

KENVILLE MINE PROPERTY

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VGS → Kenville
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1997 Report by James Laird

Overview

Anglo Swiss Resources Inc. is actively exploring for gold and copper on the historic Kenville Gold Mine Property, located near Nelson, B.C. The mine has been an important gold producer for more than a century, and recent discoveries by Anglo Swiss could bring it into production once again. The company plans to drill test a new high-grade gold vein in 1998, and to investigate a large gold, copper, silver and molybdenum geochemical soil anomaly discovered late last year. The mine itself will be subject to a geological evaluation to determine current and prospective ore reserves.

Facilities at the Kenville minesite include a 250 tonne per day ore crusher, extensive underground mining equipment, compressor, maintenance shop, assay lab, miner's dry, engineering office, core storage, Mine Manager's residence, and more. The City of Nelson supplies electrical power and water is obtained from Eagle Creek. The Kenville Mine Property consists of 15 Crown-Granted mining claims and 10 staked claims totaling 430.88 hectares (1064.79 acres); and 38.73 hectares (95.7 acres) of surface property, all 100% owned by Anglo Swiss Resources Inc. The Kenville Gold Mine has produced more than 2 tonnes of gold from about 180,000 tonnes of ore.

Location

The Kenville Mine Property is located 10 kilometres west of Nelson, B.C. in the small community of Blewett. Road access from Nelson is via Blewett Road to the Kenville Mine Road. An alternate route connects through Bedford Road three kilometres to the Taghum Bridge on Highway 3A. Taghum Bridge is 32 kilometres from the Castlegar airport and 61 kilometres from Cominco's smelter at Trail B.C. The Castlegar airport is serviced daily with scheduled flights to Vancouver, Calgary, and Cranbrook.

Mature second-growth forest of larch, fir, hemlock, cedar, birch and yew covers much of the Kenville property. A network of old mining and logging roads provides access to most of the Eagle Creek drainage area. Typically, snow is expected from November through to February and can accumulate as much as three metres in the higher elevations. Heavy rains in the springtime make for a quick snow run-off, and warm, sunny weather is normal for summer and early fall.

Mining History of Eagle Creek

The Nelson area of the Kootenays has a long and interesting mining history, which dates back to the earliest years of exploration and discovery in British Columbia. Prospectors, trappers and finally settlers came north across the border from the active mining camps in the United States, and also from the coast, following the great discoveries of gold on the Fraser River. Some of the first explorers up the Kootenay River found placer gold in paying quantities on 49 Creek, a few kilometres west of Eagle Creek. Prospectors, following the lure of gold up every watercourse to be found, detected colours in the sands of Eagle Creek. The gold became coarse upstream and led to fragments of white quartz with visible gold beside the creek. A short distance uphill, the legendary Poorman Vein was uncovered, quickly followed by discovery of the rich Granite Vein.

The Poorman Vein was accessed underground by a 30 metre crosscut tunnel, and developed by a 150 metre long drift on the ore. A water-powered 3-stamp Chalmers mill, the first in British Columbia, ground the quartz ore and extracted the free gold. News of the spectacular shoots of raw gold found in the veins quickly spread, which prompted the owners to post armed guards. By the late 1880's, Eagle Creek Gold Mining Company operated a 20-ton per day underground gold mine on the Poorman Vein and had begun construction of a 10-stamp mill. This was British Columbia's first producing gold mine, officially reporting 500 ounces in 1889. Gold production from the Poorman Vein was closely followed by startup of the famous Silver King Mine, located about 10 kilometres to the southeast, and discovery of the Rosslund gold mining camp.

Recorded production from the Granite and Poorman veins up to the turn of the century was 23,622 tonnes of ore containing 12,818 ounces of gold. True gold production was surely much higher, given the free-milling nature of the ore that allowed gold bars to be poured on site. In 1899, Granite Gold Mines Ltd. commissioned a 20-stamp mill on the bank of the Kootenay River near the mouth of Eagle Creek, and constructed an aerial tramway to transport the ore. Duncan United Mines Ltd., a large British mining company, ran the operation until 1904. For the rest of the decade, individual leasers mined the veins and supplied high-grade ore to the Granite mill.

