History of Mines in the Smiley Creek Area of the Vienna Mining District, Blaine and Camas Counties, Idaho

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Staff Report 09-6
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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 an ongoing project to identify and describe inactive and abandoned mines in Idaho. The information in this report is from a number of published and unpublished sources in the Idaho Geological Survey's mineral property files.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 1984; since 1995, the *Minerals Yearbook* has been published by the U.S. Geological Survey. 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 list of references 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.

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INTRODUCTION

The three largest mines in the Smiley Creek area were the Solace, the Vienna, and the Webfoot. All three are in the headwaters of Smiley Creek south of the townsite of Vienna, which served the mines during their heyday. The Solace Mine is in sec. 1, T. 5 N., R. 13 E. (unsurveyed; Figures 1, 2, 3, and 4); the Vienna mine is in sec. 1, T. 5 N., R. 13 E. (unsurveyed), with some of the workings possibly extending into sec. 31, T. 6 N., R. 14 E. (unsurveyed); and the Webfoot Mine is in sec. 1, T. 5N., R. 13 E. (unsurveyed) and sec. 6, T. 5 N., R. 14 E. (unsurveyed). The three mines are collectively referred to as the Vienna Group after about 1915. The elevation of the mines ranges from 8,200 feet at the Webfoot Mine to over 9,000 feet at the Vienna Mine. Access to the area is by roads from State Highway 75 near the mouth of Smiley Creek.

GEOLOGY

The Smiley Creek deposits are mineralized shear zone deposits in biotite granodiorite of the Cretaceous Idaho batholith (Ross, 1927; Mahoney and Horn, 2005; Figure 5). The biotite granodiorite is medium to coarse grained, sometimes containing alkali feldspar porphyroblasts up to 8 cm long. The rock is composed of quartz, plagioclase, microcline, and biotite, with accessory magnetite, zircon, and sphene. These rocks intruded the sandstone, siltstone, and sandy limestone of the Middle Pennsylvanian to Lower Permian Grand Prize Formation to the east of the Smiley Creek area. Also in that area, andesitic to dacitic lavas and associated volcaniclastic sedimentary rocks of the Eocene Challis Volcanic Group unconformably overlie the older rocks. Northeast-trending Eocene dacite porphyry dikes cut the biotite granodiorite throughout the area,

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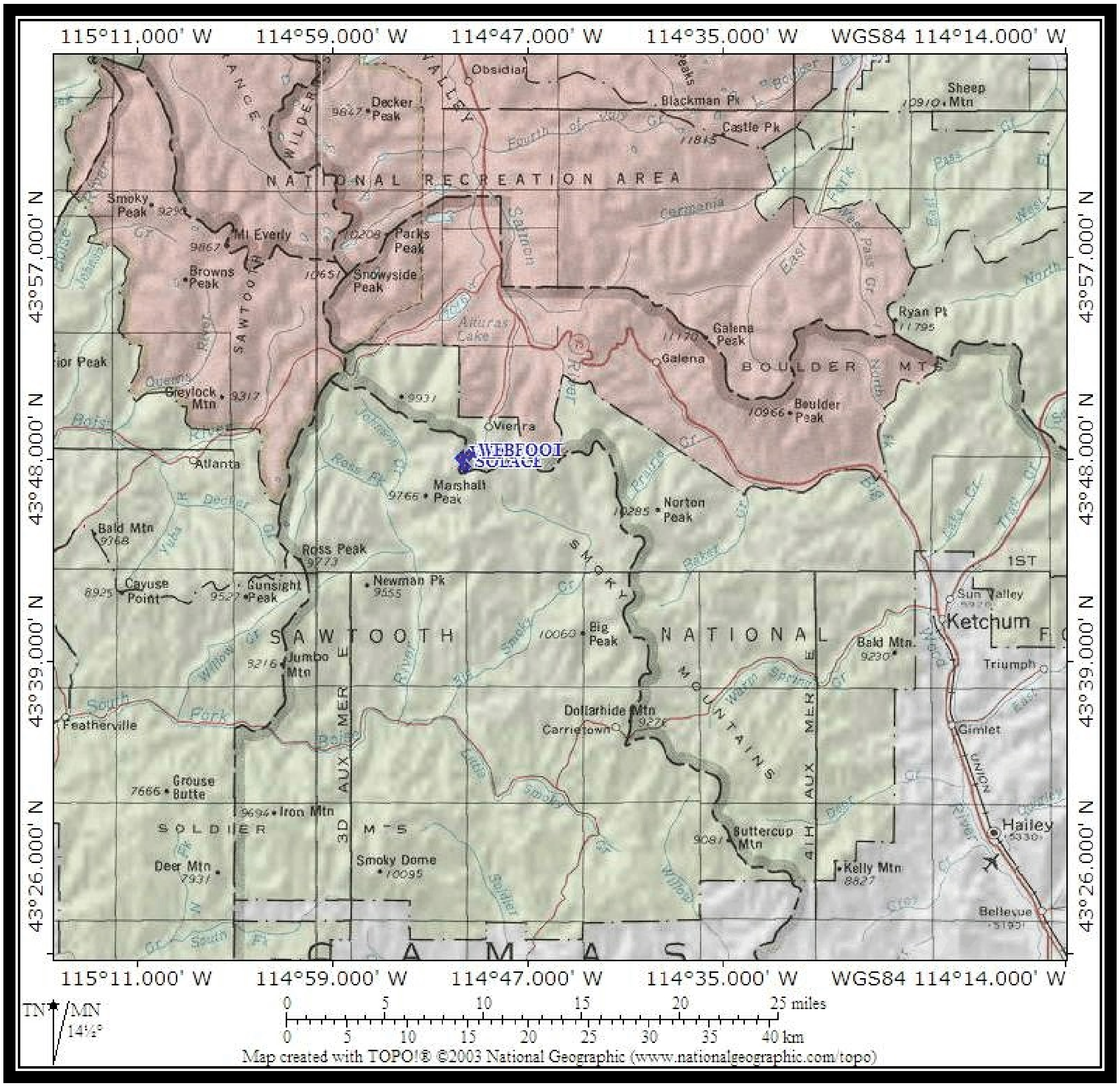
[1] Idaho Geological Survey, Main Office at Moscow, University of Idaho, Moscow, Idaho.



