# SOUTH-CENTRAL REGION

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## SUMMARY

- Exciting new stratiform base-metal massive sulphide discoveries were made on the **Fox** property (Photo 1) near Merritt, on the **Spire** claims north of Revelstoke, and on the **Broken Hill** property near Blue River.
- Large drilling programs were mounted on the Afton and Ann North porphyry copper-gold projects.
- Construction of the **Ashcroft** roofing granule plant of I.G. Machine and Fibers took place during the year. Quarrying and plant start-up are slated for mid-2001.
- Exploration activity rebounded slightly in 2000 with \$3.5 million in spending (vs. \$2.5 million in 1999), 20 000 metres of drilling (versus 12 000 metres) and 8 major projects (versus 7).
- Claim staking was relatively strong, with over 6700 new mineral claim units recorded (versus 5600 in 1999). A mini-staking rush around the Fox discovery between Merritt and Kamloops (1450 units) was partly responsible for the increase.

### **EXPLORATION TRENDS**

Exploration indicators for the South-Central region improved moderately in year 2000. Exploration and development spending (Figure 1), metres of drilling (Figure 2), and number of major projects (Figure 3) were all up. Exploration spending for 2000 is estimated at \$3.5 million while drilling activity increased to about 20 000 metres. There were eight major exploration projects (Table 1 and Figure 5).

Large drilling campaigns on the Afton mine and Ann North porphyry copper-gold projects, and renewed interest in stratiform, base-metal massive sulphide targets triggered by the new discoveries stimulated this improvement. Higher prices for platinum group metals (PGMs) resulted in one major project (Clearwater) and grassroots work on several properties, and increased interest is anticipated in the coming year. Junior companies again led the way in exploration spending, although major companies including Teck Corp., Rio Algom Inc., Highland Valley Copper, Imperial Metals Corp. and Inmet Mining Corp. were also active.

A total of 6755 claim units were staked in the region between January 1 and December 31, 2000, the highest annual figure in the last ten years (Figure 4), and forfeited claims were down to 4333 units. This resulted in a net 50 000 hectare gain in good-standing tenure in the region.



Photo 1. Gitennes Exploration Inc. geologists at the Blacktop zone (Fox property) beside the Coquihalla highway north of Merritt. Massive sulphide mineralization occurs in the cut.

### MINES

The **Highland Valley Copper** (HVC) operation (Photo 2), a partnership of Cominco Ltd. (50%), Billiton Plc. (33.6%), Teck Corp. (13.9%) and Highmont Mining Co. (2.5%), expects to produce a record amount of copper in year 2000.

Mining low-grade porphyry coppermolybdenum-gold-silver ore, the operation employs about 950 people. During the year the HVC bene-



Figure 1. Annual exploration spending, in millions of dollars, South-Central Region.



Figure 2. Annual exploration and development drilling, in thousands of metres, South-Central Region.



Figure 3. Number of major exploration projects per year, South Central Region. Major projects are those with mechanical disturbance (e.g. trenching or drilling) and expenditures exceeding \$100 000.



Figure 4. Number of new claims units staked versus claim units forfeited per year, South-Central Region. Source: Mineral Titles Branch.

fited from higher copper prices, a substantial increase in production and sales, and a three per cent reduction in operating costs compared with unit costs prior to the May-September 1999 shutdown. Mine closure is forecast for March, 2009 based on remaining reserves, although the feasibility of a three year extension is being studied. This would involve a push back of the southeastern pit wall and deepening the Valley pit. In terms of exploration, HVC completed a large IP survey south of the Highmont mine in 2000, and \$250 000 in "faint hope" exploration spending is budgeted for 2001 (Kamloops Daily News, December 21, 2000).

For its 50 per cent share in the mine, Cominco Ltd. reported a \$36 million operating profit on revenue of \$227 million for 2000. Total production for the year for the mine was 190 600 tonnes of copper metal, 2000 tonnes of molybdenum metal, 2 262 400 ounces of silver and 15 800 ounces of gold contained in concentrate (Cominco Ltd., Fourth Quarter Report, January 31, 2001).

Numerous small to medium-sized industrial mineral quarries operated throughout the region during the year (Figure 5). The Kamloops cement plant and **Harper Ranch** limestone quarry of Lafarge Canada Inc. operated intermittently, producing about 115,000 tonnes of cement, or roughly 50 per cent of capacity. Lafarge also draws materials from the **Falkland** (gypsum) and **Buse Lake** (silica-alumina rock) quarries. In 2001, production at the Kamloops plant is forecast to be about 60 to 70 per cent of capacity. At **Pavilion** near Lillooet, Graymont Western Canada Inc. (formerly Continental Lime Ltd.) operates a limestone quarry and lime kiln. The operation



Figure 5. Operating mines, major exploration projects and new discoveries, South-Central Region. 2000.

