for a year of active operation. An air compressor of four drills' capacity has recently been installed at this mine and its 10-stamp mill is soon to be moved to a convenient place below the mouth of a deep working adit that has been

1Idaho Geological Survey, Main Office at Moscow, University of Idaho, Moscow.
Figure 1. Location of the Goldstone Mine and vicinity (U.S. Forest Service Salmon National Forest map, scale 3/8 inch = 1 mile).
Figure 2. Topographic map of the Goldstone Mine (U.S. Geological Survey Goldstone Pass 7.5-minute topographic map).
Figure 3. Geologic map of the Goldstone Mine and vicinity, Lemhi County, Idaho. Yy = Middle Proterozoic Yellowjacket Formation; Yl = Middle Proterozoic Lemhi Group; Tc = Eocene Challis Volcanics; Tbd = Early Tertiary intrusive basalt and diorite; Tbz = Pliocene to Eocene Bozeman Group and related valley fill rocks; QTg = Quaternary alluvial and pediment gravels; Qf = Quaternary alluvial fan deposits; Ql = Quaternary landslide deposits; Qm = Pleistocene till; Qa = Quaternary alluvium. Heavy lines are faults: ball-and-bar symbols mark downdropped blocks on normal faults; sawteeth are on upper plates of thrust faults (Ruppel and others, 1993).
Table 1. Companies operating at the Goldstone Mine.

<table>
<thead>
<tr>
<th>Company Name</th>
<th>Officer</th>
<th>Date Incorporated</th>
<th>Charter Forfeited</th>
<th>Year(s) at Mine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Climax Mining &amp; Milling Co.</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1901?-?</td>
</tr>
<tr>
<td>Richard Gies</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>1906?-?</td>
</tr>
<tr>
<td>Goldstone Mines Corporation</td>
<td>George H. Walters, President</td>
<td>Apr. 9, 1928; reinstated: July 15, 1924</td>
<td>Nov. 30, 1928; 1931</td>
<td>1928-1931</td>
</tr>
<tr>
<td>Callahan Zinc Company</td>
<td>D. A. Callahan, President</td>
<td>July 18, 1912</td>
<td>active</td>
<td>1933-1935</td>
</tr>
<tr>
<td>Goldstone Mine Co.</td>
<td>W. L. Zeigler, Manager</td>
<td>---</td>
<td>---</td>
<td>1936?-1940</td>
</tr>
<tr>
<td>Goldstone Mining Co.</td>
<td>B. W. Porter, President</td>
<td>August 14, 1947</td>
<td>1</td>
<td>1949?-</td>
</tr>
</tbody>
</table>

1 Information not available in IGS's files.

run to the vein and is now being extended. The mine is opened on a well defined fissure in metamorphic sediments. It has a pay shoot two feet wide, of ore that shows average values of $80.00 per ton in gold, and test runs indicate that about 90 percent of its value can be saved by amalgamation and concentration.

According to the 1906 IMIR (p. 105):

[T]he Climax mine has been quite actively developed during the past year and is now employing a force of fifteen men. It is equipped with a ten stamp mill which was moved during the past summer and rebuilt at a more favorable location for the economical handling of the ore. A compressor plant was installed and two hundred sixty-five feet of new work accomplished on the mine. Its total development is quite extensive in the shape of cross-cuts, raises and drifts on a vertical fissure vein in altered sedimentary formations that carries some well defined ore shoots containing good milling values in free gold, and also concentrates, of hematite and pyrites, associated with lead and silver, as well as high gold values that will pay well for shipping to a smelter. The concentrating attachments of the mill consist of three Frue vanners.

This property is near the summit of the main range of the Rockies at an elevation of nine thousand feet. The wages paid are as follows: Miners, $3.50 per day; laborers, $3.00 per day, eight hours shift. Mr. F. C. Miller is manager in charge, and Mr. Richard Gies of Great Falls, Montana, is the sole owner.
A considerable force of men worked the mine and mill for part of 1907. Mine workings included a 230-foot vertical shaft and a 300-foot tunnel. The mine was idle in 1908, but shipped some concentrate containing gold, silver, and lead. By 1910, the mine had about 3,000 feet of tunnels and the shaft was 235 feet deep (Umpleby, 1913). The 10-stamp amalgamation mill was operated during the last half of 1912 and produced a small quantity of gold and silver bullion.