Map created with TOPO!® ©2003 National Geographic (www.nationalgeographic.com/topo)

Figure 1. Location of the Webfoot, Solace, and Vienna mines in relation to the surrounding area. Note the distance to all of the surrounding towns and the poor access during the 1880s when the mines were most active (National Geographic TOPO! map).

Figure 2. Locations of the Webfoot, Vienna, and Solace mines, showing the rugged country between the mines and the mouth of Smiley Creek (National Geographic TOPO! map).

Figure 3. Locations of the Webfoot, Vienna, and Solace mines and the site of the town of Vienna. Note that the Vienna mine is not where it is labeled on the topographic map (National Geographic TOPO! map).

and thin lamprophyric dikes of uncertain age locally cut the biotite granodiorite (Mahoney and Horn [Figure 5]).

A prominent joint set, which strikes N. 35º-50º W. and dips steeply to the northeast, is present in the biotite granodiorite (Mahoney and Horn, 2005). This joint system is roughly parallel to the east edge of the batholith and may represent contraction joints associated with the margin of the Idaho batholith. A conjugate shear set, with one set of fractures trending about N. 60º W. and the second trending east-west, contains most of the mineralization in the area. The shear zones are vertical or dip steeply to the north. Northeast-trending high-angle normal faults with displacements ranging from tens to hundreds of meters are probably related to the trans-Challis fault zone. A horst block bounded by these faults contains the Webfoot, Solace, and Vienna Mines (Mahoney and Horn, 2005).

ORE DEPOSITS

In 1926, C.P. Ross visited the Webfoot and Solace mines, and his report described the minerals in the ore deposits in detail (Ross, 1927, p. 10-13):

> The nonmetallic minerals produced during mineralization include quartz, sericite and related mica, chlorite, epidote, microcline, siderite, and hisingerite. All except the hisingerite, part of the quartz, chlorite, and mica, and most of the siderite were formed during the alteration of the granite, which preceded the deposition of most of the metallic minerals. The rest of the quartz, chlorite, mica, and siderite are in bands and lenses in the altered granite. They were formed essentially by filling of open fractures, whereas those previously mentioned were formed by replacement of the rock. However, the two processes graded into each other. It is impossible, for example, to draw sharp distinctions between quartz formed in the veinlets and that formed during silification of the granite. The hisingerite was formed by a later and perhaps entirely distinct process.
>
> Alteration of the granite was most intense where the shearing was most pronounced but extended for some distance on both sides of the lodes. All the granite in the Webfoot mine is altered, although much of it shows no other evidence of mineralization. The alteration was somewhat less intense in the Solace. In both mines it consisted mainly in sericitization of the feldspars, chloritization of the biotite, and later replacement by quartz.
>
> Most of the purer quartz is in bands and lenses elongated parallel to the major shear zones and doubtless occupying fractures produced by the shearing. It is possible that this clear quartz, much of which is in aggregates of rather coarse irregular grains, was formed in part at the expense of the adjoining wall rook, but it seems at least equally possible that it was formed in open spaces either existing at the time of its advent or produced as a result of injection of the siliceous solution into the already sheared granite. Some deposition in open cavities took place, for drusy cavities lined with quartz crystals were formed, but these are rare. This quartz contains in places, especially in the Webfoot mine, subordinate amounts of siderite, chlorite, and white mica. The micaceous minerals are nowhere abundant in the veinlets and generally line cracks in the quartz or occur in isolated bunches.
>
> In some places in the Webfoot mine aggregates of light silvery-green chlorite are prominent. Much of the altered granite in both mines contains epidote. These minerals are products of the hydrothermal alteration but are less universally abundant than the sericite. It appears that in general the sericitization preceded the formation of quartz, but there is abundant evidence that the two processes were interrelated. Sericitization extended to a greater distance from the zones of maximum shearing than most of the quartz, but in general where the lodes show marked sericitization there is considerable quartz and where little quartz has been deposited sericite is not abundant. Also some of the quartz veinlets contain both mica and chlorite in well-developed plates. In some places, particularly on the lowest level of the Webfoot mine, silicification has gone so far as almost to obliterate

the granitic texture. The silicified granite near the winze on the third level of the Solace mine contains stringers of quartz and microcline which appear to merge into the quartz that replaced the granite, as if the two were formed by essentially the same process.

In places alteration has gone so far as to reduce the granite to a soft gougelike mass that requires heavy timbering in order to maintain mine workings in it. This softening may be in part the result of natural weathering, but it is believed to have been caused mainly by the breaking down of the feldspars into sericite and associated minerals under the attack of hydrothermal agencies. Yielding of the rock is accelerated by mining operations, both because of the shattering effect of the blasting and disturbance of mechanical equilibrium resulting from the removal of material from the workings and because of the chemical action resulting from the admission of air and the acceleration of the circulation of water.

The lodes are characterized by banding, which results both from the deposition of quartz and sulphide along parallel shear planes in the granite and from the fact that the sulphides were in part deposited along subparallel planes in the quartz that apparently resulted from renewed movements essentially parallel to the original shearing.

After the deposition of the minerals mentioned above, perhaps as late as Miocene time, different solutions entered the rocks and deposited hisingerite, a hydrous ferric silicate. This mineral lines fractures in the ore in the Webfoot mine but does not appear to be abundant. It was not noted elsewhere in the district. The hisingerite from the Webfoot has an index of refraction of 1.61 ± 0.01. Schaller [Hewett and Schaller, 1925] has called attention to the fact that the index varies considerably in specimens from different localities.