In 1911, a new company known as Kootenay Gold Mines Ltd. acquired the Granite and Poorman mines, and began development work on the newly discovered Hardscrabble and Greenhorn veins. One wheelbarrow load of ore from the Beelzebub Vein in the Granite workings was reported to contain 350 ounces of gold. Numerous lesser gold veins such as the Dundee, Paradise, Majestic, Star, Alma N, Royal Canadian, Nevada, Central and Evening Star occasionally shipped hand-sorted high-grade ore to the Granite mill. Just upstream from the Poorman Mine, incredibly rich shoots of wire silver, native copper and free gold in a gangue of turquoise, chrysocolla and malachite were found in the Eureka Mine.

Prior to 1912, the Granite and Poorman mines reportedly produced 90,000 tonnes of ore containing over \$1,000,000 in gold. Production tapered off during World War I. By this time, much of the high-grade gold ore on the Poorman, Granite and Hardscrabble veins had been mined out. Again, small time leasers descended on the veins and periodically supplied the Granite Mill with small tonnages of hand-sorted ore. In 1928, an ambitious new company called Granite-Poorman Mines Ltd. began to drive a 1200 metre long lower level tunnel from the Granite millsite to tap the veins at depth. The company completed 320 metres of tunneling before the money ran out.

The Livingstone Mining Company of Seattle, managed by Harold Smith, took control of the mines in 1932. He then organized a group of leasers to mine high-grade ore from the many known veins. In 1933, the Granite mill was moved up to the present millsite beside Eagle Creek, and work began on the new 2570 level adit. Underground development proceeded slowly during the next decade with only a few thousand tonnes mined and milled each year under the direction of Harold Smith.

In 1936 and 1937, two new veins were discovered by a miner named Albert Norcross while ground-sluicing on the Venango claims west of Eagle Creek. Underground development commenced in 1938, and sacks of gold ore were shipped directly to the Cominco smelter at Trail, B.C.. High-grade tungsten was also identified in the Venango veins. In 1940, the mine owner reported production of 1350 tonnes of ore containing 700 ounces of gold.

Kenville Gold Mines Ltd., a company controlled by Quebec Gold Mining Corporation and Noranda Mines Ltd., purchased the Granite, Poorman and Venango properties in 1944. Prior to this, the mines had officially produced 116,000 tonnes of ore containing 47,043 ounces of gold, with some silver, copper and lead credits. In 1945, Kenville Gold Mines Ltd. commenced a comprehensive exploration program designed to develop 100,000 tonnes of mineable ore. Over 10,000 metres of diamond drilling and a detailed geological study revealed the existence of several new gold veins between the Poorman and the Granite.

After the 2570 level adit was pushed through to the old lower mine levels on the Hardscrabble Vein, a crosscut tunnel was driven east to the Midway Vein. The Yule Vein was encountered by the crosscut on Christmas Day, 1946 and the Flat Vein soon after. In total, 2700 metres of underground development was done prior to commissioning the 100 tonne per day Kenville mill in November 1947. From this time until the company ceased mining activity in 1950, 61,500 tonnes of ore containing 17,166 ounces of gold with some silver, copper, lead and zinc were produced.

For the next decade, the Kenville mill operated as a custom mill and base metal concentrator. Small mines throughout the Kootenays shipped ore until final closure and decommissioning in 1962. Occasional small shipments of high-grade gold ore were made directly to the Trail smelter from the Venango and Granite mines in the early 1960's.