Several hundred tons of ore was produced from the Gladstone group in 1916. The mine operated the entire year, and the mill was run in August, September, and October.

In 1917, a small amount of ore from the property was treated by amalgamation. Additions to the mill included a Dorr classifier, a Card table\(^1\), and a Wilfley table.

Lessees operated the mine for a short time in 1919, producing gold and silver bullion. In 1920 lessees produced gold bullion and lead concentrate, and bullion was produced by amalgamation in 1921. (Table 2 shows development work, men employed, and operating companies at the mine.) Lessees operated the Gladstone group in 1923, treating one lot of ore by amalgamation and carrying out development work from May to December. The mine was said to have considerable reserves of free-milling gold ore.

The Goldstone produced gold ore, which was treated by amalgamation, in 1924 and was under active development for most of 1925. The mill operated for a few weeks in 1925, shipping a little bullion to Boise and one lot of rich gold concentrate to Midvale, Utah. Active development continued in 1926, and lessees shipped a small amount of bullion.

In 1928, Goldstone Mines Corporation was organized to operate the mine. The company operated the 20 ton-per-day (tpd) amalgamation and concentration plant during the year. Gold bullion, valued at around $800, was shipped to the Boise Assay Office. The mill also produced 6 tons of lead concentrate, containing nearly 3 ounces of gold to the ton; the concentrate was not shipped. Plans called for increasing the capacity of the mill to 100 tpd and adding flotation cells. A body of ore assaying nearly $13 per ton in gold, silver, and lead was opened on the 500-foot level. The mine had seven tunnels, two shafts, two raises, and one crosscut. The crosscut was 1,000 feet long, and the four longest tunnels were 400, 600, 700, and 1,100 feet. Total development at the mine was about 6,000 feet of workings, including 700 feet of vertical shafts, 300 feet of raises, and 5,000 feet of tunnels, crosscuts, and drifts. The company noted that the ore showed milling values of $10 to $12 per ton. Of that,

\(^1\)Unlike most types of concentrating tables (which used square bars nailed to the surface of the table), the riffles on a Card table were asymmetrical grooves cut into the surface of the table. Concentrate was discharged over the entire forward edge, allowing the division between middling and concentrate to be placed wherever the operator chose.
Table 2. Development work, men employed, and operating companies at the Goldstone Mine, by year.

<table>
<thead>
<tr>
<th>Year</th>
<th>No. of Men employed</th>
<th>Tunnels (feet)</th>
<th>Cross-cutting (feet)</th>
<th>Drifting (feet)</th>
<th>Operator</th>
</tr>
</thead>
<tbody>
<tr>
<td>1921</td>
<td>3</td>
<td>---</td>
<td>---</td>
<td>300</td>
<td>---</td>
</tr>
<tr>
<td>1931</td>
<td>18</td>
<td>---</td>
<td>---</td>
<td>200</td>
<td>Goldstone Mines Corporation</td>
</tr>
<tr>
<td>1938</td>
<td>23</td>
<td>---</td>
<td>---</td>
<td>450</td>
<td>Goldstone Mine (partnership)</td>
</tr>
<tr>
<td>1939</td>
<td>25</td>
<td>---</td>
<td>---</td>
<td>520</td>
<td>Goldstone Mine (partnership)</td>
</tr>
<tr>
<td>1950</td>
<td>5</td>
<td>---</td>
<td>800</td>
<td>---</td>
<td>Goldstone Mining Company</td>
</tr>
<tr>
<td>1951</td>
<td>5</td>
<td>---</td>
<td>50</td>
<td>---</td>
<td>Goldstone Mining Company</td>
</tr>
<tr>
<td>1952</td>
<td>4</td>
<td>400</td>
<td>400</td>
<td>---</td>
<td>Goldstone Mining Company</td>
</tr>
<tr>
<td>1953</td>
<td>5</td>
<td>500</td>
<td>500</td>
<td>---</td>
<td>Goldstone Mining Company</td>
</tr>
<tr>
<td>1954</td>
<td>7</td>
<td>500</td>
<td>500</td>
<td>---</td>
<td>Goldstone Mining Company</td>
</tr>
</tbody>
</table>