Hisingerite has frequently been interpreted as a product of weathering, but the lack of oxidation in the hypogene sulphides adjoining the hisingerite in the Webfoot mine makes such an interpretation for this occurrence doubtful. Hewett [Hewett and Schaller, 1925] believes that the hisingerite in the Wood River district was produced through the replacement of siderite by the agency of hot spring waters, which also deposited zeolites in the country rocks free from siderite, and not through weathering processes. Zeolites are sparingly developed in the near-by Tertiary volcanic rocks but were not noted in or near the mines.

Metallic Minerals

The hypogene metallic minerals include proustite, stibnite, arsenopyrite, tetrahedrite, pyrite, galena, sphalerite, and chalcopyrite. Microchemical tests by M. N. Short show that the proustite contains some antimony and the tetrahedrite contains some arsenic. The proustite has so dark a red streak that it resembles pyrargyrite. Much of the ruby silver reported in the literature from other districts in this part of Idaho (Ballard, 1922, p. 8-9) is called pyrargyrite. In some reports both pyrargyrite and proustite are stated to be present. All gradations between the two ruby silver minerals may exist, and in the absence of detailed mineralogic examinations distinctions between them are of doubtful accuracy, especially where, as in this locality, specimens in which arsenic is more abundant than antimony have megascopic characteristics resembling those listed in the textbooks for the antimonial ruby silver. Stephanite has been reported from the Sawtooth district and, although not noted, may also be present in the Vienna district.

Wire silver is reported to occur in the outcrop of an undeveloped deposit near the head of Smiley Creek and was probably present in the rich silver ore mined in the early days in the Vienna and Sawtooth districts. Other supergene minerals, such as cerargyrite, were presumably also present in the Sawtooth district but were not identified in any of the ore seen during the present investigation. Cerargyrite is reported to have been found in the Sawtooth district. All the metallic minerals except cerargyrite and native silver are believed to be hypogene.

The hypogene metallic minerals are irregularly distributed in the lodes, and their proportions vary from place to place. Except in certain isolated masses, metallic minerals are not very abundant in the parts of the lodes now visible underground. Pyrite, probably the first metallic mineral to be formed, is widespread but nowhere occurs in large masses. Stibnite and arsenopyrite are the most abundant minerals in the Webfoot mine. Gold is reported to be associated with the arsenopyrite. Proustite is present in both the Webfoot and Solace mines and is the characteristic mineral in the Solace. Tetrahedrite is widely distributed but not abundant in the ore seen. Galena is more abundant in the Webfoot ore than in that of the Solace mine but was nowhere seen in place in sufficiently large amount to constitute lead ore of much apparent value. However, the table below, compiled from the records of E. Daft, of Hailey, Idaho, shows that lead ore has been shipped from the Mountain King (Webfoot?) mine. Umpleby [1915] states that three carloads of ore containing galena, sphalerite, and pyrite in a quartz gangue were shipped from this mine in 1912 and lists four assays taken at this time, the highest of which showed a lead content of 28 per cent. Probably there were, in the early days, other shipments of lead ore of which no record is available.

Shipments from the Mountain King.				
Year	Ore (tons)	Gold (oz.)	Silver (oz.)	Lead (lbs.)
1890	49.7		4,798.0	51,191
1891	74.4	4.5	6,726.6	92,602
1892	22.1	Trace	80.5	28,410
[total]	146.2	4.5	11,605.1	172,203

Sphalerite is even less abundant than galena in most of the ore now exposed. It is a prominent constituent of the ore in places on the third level of the Solace mine, but even here the quantity exposed seems insufficient to constitute a zinc ore. The assay of Mountain King ore referred to above showed 14.9 per cent of zinc. Blebs or [of] chalcopyrite were observed in ore from the Webfoot mine, but this mineral is nowhere exposed in sufficient quantity to be of any economic significance.

The metallic minerals, with the exception of some of the pyrite, are all later than the vein quartz. They fill cracks and cavities in the quartz and in the silicified granite and to a minor extent have made more space for themselves by replacement. This is well illustrated in a specimen from the Solace mine in which a drusy cavity has been filled with galena, tetrahedrite, and prousite. Some of the quartz crystals that formerly projected into the cavity have been broken and are inclosed in the sulphides. Nearly all the quartz has been corroded where it came into contact with the sulphides. The corrosion has roughened the faces but has by no means obliterated the forms of the quartz crystals.

Mahoney and Horn (2005) observed two separate types of mineralized veins in the area: shear-zone hosted silver-sulfide ribbon veins, and shear-zone hosted quartz-sericite-pyrite-galena veins. Crosscutting relationships indicate the ribbon veins formed before the quartz-sericite-pyrite-galena veins were emplaced. These two types of veins are discussed in detail as follows (Mahoney and Horn, 2005, p. 6-7):

Quartz-Silver-Sulfide Ribbon Veins

The quartz-silver-sulfide ribbon veins consist of roughly defined bands of massive white vein quartz and aphanitic dark-gray silver-sulfide minerals, primarily pyrargyrite and proustite (figs. 3, 4 [Figures 6 and 7]). Aphanitic minerals are present as thin (<0.5 cm) stringers in thicker (≈0.7-2 cm) white quartz veinlets, which are present as anastomosing ribbons separated by elongate blebs of highly altered wallrock. Tetrahedrite, ruby silver, argentian stibnite, and argentite ("black metal") are locally abundant (Ballard, 1922; Shannon, 1971). The arsenic and antimony contents of the deposits vary considerably across the district (Shannon, 1971; Federspiel and others, 1992) but are highest in the Silver King mine, which represents the deepest level of exposure in the district (fig. 2 [Figure 5]). Pyrite and arsenopyrite are common in the altered wallrock and in the gangue of shear zones but are notably absent in the competent ribbon veins.