In 1969, Algoma Industries and Resources Ltd. acquired the Kenville Mine property. The company re-opened the 2570 level tunnel and began rehabilitation of the mine and mill. No production was recorded. The De Kalb Mining Company of Calgary optioned the Kenville and Venango properties in 1980. The company drilled 11 surface holes totaling 1100 metres on the Venango vein system, and 10 surface holes totaling 1830 metres west of the Kenville Mine to investigate for extensions of the Flat Vein. Several promising gold and copper-rich drill intersections were encountered but a corporate re-structuring of De Kalb resulted in the company relinquishing the option.

Coral Industries Ltd. purchased the Kenville Mine property from Algoma in 1986, and began a complete rehabilitation of the 2570 level including trackage and air supply piping. The Venango claims were acquired in 1989. In 1991, a 163 tonne bulk sample of ore grading 0.46 oz/t gold was mined from the Jewelry Box stope on the Flat Vein, and shipped to the Asarco smelter at Helena, Montana. Ownership of the mines transferred in 1992 to 409556 B.C. Ltd., a private company, who in turn transferred title to Anglo Swiss Industries Inc., a publicly traded company. Anglo Swiss continued underground exploration with a small diamond drill rig testing for new ore shoots. During 1992 and 1993, small-scale test production from the Jewelry Box stope was processed at the custom milling operation of Bow Mines Ltd. located near Greenwood, B.C. Returns indicated excellent gold recovery using a combination of jig concentration and floatation.

In February 1995, Teck Exploration Ltd. entered into an option agreement with Anglo Swiss Industries Inc. to earn a majority interest in the Kenville Mine property by making cash payments and scheduled expenditures on exploration and development. Teck Exploration Ltd. commenced a 5 hole, 1140 metre surface diamond drill program in July 1995. The drill program focused on confirming the existence of broad zones of disseminated copper-gold mineralization first encountered in drill holes done by Kenville Gold Mines Ltd. in 1945. A bulk-tonnage, porphyry copper-gold deposit was Teck's main geological target.

Teck's drill program successfully located several zones containing copper, silver, gold and molybdenum mineralization, and also intersected a 2.6 metre wide quartz vein. The new vein, now known as the Eagle Vein, is located midway between the Hardscrabble and Venango veins in an area of overburden cover. Both drill intersections on the Eagle vein contained visible gold, and one 0.25 metre sample section graded 2.64 oz/t gold. The deepest vein intersection was 75 metres below the lowest developments on the adjoining Hardscrabble and Venango veins, thereby inferring considerable additional development potential in the mines. The Eagle Vein was unique in that it dipped moderately to the west; perpendicular to the known mine veins and parallel to regional shearing and foliation in the host diorite.

Following the 1995 diamond drill program, Teck completed a magnetometer and induced polarization survey over the southwest part of the property. The survey outlined a large coincident mag and I.P anomaly, 500 metres west of the 1995 drilling. No further exploration work was done on the Eagle Vein. In 1996, Teck drilled 7 surface holes totaling 1317 metres to test the geophysical anomaly. The drill holes encountering several zones of copper, gold, silver and molybdenum mineralization within broad areas of intense porphyry-style alteration. Despite the promising results, Teck returned the Kenville property to Anglo Swiss in February 1997.

Anglo Swiss Industries Inc. decided in 1997 to investigate the Eagle Vein with a geochemical soil survey designed to assist in targeting additional drill sites. A total of 341 soil samples were taken at 25 metre intervals on 8375 metres of grid lines. The soil survey showed a high-contrast gold anomaly stretching more than 500 metres to the south along the projected strike of the Eagle Vein. Prospecting the anomalous zone located quartz vein float that assayed 0.7 oz/t gold, and several showings containing copper mineralization. Late in 1997, geochemical soil results defined a large gold, silver, copper, and molybdenum anomaly west of the Eagle Vein and east of Teck's 1996 drilling. The strongly anomalous area is covered with forested overburden and is virtually unexplored. Intensive prospecting of the soil anomaly uncovered several float boulders containing tourmaline-rich porphyry copper-style mineralization with significant gold values.