$5 to $7 per ton was saved by amalgamation and the rest by concentration. The concentration ratio was 20 to 1, and the concentrate was valued at about $100 per ton, of which half was gold and the other half lead and silver (mostly lead).

No production was reported from the Goldstone in 1929, but the company installed a hydroelectric power plant and increased the capacity of the mill to 100 tpd. Work on the mill was completed during the winter of 1929-1930, and the mine was retimbered. The hydroelectric plant had a 195-kilowatt generator powered by a 4-foot Pelton wheel which received water through a 3,800-foot pipeline; electricity was produced at 440 volts and transmitted 4 miles at 11,000 volts. The 100-tpd amalgamation and flotation mill had an 8-foot Hardinge ball mill, six Fahrenwald flotation cells, two amalgamating plates, and three concentrating tables. Air for the mine was provided by a 14x9x112 Chicago Pneumatic compressor.

During 1930, the company operated continuously. The mill ran intermittently and treated about 1,000 tons of lead ore, which had accumulated from development work. The concentrate was shipped to Midvale, Utah, for smelting. A diesel engine was added to the power plant, and a large amount of development work was done in the mine. According to the company, mine workings totaled about 5,000 feet,

2The diameters of the low-pressure and the high-pressure cylinders in the compressor and the length of the piston's stroke, in inches.
including 1,000 feet of shafts, 500 feet of raises, and 3,500 feet of tunnels, crosscuts, and drifts. The principal tunnel was 2,150 feet long.

Goldstone Mines Corporation operated the mine for the first three months of 1931. The mill treated 1,500 tons of lead ore, producing about 31 tons of lead concentrate, which contained 18.09 ounces of gold per ton. The concentrate was shipped to Midvale for smelting. Operations were discontinued in June, after which the company reorganized as Western Gold Mines, Inc. At that time, the mine had one tunnel, two shafts, one crosscut, and four drifts. The vertical shaft was 300 feet deep; the inclined shaft was 220 feet long and gained a depth of 200 feet. The intermediate levels were 100 feet apart, with the following lengths: No. 2 level, 700 feet; No. 3 level, 500 feet; No. 4 level, 300 feet; and No. 5 level, 700 feet.

Western Gold Mines dismantled the mine in June 1932, and the company disbanded. A minor amount of work was done on the property in 1934.

As part of a refinancing deal started in 1933, Callahan Zinc Company acquired a lease and option on the Goldstone for $65,707.80. The IMIR stated that Callahan planned to start work as soon as some title matters were cleared up, but instead, the company allowed its option to expire in August 1935. Callahan apparently negotiated the cancellation of a $48,000 note that covered most of the leasing and option expense; the final loss for forfeiting the option was $19,968.54.

For the next several years, the mine was operated by a Wallace, Idaho, partnership which did business under the name of Goldstone Mine; the partnership worked the property under lease and option from the owner, Mrs. Isadore Gies of Great Falls, Montana. Principals in the venture were said to include the presidents of Hecla Mining Company and Spokane Iron Works. The price for the property was $60,000, to be paid from royalties on the ore produced over a 4-year period.

In 1936, a bunkhouse was built at the Goldstone, two hydroelectric plants were installed, and the mill was remodeled to house a flotation plant with a capacity of 50 tpd. The company planned to continue work through the winter. The construction and remodeling work was finished in 1937, and ore from the mine was concentrated in the mill. The mine operated throughout in 1938, and several thousand tons of ore was treated. Total development was approximately 5,880 feet. Equipment included a motor-driven 14x11x9\(^1\) Chicago Pneumatic compressor and ten horse-drawn ore cars.