The ribbon veins pinch and swell along strike and locally form tabular ore lenses. Veins range in width from 0.1 to 2 m, and alteration zones extend from 1 to 3 m from the veins. The ribbon vein system is parallel to subparallel with shear zones; wallrock fractures are commonly parallel with the ribbon veins and are best developed in the east-trending shear zones. Brecciation and folding of the ribbon veins are common (fig. 5 [Figure 8]). Alteration adjacent to the veins consists of intense sericitization close to the veins and chloritization and kaolinitization near the outer edges of the altered zones to a distance of 1-3 m from the veins.

The ribbon veins represent a hypogene mineralization event characterized by repeated pulses of quartz deposition and deposition of aphanitic sulfide minerals, as indicated by the development of ribbon structures and the presence of vein-parallel inclusions of intensely altered wallrock (J.S. Lee, unpub. data). Sulfide mineral paragenesis and the primary alteration features associated with the ribbon veins are difficult to determine because of subsequent shearing and brecciation during late-stage and post-mineralization tectonism.

Quartz-Sericite-Pyrite-Galena Veins

The quartz-sericite-pyrite-galena vein system consists of galena, sphalerite, and arsenopyrite and minor stibnite and argentite in a quartz, sericite, siderite, and pyrite gangue (fig. 6 [Figure 9]). The arsenopyrite contains minor amounts of gold (Shannon, 1971), and disseminated gold is presented in the alteration zones (J.S. Lee, unpub. data). Pyrite, and to a lesser extent, arsenopyrite are disseminated throughout the shear zone and surrounding altered wallrock. The sulfide minerals are present as irregular patches within the intensely sheared gouge zone, and open-space-filling textures are locally evident. Sulfide minerals locally form massive lenses as long as 3 m, particularly near shear zone-joint and shear zone-shear zone intersections. The gangue material consists primarily of irregular, elongated grains of quartz and abundant sericite and siderite. Andorite and other sulfosalts are locally important (J.S. Lee, unpub. data).

Sericite from a northwest-trending shear zone in the headwaters of Beaver Creek yielded a K-Ar date of 80.7±2.8 Ma that indicates mineralization in the Vienna mineralized area to be Late Cretaceous (D. Runkle and J. Herckel, University of British Columbia Geochronology Lab, unpub. data). This date agrees with field relations, which indicate that mineralization occurred following emplacement of the Cretaceous biotite granodiorite and development of the joint system, yet prior to intrusion of the crosscutting Eocene dacite porphyry dikes. This age of mineralization corresponds with the earliest Late Cretaceous–Paleocene mineralization episode suggested by Snee and Kunk (1989).

Quartz-sericite-pyrite-galena veins are present in the same shear zones as the ribbon veins and significantly overprint the early phase of mineralization. The ribbon veins are strongly sheared and brecciated, although small unsheared segments of the ribbon veins are present as inclusions within the intensely sheared and mineralized gouge zone (figs. 4, 5 [Figures 7 and 8]). The gouge zone contains abundant sericite and minor chlorite, and the wallrock is chloritized and sericitized as far as 1-3 m from the shear zone. Quartz-sericite-pyrite-galena mineralized rock is present along both shear-zone systems in the Vienna mineralized area, and ore shoots of this assemblage locally are present at shear-zone intersections. Minor mineralized rock also is present along joint planes near joint-shear zone intersections.

Genesis of Mineral Deposits

The two vein types in the Vienna mineralized area are mineralogically and texturally distinct but are spatially and genetically related. The quartz-sericite-pyrite-galena veins postdate the ribbon veins, as shown by (1) brecciation and shearing of the ribbon ore within the highly sericitized and mineralized shear zones and (2) dissemination of pyrite and arsenopyrite throughout the gouge and alteration zones but absence of those minerals in the more competent (impermeable) ribbon veins. Ribbon veins are concentrated near the center of shear zones, whereas the quartz-sericite-pyrite-galena veins are present throughout the gouge and alteration zones, as well as in ore shoots at shear zone and shear zone-joint intersections.

Mineralization in the Vienna mineralized area is believed to be the result of multiphase injection of mineralizing fluids along a conjugate shear system during the Late Cretaceous. Structural control on the conjugate shear set is unclear; the shear zones may be the result of hydrostatic stress associated with the late-stage hydrothermal system or may have formed from post-intrusion, pre-mineralization tectonic stress.

The two vein systems probably formed as the result of changes in hydrostatic pressure, temperature, and fluid composition during a mesothermal mineralization event of multiple phases. This event was characterized by emplacement and continued brecciation of the ribbon ore, followed by deposition of the quartz-sericite-pyrite-galena system along the same shear zones. The ribbon vein system is mesothermal in origin and was emplaced during several stages of quartz injection, sericitization, and mineralization, as suggested by the ribbon nature of the veins, alternating brecciation and ribbon vein formation, and inclusion of altered wallrock within the shear zones. The quartz-sericite-pyrite-galena system was subsequently deposited along the sheared and brecciated shear zones. This vein system displays open-space textures characteristic of an epithermal origin, but such textures also develop in mesothermal systems in void spaces created by brecciation and at the intersections of shear zones and shear zone and joints (C. Godwin, consulting geologist, oral commun., 1990).

The paragenetic sequence is believed to progress from deposition of silver-sulfide minerals to deposition of galena, sphalerite, arsenopyrite, and pyrite, and probably is the result of changes in ore fluid composition related to depletion and the interaction between evolving ore fluid and granodiorite wallrock. The metal-bearing fluids are probably a late-stage hydrothermal system associated with Cretaceous biotite granodiorite; however, lead-isotope analysis suggests that the ultimate source of the metals may be related to Precambrian upper crustal rocks (Sanford and Wooden, 1995).