In addition to the Teck drill intersections on the Eagle Vein, re-logging of a 1992 underground drill hole led to the recognition of a native gold-bearing quartz vein intersection that plots up within the projected strike of the vein. A Kenville Gold Mines Ltd. 1945 drill hole may also have cut the vein. However, Kenville's follow-up drill holes were unable to locate the vein due to the mistaken belief that it dipped to the east. Three new drill sites were selected and 250 metres of access road constructed to prepare for a 1998 drill program. A geological compilation of historical Poorman Mine data in early 1998 identified several areas within the old mine that could host potential ore reserves. Drill exploration below the Hardscrabble Vein and in the vicinity of the Jewelry Box stope on the Flat Vein will undoubtedly encounter more high-grade ore. The old prospector's saying of "The best place to look for a new mine is beside an old mine" best captures the fascinating mining history of Eagle Creek.

Geology

The Eagle Creek area is underlain by a large, sill-like mafic intrusion known as the Eagle Creek plutonic complex, which intrudes mafic volcanics of the Elise Formation of the Rosslund Group. The ore-bearing veins of the Kenville Mine are hosted within the Eagle Creek plutonic complex. The younger Silver King, Nelson, and Coryell intrusive suites occur peripheral to the Eagle Creek area, and are in part responsible for structural deformation and thermal metamorphism of the Eagle Creek plutonic complex.

The Rossland Group comprises a succession of arc-derived mafic volcanic rocks and associated clastic sediments of Early Jurassic age. It extends in an arcuate belt south from Nelson to Salmo and west to the Rossland-Trail area. The Nelson-Rossland arc is centred on an ancient zone of weakness that has controlled sedimentation, volcanism, intrusives, deformation patterns and ore deposits. The Rossland Group includes a basal succession of fine to coarse-grained clastic rocks of the Archibald and Ymir Formations, shoshonitic mafic volcanic and epiclastic rocks of the Elise Formation, and overlying marine sediments of the Hall Formation. The succession was deformed in the Early Jurassic in response to an easterly-directed episode of thrust faulting and folding resulting from a major terrain collision.

The Rossland Group is intruded by a variety of igneous rocks of various ages. A number of mafic, potassium-rich alkalic plutonic complexes within the Rossland Group are interpreted to be sub-volcanic arc granitoids, co-magmatic with the Elise Formation. These pre-tectonic intrusions include the Rossland monzodiorite, the Eagle Creek plutonic complex, and a number of small mafic plugs, dikes and sills scattered throughout the Rossland-Nelson area. Many of these are clearly associated with copper-gold mineralization, including the Eagle Creek gold veins, gold skarns, porphyry deposits, and the copper-gold rich massive pyrrhotite veins of the Rossland mining camp. There has been more than 84 tonnes of gold mined from veins in the Rossland monzonite.

The Eagle Creek plutonic complex is a sill-like, medium to coarse-grained mafic intrusion of dioritic to gabbroic composition. It locally grades into a leucocratic potassic diorite and also incorporates coarse ultramafic phases. The age of the complex is not definitely known but geological evidence indicates a similar age to the 190 Ma. Rossland Monzonite. Contacts of the Eagle Creek plutonic complex with the Rossland Group are generally sharp, locally marked by coarse-grained clinopyroxenites. A major contact between the dioritic complex and the Rossland Group is exposed on the east side of the Kenville Property. The contact dips moderately west, sub-parallel to foliation within the complex, and is marked by development of a coarse clinopyroxenite.