Fire destroyed the Goldstone mill early in 1939. Operations were suspended, but the company still did a substantial amount of development work and shipped 5 tons of high-grade gold-lead concentrate. Total development at the mine was about 6,400 feet of workings, including 1,180 feet of shafts and 5,225 feet of tunnels, crosscuts, and drifts. The mine had one tunnel, five raises, and four drifts. The 1940 IMIR stated the company had employed ten men at the property until operations were suspended after the fire.

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\(^1\) The diameters of the low-pressure and the high-pressure cylinders in the compressor and the length of the piston's stroke, in inches.
The mine remained idle through World War II. In 1949, the Goldstone Mining Company built a new bunkhouse and compressor house, and installed two Ingersoll-Rand compressors (with capacities of 100 cubic feet and 120 cubic feet). Other equipment included eleven ore cars, an air trammer, two heavy-duty trucks, and a Cletrac tractor. Development for 1950 consisted of driving 800 feet on a projected 2,000-foot crosscut (known as the Mottman tunnel), which was to intersect the vein at approximately the 1000 level of the old workings (Figure 4). The following year, the company installed a gasoline motor and 1,000 feet of ventilating pipe in the tunnel. The compressors were replaced with a 315-cubic-foot Schramm compressor, and work began on a 150-tpd mill.

In 1952, work on the Mottman tunnel continued. It was over 1,000 feet long and about 1,000 feet short of the vein. The following year, the tunnel was 1,600 feet long (according to the IMIR, it was 1,900 feet long and expected to intersect the Goldstone vein at 1,960 feet). The company also built a new blacksmith shop and powder magazine during 1953. Development work continued in 1954, and 1,200 feet of 12-inch ventilating pipe was installed in the tunnel. There were about 6,800 total feet of workings in the mine, including 800 feet of shafts, 1,000 feet of raises, and 5,500 feet of tunnels, crosscuts, and drifts. The mine had five tunnels, three shafts, ten raises, one crosscut, and four drifts. The No. 4 tunnel was 1,500 feet long, and the No. 5 tunnel (the main tunnel of the original workings) was 3,000 feet long. The principal vertical shaft was 300 feet deep. According to the company, the principal inclined shaft was 200 feet long, while gaining a depth of 500 feet2.

The Goldstone Mining Company applied for a government loan from the Office of Minerals Exploration (OME) in 1964, but the application was not approved. When Green (1967) visited the mine, he noted that all the workings except the Mottman tunnel were caved. He stated that the Mottman tunnel had not intersected the vein, although other information suggests that the tunnel actually extended past the vein, which was much less mineralized at the lowest level than in the upper workings. Reserves at that time were estimated at about 30,000 tons of ore valued at $15 a ton.

The mine was visited during the summer of 1994 by an Idaho Geological Survey geologist as part of a program to evaluate abandoned and inactive mines. Figures 5 and 6 show the millsite as it appeared at that time.

Total recorded production from the Goldstone Mine between 1901 and 1939 was 21,056 tons of ore. From this was obtained 3,475 ounces of gold, 2,771 ounces of silver, 4,058 pounds of copper, and 139,669 pounds of lead. How much ore, if any, was produced from the post-World War II operations is not known.

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2Although the shaft was described this way in every report between 1950 and 1954, these numbers are probably reversed (i.e., the shaft was 500 feet long and reached a vertical distance of 200 feet below the collar.
Figure 4. Claim map and workings of the Goldstone Mine (Lakes, 1944).
Figure 5. Mill building at the Goldstone Mine (1994). The white material in the lower right and in the center of the photograph along Pratt Creek is mill tailings (Idaho Geological Survey photograph by Falma J. Moye).
Figure 6. Stamp mill at the Goldstone Mine (1994) (Idaho Geological Survey photograph by Falma J. Moye).
References


Callahan Lead-Zinc Company's Annual Reports to Stockholders.


Idaho Geological Survey's mineral property files (includes copies of company reports to the Idaho Inspector of Mines).