HISTORY OF THE MINES IN THE SMILEY CREEK AREA, BLAINE AND CAMAS COUNTIES, IDAHO

VIENNA MINE

Levi Smiley first prospected the Vienna area in 1879 (Wells, 1983). The earliest discoveries were reported in 1879 (Umpleby, 1915). E. M. Wilson discovered the Vienna Mine on June 4, 1879. (See Table 1 for individuals and companies operating at the mine.) Before long, the mine was sold to investors from LaCrosse, Wisconsin, and Winona, Minnesota (Wells, 1983). Concerning early development at the mine, Wells (1983, p. 111) noted:

> The development of the Vienna mine, while less extensive than all of Sawtooth's properties, had justified construction of a major mill. A 7-foot vein of $200 ore (but with assays as high as 19,000 ounces of silver a ton running far above this average) was exposed by two upper tunnels each of which ran 275 feet to reach the Vienna lode. A tunnel was driven to provide access at a depth of 500 feet below the Vienna outcrop. While all this exploration was under way between 1880 and 1882, a twenty-stamp mill was completed in 1882. Built to precisely the same specifications as the highly productive Custer mill on Yankee Fork and installed by the same contractor, this plant exceeded $200,000 in cost. Production had to be delayed until the next season for lack of mill supplies when winter snow isolated Vienna and Sawtooth for another season.

Strahorn (1881, p. 59) described the workings in more detail:

> Three tunnels of from 250 to 400 feet each, and a number of other openings have been made upon the vein, and some 600 tons of ore, worth from $100 to $500 per ton, have been produced in the course of this simple development work, while two thousand tons equally good are blocked out in the mine. One shipment of twenty tons to Salt Lake last fall yielded $400 to the ton, while several smaller shipments did considerable better. The vein is two to seven feet wide, and there are streaks in it worth $2,000 per ton.

The following year, the mine was steadily producing very high-grade ore. Several hundred tons of ore had been mined and were awaiting milling. A tunnel had been driven to the ledge and afterward continued along the vein about 300 feet, opening some rich ore. A strike made in a raise off the main tunnel added materially to the value of the mine. In 1883, the Vienna Mine was still yielding steadily, and the ore was of even better quality than previously. The yield was estimated to be $25,000 a month. The Vienna Mining and Milling Company employed about one hundred and twenty men for the entire year in 1884. (See Figure 10 for a picture of the town of Vienna at this time.) During the year the mine was estimated to have shipped probably $200,000 worth of bullion.

The Vienna Mine was shut down in 1886. In 1888, a $60,000 development tunnel, driven through to the South Fork of the Boise River face of the ridge, failed to produce any ore. After the mine was sold at a sheriffs auction in 1906, lessees did a little work in 1912 (Wells, 1983).

WEBFOOT MINE

The Webfoot Mine was originally called the Mountain King. Exactly when it was discovered is not known, but it was apparently one of the early discoveries in the area. Strahorn (1881, p. 59) provided the following information about the mine:

> Near the Vienna is the Mountain King, next to the Custer[1] probably the most promising mine in all Idaho. The vein has been located for a mile. It projects above the surface two to seven feet, and is from eight to sixteen feet wide, five feet of which is ruby and sulphuret ore, worth $200 to $800 silver, and $8 to $12 gold per ton. Nearly 800 tons of rich ore are on the Mountain King dump, with hundreds of thousands of dollars worth in sight in the various openings. About 100 tons shipped to Salt Lake this year yielded $240 per ton. Excepting the Custer this is the largest outcrop of very high-grade ore I have seen, and its granite walls are so well defined it seems almost certain that it will maintain its present proportions and probably its richness. The Mountain King is being systematically developed under the able direction of Chris. Johnson, Esq., superintendent, who is also superintendent of the Vienna. A twenty-stamp mill will be erected early in 1882 to work Mountain King ores, when we may safely look for a product of from $50,000 to $75,000 per month. The Alturas, Lucre, Justice and Wisconsin claims [Figure 4], all believed to be on the Mountain King vein, are being developed, and promise good things for the immediate future.

In 1882, the Mountain King had two tunnels about 100 feet vertically apart and a total length of about 350 feet. About 1,700 tons of ore had been mined or was in sight. This ore ran from 75 to 100 ounces of silver per ton. Contradictory reports from the next year said that the ores of the mine had not exceeded 20 ounces of silver per the ton in preceding years, but the vein had improved to show a foot of ore which ran nearly 30 ounces of silver per ton. The production for 1883 was 74 bars, valued at $103,600. There is no further mention of activity at mine, which means that it probably was closed. By 1896, the mine was definitely idle (Lindgren, 1900).

In 1912, the Mountain King shipped lead sulfide ore carrying considerable gold and silver. The following year, the Webfoot property shipped a car of galena carrying gold and silver values to Salt Lake City.

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[1] The General Custer Mine near Custer on the Yankee Fork of the Salmon River.

SOLACE MINE

The Solace was discovered in July 1881 and sold within sixty days for $40,000. The discovery was a 4-foot vein of sulphurets and antimonial silver, worth from $100 to $2,000 per ton (Strahorn, 1881). Describing the veins in more detail, the 1882 Director of the Mint Report (DotMR) noted:

> The Solace Mine has been considerably explored. A tunnel was started to tap the main ledge, but in advancing a vein was cut which was supposed to be the main vein, but in raising from the tunnel level to the surface it proved to be a blind vein carrying very rich ore. Upon further advancing the tunnel the main vein was struck at a depth of 120 feet from the surface, showing very high-grade ore. Thirty tons from this mine were sold last season, realizing $10,000. Reduction works will be erected in 1883 in connection with this mine.

In 1883, the Solace Mine was owned by J. B. Haggin of San Francisco and other men, including one of the Hearst family. The mine produced no bullion during the year, but had a large quantity on the dump. The mine had a large amount of high-grade ore. There were no further reports of activity at the mine. By 1896, the mine was definitely idle (Lindgren, 1900).