The Eagle Creek complex and the Rossland Group have a pervasive, irregular foliation pattern which trends north to northwest and dips westerly. The resulting gneissic metamorphic fabric has caused the Eagle Creek complex to be called "pseudodiorite" or "metadiorite" in the past. Foliation within the intrusive complex is contemporaneous and structurally continuous with the Silver King Shear Zone to the south. Projected further south, the Silver King Shear Zone merges with the Hall Creek Syncline fold axis, and probably the Rossland Fault Zone, thereby marking a deep, underlying ancient structure. Regional foliation patterns and shearing generally parallel the long axis of the arc, and dip inwards towards the centre of the arc. Gold veins in the Eagle Creek complex strike parallel to this trend, but dip eastwards, across foliation. The veins were formed from hydrothermal fluids generated initially by Early Jurassic regional compressive forces, and then circulated into an interconnected series of lower pressure extensional structures for deposition.

The Silver King intrusions are a series highly deformed foliated to massive feldspar porphyries which occur within the Elise Formation south of Nelson. Many are associated with significant gold, silver, and copper mineralization. Contacts with the Rossland Group rocks are either sharp and discordant or highly sheared. A number of felsic, potassic, mineralized alteration zones occur within the Eagle Creek complex and may be related to the Silver King intrusive event. In particular, a brecciated, pyritized, porphyritic felsic intrusive is located on the southwest corner of the Kenville Property and on the adjoining Josie claim. The felsic intrusion has a wide

alteration zone which hosts disseminated low-grade copper-molybdenum mineralization, and a few large, low-grade quartz veins up to 10 metres in width. The age of the Silver King intrusions is approximately 180 Ma., and marks the beginning of tectonic closure of the Rossland volcanic arc.

The Nelson intrusions are a major continental arc granitic suite comprised of granodiorite with lesser diorite and granite. The age ranges from 160 Ma. to 173 Ma. and the plutons show little internal deformation textures. The peripheries of the intrusions are often proximal to or associated with gold, copper and silver mineralization.

The Coryell intrusions are an alkaline, syenitic suite of granitic rocks related to Tertiary extensional tectonism and eruption of the Marron volcanics. The age is dated at 51 Ma. and the plutons are generally undeformed. Epithermal gold veins, skarns and possibly other styles of mineralization are related to this intrusive episode. A small, undated granitic intrusion with abundant quartz veins, pyritization, and scattered molybdenum mineralization is present along the faulted western edge of the Eagle Creek complex in 49 Creek.

Many Tertiary-aged lamprophyre dikes of various compositions are present in the Eagle Creek area. The generally trend north to northwest, dip steeply, and range from a few centimetres to a few tens of metres thick. Mineralogy of the lamprophyres varies from biotite to hornblende or pyroxene-dominant types within a groundmass of plagioclase, orthoclase, olivine, calcite, chlorite and rock fragments. The dikes commonly occupy faults or fracture zones, and can occur in parallel, interconnected swarms. Within the Kenville Mine, structures hosting lamprophyre dikes often cut and offset the earlier gold veins.

Mineralization

Gold mineralization at the Kenville Mine is primarily hosted within a series of quartz-sulphide veins occupying parallel extensional fractures within a one kilometre wide zone. The main productive veins were, from east to west, Beelzebub, Granite, Greenhorn, Midway, Yule, Flat, Poorman, Hardscrabble and Venango. Strike of the veins trends in the north to northwest quadrant, and dips vary from 20 to 75 degrees to the east, averaging about 45 degrees. The Flat Vein is an exception to this, trending east-west and dipping very slightly to the south. The new Eagle Vein is also an exception, with a northerly strike but dipping moderately to the west with the regional foliation.

The veins vary in width along strike and down dip, up to a maximum observed width of 2.6 metres in a single vein. Multiple vein silicified zones are uncommon but known to exist in the mine, and can reach more than 10 metres in aggregate width. Multi-vein intersections, such as the junction of the main veins with flatter dipping footwall offshoots, often controls the rake of high-grade ore shoots within the veins and can host bonanzas in free gold. The Flat Vein intersects the Hardscrabble, Hardup, Poorman, Yule, Midway and 225 vein structures. The rich Jewelry Box stope on the Flat Vein is situated near a junction with the Hardscrabble Vein. The 217 stope on the Flat Vein is situated near a projected junction with the Poorman Vein. The remaining undeveloped intersection areas on the Flat Vein are a prime exploration target for developing high-grade ore reserves. It is interesting to note that the bulk of the ore mined from the veins had a shallow plunge to the south, parallel to the dip of the Flat Vein.