VIENNA GROUP

After about 1915, the Vienna, Solace, and Webfoot mines were collectively referred to as the Vienna Group. Shannon (1971, p. 17) attributes the first discussion of the Vienna Group to the Idaho Inspector of Mines: “The Vienna group includes the old Vienna Mine across Smiley Creek canyon from the Webfoot Mine; since 1912 (Bell, 1912, p. 86), virtually all output of the Vienna group has come from the Vienna Mine.” However, Bell does not discuss which claims the Vienna Mine controlled in 1912 (1912 IMIR, p. 86-87):

> Another interesting point of ore development was made in the old Vienna Mine near the head of the Salmon River in the north corner of Blaine County during the past year.
>
> This property embraces a very extensive group of patented claims on which a very large amount of development was done in early days that yielded an output of over a million dollars in gold and silver.
>
> One of the old tunnels has been reopened and retimbered and discloses a wide fissured and sheared mineral zone in granite containing rich streaks of lead-silver and gold bearing material in quartz, from which three carloads of hand sorted ore were shipped during the year containing an average value of $50.00 per ton.
>
> The ore bodies on this property are associated with porphyry intrusions and are of great size and lineal extent and contain some excellent values, varying from $5.00 to $50.00 per ton, and in widths of from 5 to 10 feet and over.
>
> This property was worked at a time when the supplies had to be freighted by wagon from Corrinne, Utah, a distance of over 300 miles and only the choicest milling ores were extracted, leaving the base lead ore which contains some antimony.
>
> It is believed from the size of the dumps of low grade now in evidence at several extensive tunnels in the property that the former owners avoided the smelting mineral as much as possible, as their method of treatment was by stamp milling and pan amalgamation for the recovery of the gold and silver values, and that there remains in the property an extensive tonnage resource which, by first concentrating the smelting mineral out, could then be treated by modern chemical means for the recovery of the gold and silver values and form the basis of a very large mining and milling operation.

Despite Shannon’s incorrect attribution, U.S. Bureau of Mines production records indicate production had shifted to the Vienna Group as a whole by 1915 at the latest. The Idaho Mines Inspector reported the Vienna Group was composed of the Webfoot, Solace, Emma, and Lion claims. Umpleby (1915, p. 248-249) described the Mountain King (Webfoot) workings, which were the only ones open when he visited the district:

> At the time of the writer's visit only the Mountain King workings were accessible. They had recently been cleaned out in part by a group of men who held three claims of the Vienna group under bond and lease, and who were seeking lead-silver ores in the old silver-quartz stopes. This is said to be the only mine in the district which contains important amounts of lead ores, and as lead was not desired in the chlorination mill owned by the old company it was not removed from the mine. The ore occurs along a crushed zone that strikes N. 60º W. and dips 51º NE. in the upper levels and 800 in the lowest or No. 4 level. Development comprises about 6,000 feet of work in four drifts on the vein. As shown by the old stopes the ore body was about 700 feet long and ranged in width from a few inches to 15 feet, probably averaging about 4 feet. It is said that material from these stopes averaged between 20 and 30 ounces of silver to the ton and contained a noteworthy amount of gold. The best lead ore was found on level No. 3 near raise No. 9, where a small vein which strikes N. 40º E. intersects the main lode. The silver-quartz ore occurred as a band 8 to 20 inches wide alongside the galena ore, either next to the hanging wall or next to the footwall. Both sorts of ore show abundant evidences of replacement of crushed granite. Next to the vein, pyrite as isolated cubes and stringers is developed in the granite, and sphalerite and galena replace blocks of wall rock within the fissure. The granite is intensely sericitized adjacent to the fissure, and locally chlorite is abundantly developed. The lead ore is irregularly distributed along the fissure and ranges in width from 1 inch to 6 feet.
>
> Assay records supplied by T. H. Williams, who with two associates held the bond and lease in 1912, are as follows:
>
> *Assays of ore from veins of Mountain King mine, Idaho.*
>
> | Width in inches of vein sampled. | Gold. | Silver. | Lead. | Zinc. | Insoluble. | Sulphur. | Iron. | Copper. |
> |---|---|---|---|---|---|---|---|---|
> | | *Ounces.* | *Ounces.* | *Per cent.* | *Per cent.* | *Per cent.* | *Per cent.* | *Per cent.* | *Per cent.* |
> | 16 | 1.07 | 26.4 | 28.0 | 14.9 | 4.6 | 26.1 | 13.5 | 0.3 |
> | 24 | 1.58 | 11.1 | 6.8 | 4.0 | 27.2 | 21.6 | 21.8 | .2 |
> | 20 | 0.98 | 4.9 | 1.2 | 12.4 | 10.4 | 34.0 | 25.6 | .2 |
> | 72 | 0.58 | 6.8 | 11.4 | 14.2 | 27.8 | 22.4 | 14.3 | .2 |
>
> Three carloads of hand-sorted ore said to average $50 to the ton were shipped from the mine in 1912. This ore consisted of galena, sphalerite, and pyrite in a coarse-textured quartz gangue.

The Idaho Mines Inspector described the area later in the year (1915 IMIR, p. 74):

> Near the head of Wood River 25 to 30 men were employed during the last half of the year in a resumption of operations at the long idle former bonanza silver ore deposits of the Vienna district, where recent reports indicate the uncovering of a considerable tonnage of good lead-silver ore that was left by former operators, who handled the property with a pan process silver mill for its rich silver and gold values, which were conspicuous for their bonanza tenor in the early operations of these veins over 25 years ago. The management of this enterprise is finding indications and is hopeful of developing further reserves of the rich silver ore values for which the veins were formerly noted in addition to the lead smelting minerals that were left by the former operators and from which several car load shipments have been made.