The main vein structures can be traced for more than 500 metres along strike, although pinching and swelling of the veins creates economic mining boundaries. To depth, some veins appear to

flatten in dip and narrow in width, although gold grades are still excellent. Very little drill exploration has been done below the lower 2570 mine level, and in particular, none under the south end of the Hardscrabble Vein workings. This area is also a prime target for developing new high-grade ore reserves.

Mineralogy of all the veins is similar, containing quartz, sulphides, and native gold. Native gold in small specks is quite common, and large bonanza masses have been found during mining. The oreshoots are rich in pyrite, chalcopryrite, sphalerite, galena and scheelite. In particular, the occurrence of galena and sphalerite in a vein usually marks the presence of rich gold ore. Although the historic mining grade in much of the mine averaged about 0.5 oz/t, some oreshoots assayed up to 10 oz/t across a mining width. Vein gangue is massive white quartz, with lesser potassium feldspar, calcite, and black tourmaline. Chloritized wallrock fragments are common in some veins, and are the result of a secondary tectonic episode that sheared and recrystallized the veins. Remobilization of the sulphide minerals and gold during this episode resulted in structurally controlled concentrations within the original veins.

Given the known structural and mineralogical complexities of the productive vein systems, comparatively little weight in reserve calculations was historically given to drill intersections. Due to the "nugget effect" from native gold in assay samples and variability in vein width, underground bulk sampling was the preferred method of testing the veins, using the classic "drill for structure, drift for values" development plan. The Eagle Vein is located about 150 metres west of the Hardscrabble Vein on the 2570 level, and would require a new crosscut drift from the mine workings to facilitate underground bulk sampling.

A second type of mineralization is present on the Kenville Property, which was the focus of Teck's exploration program. The second type consists of broad zones of disseminated copper mineralization with gold, silver and molybdenum values, hosted within sheared and altered diorite and structurally conformable to foliation. This style of mineralization is accompanied by an alteration pattern typical of many porphyry copper deposits. The mineralogy of the zones is distinct and is often marked by abundant secondary copper oxides and occasionally native copper. Oxidization persists to the bottom of the deepest drill holes to date, due to deep groundwater circulation through the highly fractured rock. Mineralogy includes chalcopryrite, bornite, chalcocite, cuprite, native copper, specular hematite, magnetite, pyrite, molybdenite and several oxide minerals.

The geochemical soil grid located a large copper, gold, silver and molybdenum anomaly, which may overlie a zone or zones of foliation-conformable porphyry copper-style mineralization. The soil anomaly is located near the periphery of the previously mentioned felsic intrusion in a virtually unexplored area. The anomalous area is over 800 metres in strike length and 250 metres in width, and is open to expansion. Maximum assay values encountered in the soil samples were 6213 ppm (0.62%) copper, 1970 ppb (1.97 g/t) gold, 9.9 ppm (9.9 g/t) silver, and 68 ppm molybdenum. This area has the potential to host a large, bulk-tonnage open pit mineral deposit. Further detailed soil geochemistry followed by geophysics, machine trenching and eventually diamond drilling will be used to explore this significant new target.

Operating Plan

In 1998, the company plans to enlarge the soil geochemical grid to explore and expand the present anomalies. Magnetometer and VLF-EM surveys, machine trenching, surface prospecting and geological mapping will be used to follow-up the anomalies. A diamond drill program is

planned to investigate the Eagle Vein and three drill sites have been selected and prepared. The Kenville Mine will be subject to a detailed geological evaluation to determine current and prospective ore reserves.