In 1917, a shipment of rich silver ore was made from the Vienna Mine. The mine was “said to be showing encouraging evidence of new ore resources” (1917 IMIR, p. 56). On August 25th, 1918, Frank W. Wilcox, a teamster at the Vienna Mine, jumped or fell from a runaway team and broke his neck; he was found dead in the road shortly afterwards. The following year, the IMIR (1919, p. 86) noted:

> Ten miles south of this district [the Sawtooth district] the Vienna district is a practical duplication of the Sawtooth district conditions with a still better past production of silver that was also one of the leading producers of the State in the eighties, but has long been idle except for a mismanaged venture of the Vienna Mines Company started a few years ago that did not get anywhere in the demonstration of the remaining resources of the district one way or the other.

The Vienna Consolidated Mines & Smelting Co. held the mine in the early 1920s but did no mining after 1918. A. F. Peery, operating the Vienna Mine under a lease, shipped one car of rich silver ore from the mine in 1925 and conducted development work throughout the year. (Figures 11, 12, and 13 show maps of the open workings in the district in August 1926.) Peery continued to develop the mine from 1925 until 1930. In 1927 he found some excellent high-grade silver ore. In 1929, the Vienna Group produced a test shipment of lead ore containing considerable silver. Development work for the year was about 500 feet of drifting and 150 feet of raising. This work opened a good showing of high-grade silver. In addition, Peery installed complete mining equipment and a compressor driven by a Diesel engine. In 1930, Peery ran an active development program during the early and latter parts of the year.

The Idaho Mineral Products, Ltd., developed the Vienna Group throughout 1931, installed new milling equipment, and began milling operations in December. This company, in cooperation with the Idaho State Highway Department, opened Galena Summit to motor vehicle travel in December so that the company could complete storing winter supplies. The property had a gas-driven jig concentrator and a 75-horsepower Diesel engine driving compressor. The company noted in its report to the Idaho Mines Inspector:

> The company is employing an average of 10 men a day, and expects to work 1 shift in the mine and 3 in the mill.
>
> Mill running 50% lead concentrates. Have opened five faces of ore on the No. 4 level, over a distance of 1000 feet. Ore will average better than $23 per ton. Vein 5 feet wide.

Idaho Mineral Products maintained active development work throughout 1932, and also remodeled and modernized its mill. Average employment was seven men. The company continued to operate the Vienna Mine in 1933 and treated about 2,600 tons of lead ore in the new 75 tons-per-day (tpd) flotation mill. Lead concentrates rich in silver and gold were shipped to Midvale, Utah, for smelting. Development work with a crew of 10 men showed excellent results. The company was reorganized and new capital was provided during the second half of the year. Plans called for working thirty-five men throughout the winter. Heinecke (n.d., p. 30) quoted a letter describing the 1933 work:

> A letter dated April 8, 1968, from Robert B. Thompson (Professional Engineer) states the following: “During the summer of 1933, I worked at the Vienna Mines, North of Galena Summit, Idaho. At that time, an adit about 1,200 to 1,500 feet long had been opened. A 50-ton per day mill had been completed. The ore feed for the mill was a reasonably high-grade galena ore with high values in silver. The metallurgy was reasonably simple. A single stage grind in an overflow ball mill with a rake classifier in

> closed circuit resulted in a floatation feed approximately all minus 65 mesh. A short string of six or eight 24-inch agitair floatation machines gave a recovery above 90 % of lead and silver values. Concentrates were shipped to the United States Smelting, Refining and Mining Company smelter at Midvale, Utah. Opening the adit was difficult because of a fault which crossed the adit. Ultimately, a new section of adit was driven to by-pass the caved portion. Beyond the fault, a winze was sunk. This winze was intended to follow the dip of ore revealed by sampling below the track. It was my observation that the ore passed out of the footwall of the winze because the winze was very high-grade lead ore (steel galena) with high values in silver. In other places in the adit, good silver values were found both above and below the track level. Much of the mill feed ran over 50 ounces per ton of silver. Silver values were largely in ruby silver. The remoteness of the area in 1933, and the depressed metal prices combined to make operation unprofitable. There is little doubt of the existence of ore bodies in the property which under today's economics and logistic circumstances would warrant an investigation."

On September 20, 1933, Idaho Mineral Products Co. sold the Vienna Group to the Ruby Queen Silver Mines Corp. The sales contract was cancelled June 30, 1934, for failure to fulfill its terms. A small amount of development work was carried on in 1934, and a small lot of mill clean-up ore was shipped. Kimball Mining Syndicate leased the Vienna mine in 1935. About 375 tons of silver ore were concentrated by flotation; in addition to silver, the concentrates also contained considerable gold, a little lead, and copper. The property was idle in 1936, 1937, and 1938. Idaho Mineral Products Co. was in process of reorganization during 1937.

The Vienna Mine was the chief producer in the district in 1939. A lessee shipped several cars of siliceous ore to smelters in Utah. In 1940, lessees shipped crude gold and gold-silver ore. About 35 tons of gold-silver ore was shipped in 1941. On Oct. 8, 1942, War Production Board Limitation Order L-208 closed all non-essential mines for the duration of World War II. Nevertheless, in 1944 a lessee worked the Vienna Mine and shipped 80 tons of high-silica gold-silver ore to a Utah smelter.

Heinecke (n.d., p. 4-5) reported the following on the history of the property between 1955 and 1985:

> In 1955, Heinecke Brothers obtained a lease from the Northern Trust Company, trustee for the estate of Lewis Hippach. Herman Heinecke had worked at the mine in 1934 when Mercer and Williams were the operators and knew of the great potential of the mine. Heinecke Brothers shipped 600 tons of flux ore from the dump at level #200 and did some open cut stripping near the #200 adit where the vein comes to the surface.
>
> In 1959, Homestake Mining Company was involved with efforts to get through a cave-in 800 feet from the portal of level #400 but this effort failed and work was again stopped.
>
> Western Gold Corporation did some diamond drilling at the same location and results of drilling showed 8 feet of ore that assayed 15 to 20 oz silver per ton.
>
> In 1962, Heinecke Brothers assigned the Vienna lease to the Vienna Silver Mines Company and received stock for their interest. During the following 10 years, old adits were opened, access roads were built and equipment was purchased for building a floatation mill on the property. About 800 tons of flux ore was produced from dumps and an open cut near #200 adit. A heavy media plant, using a Cedar Rapids crushing plant and jig and table, was tested on the #400 dump, but was not put into full operation before lack of financing caused the work to stop.
>
> In 1968, a sub-lease was given to Silver Empire Mining Company and they subsequently drove a new adit 200 vertical feet below the #400 level. Considerable mineralization was encountered in the #600 level but lack of finances caused exploration activities to cease before ore development was accomplished. Silver Empire lease was terminated and full control of the 36 patented mining claims reverted back to Vienna Silver Mines.
>
> No significant work was done on the Webfoot mine until 1983, when Cash Industries, Inc. signed a Management Contract with Vienna Silver Mines. During 1983

> and 1984, some limited drilling was performed by Cash Industries, the results of which served as the basis for the exploration program described later in this report.
>
> After Cash Industries, Inc. went into bankruptcy and was liquidated in 1985, Rothschild Mining Corporation staked the 16 unpatented claims after it had negotiated an agreement with option to purchase for the 36 patented claims.

Rothschild's 1986 or 1987 exploration program at the Vienna Group was successful, and mining was scheduled to begin the following spring. In 1988, Rothschild continued its exploration program. The company completed a raise in the mine and stockpiled ore at the Webfoot Mine. Several test batches of ore were run through the company's mill west of Ketchum. (Figure 14 is a partial map of the underground workings; Figure 15 is a picture of the vein on Level 6.)

In 1989 and 1990, Earl Waite worked the Webfoot mine. In 1991 Rothschild Corporation did underground drilling and exploration at the mine. The mine was idle in 1992 and 1993. (Figures 16, 17, 18, and 19 show the location of the various mine workings when they were visited by U.S. Bureau of Mines geologists.) Logging was the only activity at the Rothschild's Webfoot Mine in 1994. (See Figures 20-33 for pictures of the sites when they were visited by an Idaho Geological Survey geologist in the summer of 1994.) At the end of 1994, Aurtex, Inc., leased the Vienna district mines. In 1995, Aurtex started a surface evaluation of the mines for their gold potential. Sixteen excavator trenches were dug in mineralized areas of the old workings. The trenches were mapped and sampled, then reclaimed. Aurtex planned surface drilling and perhaps underground mapping for 1996.

Total recorded production from the Webfoot Mine for the years 1908 to 1913 and the year 1981 is 125 tons of ore. This material yielded 145 ounces of gold, 1,907 ounces of silver, 137 pounds of copper, 35,725 pounds of lead, and 1,768 pounds of zinc. Total recorded production from the Vienna Group from 1915 to 1977 is 5,009 tons of ore. This material yielded 904 ounces of gold, 84,451 ounces of silver, 3,165 pounds of copper, 93,088 pounds of lead, and 1,968 pounds of zinc. These numbers must be considered a bare minimum, because there is no accurate record of the amounts of ore or metals produced by any of the three mines before 1900. No post-1900 record of production from the Solace Mine appears to exist, but all twentieth century production from the mine may have been recorded as part of the Vienna Group.

References

Ballard, S.M., 1922, Geology and ore deposits of Alturas quadrangle, Blaine County, Idaho; Idaho Bureau of Mines and Geology Bulletin 5, 36 p.

Director of the Mint's (DotMR) report on the production of precious metals in the United States, 1881-1893.

Federspiel, F.E., P.N. Gabby, T.N. Neumann, and A.M. Leszcykowski, 1987, Mineral resources of the South Boise-Yuba study area and additions, Blaine, Camas, and Elmore Counties, Idaho: U.S. Bureau of Mines Mineral Land Assessment Open-File Report 64–87, 117 p.

Heinecke, G. Michael, n.d., Vienna Mines: Historical and geological background and description and findings of exploration work performed by Rothschild Mining Corporation: unpublished report, 16 p. [copy available in Idaho Geological Survey's mineral property files.]

Hewlett, D.F., and Schaller, W.T., 1925, Hisingerite for Blaine County, Idaho: American Journal of Science, 5th series, v. 10, p. 29-33.

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

Idaho Geological Survey's (IGS) reports on regional developments in minerals, mining, and energy in Idaho, 1975-1998.

Idaho Inspector of Mines' annual reports (IMIR) on the mining industry of Idaho, 1899-1970.

Lindgren, Waldemar, 1900, The gold and silver veins of Silver City, De Lamar and other mining districts in Idaho: U.S. Geological Survey Twentieth Annual Report, Part 3, p. 65-256.

Mahoney, J. Brian, and Michael C. Horn, 2005, Geology of the Vienna mineralized area, Blaine and Camas Counties, Idaho: U.S. Geological Survey Bulletin 2064-DD, 9 p.

Ross, Clyde P., 1927, The Vienna district, Blaine County, Idaho: Idaho Bureau of Mines and Geology Pamphlet 21, 17 p.

Sanford, R.F., and J.L. Wooden, 1995, Sources of lead in ore deposits of central Idaho: U.S. Geological Survey Bulletin 2064–N, 24 p.

Shannon, Spencer S., Jr., 1971, Geology and geochemical exploration of the Vienna district, Blaine and Camas counties, Idaho: Idaho Bureau of Mines and Geology Pamphlet 146, 45 p.

Snee, L.W., and M.J. Kunk, 1989, $^{40}Ar/^{39}Ar$ thermochronology of mineral deposits in the southern part of the Idaho batholith, *in* Winkler, G.R., S.J. Soulliere, R.G. Worl,