Property	Operator	NTS	MINFILE #	Commodities	Target/Deposit Type	Work Done
Afton Mine	DRC Resources Corp.	92I/10E	092INE023	Cu, Au, Pd, Ag	Alkalic Porphyry	22 ddh, approx. 8500 m
Ann North	GWR Resources Inc.	92P/14W	092P115	Cu, Au	Porphyry	25 ddh, 5051.2 m; geol
Clearwater (Golden Loon)	Cusac Gold Mines Ltd.	92P/08E	N/A	Pt, Pd, Au, Cr	Ultramafic	230 m trenching; IP, 11 km geochem
Elk (Siwash North Mine)	Fairfield Minerals Ltd.	92H/16W	092HNE096	Au, Ag	Vein	12 ddh, approx. 1400 m; prosp; geochem
Pellaire	Zelon Chemicals Ltd.	920/04E	0920/045	Au, Ag	Vein	Bulk sample
Spire	Imperial Metals Corp.	82M/10E	082M278	Cu, Zn, Ag	VMS	7 ddh, 720 m; geol; prosp
Wood	Lakewood Mining Co. Ltd.	921/09W	092INE165	Cu	Alkalic Porphyry	5 ddh, 1417.93 m
Zeo (Bromley Vale)	Zeo-Tech Enviro Corp.	92H/07E	092HSE166	Zeolite	Industrial Mineral	2200 tonne bulk sample; engineering and marketing studies

Table 1. N	lajor Exploration	Projects, South-	Central Region, 2000.
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Photo 2. Blast in Valley pit, Highland Valley Copper.

produces about 200 000 tonnes of lime per year, mainly for use in pulp mills. Near Merritt, M Seven Industries Ltd. produces magnetite on an intermittent basis by reprocessing tailings from the old **Craigmont** copper mine. The magnetite is used in coal washing plants throughout western Canada.

Western Industrial Clay Products Ltd. operates the **Red Lake** quarry which supplies diatomaceous earth for its plant in Kamloops. The company produces kitty litter, barn deodorizer and other industrial absorbents. Bentonite from the **Bud** quarry at Princeton is used as a clumping agent in some of the company's products. Western Industrial Clay is also evaluating the feasibility of mining and selling "leonardite" or "humate" soil conditioner from a humic acid-bearing, carbonaceous layer which occurs between two diatomaceous earth layers in the Red Lake quarry.

The Mountain Minerals Division of Highwood Resources Ltd. owns the Z1 zeolite quarry near Cache Creek. Intermittent production from the quarry supplies the agri-food and industrial absorbents markets. A few kilometres to the east, C<sub>2</sub>C Zeolite Corp. mines zeolite-bearing shale from the Z2 quarry, and processes the rock into various absorbent products at its plant in Ashcroft. Fourth-quarter sales were reported by the company to be up to 620 tonnes, however, this figure includes an undisclosed tonnage sold from the company's operation in Nova Scotia. Deodorizers, feed binders, cat litter and industrial absorbents are sold in bulk and bagged form under the trade names Muckers Mate, Cage, Cage T408 and Zippity Doo. The company is also developing a commercial process for producing lightweight zeolite concrete.

At Kelowna, The Kettle Valley Stone Company, a subsidiary of L. & D. Petch Contracting Ltd., expanded production of its flagstone, facing stone, ashlar and landscape rock products from the nearby **Nipple Mountain** (photo 3), **Canyon** and **Gemini** quarries. These quarries produce the "Mountain Ash" "Rainbow granite" and "Shadow Ridge" product lines from Tertiary dacite ash, Okanagan gneiss, and Tertiary columnar basalt respectively. Perhaps most significantly, Kettle Valley has developed a technique to produce lightweight "thin-veneer" wallstone (Photo 4) using all of its different rock types. The thin veneer product includes corner pieces and



Photo 3. Nipple Mountain dacite ash quarry, Kettle Valley Stone Company..

is reported to compare favourably, both in terms of cost and ease of installation, with imitation or "cultured" stone products. Kettle Valley employs between ten and twenty people in quarrying, plant and sales jobs.

During the year, the dormant **Similco** porphyry copper-gold mine and mill complex at Princeton and the Invermay project near Hope were purchased by Leader Mining International Inc. from Imperial Metals Corp. At the time of writing, Leader has paid \$350,000 with a final \$700,000 payment due on February 28, 2001. Upon closing Leader will have a 100% interest in both projects with Imperial retaining a 3% net smelter return. According to Imperial, Similco has a resource of 142 million tonnes grading 0.397% copper in the area of pits 2 and 3 on the Copper Mountain side of the property. Leader plans to conduct a \$3 to \$5 million study over the next 12 to 18 months to see if it is feasible to restart the mine, which has been on care and maintenance since September, 1996.



Photo 4. Thin veneer corner piece, Kettle Valley Stone Company.

The dormant **Blackdome** gold-silver mine of Claimstaker Resources Ltd. remains on care and maintenance after operating briefly from October, 1998 to May 1999. The mine closed due to low gold prices, poor recoveries and downward revision of the estimated proven and probable reserves (Claimstaker Annual Report, 1999). In 2000, the company wrote down the value of the property and removed camp buildings. The 200 tonne-per-day mill remains on site in anticipation of an improvement in the price of gold and future exploration for additional reserves.

### **DEVELOPMENT PROJECTS**

Development of the 250 000 tonne per year **Ashcroft** basalt quarry and roofing granule plant proceeded throughout the year. Work mainly comprised plant construction. Initial quarrying and plant start-up are scheduled for mid-2001. The project is owned by I.G. Machine and Fiber Ltd., a subsidiary of IKO Industries Ltd., one of the largest roofing shingle manufacturers in Canada. Roofing granules will be produced from Nicola Group basalt. The basalt will be crushed and sized on site, and the granules will then be coloured (painted) with different hues prior to being shipped to IKO shingle plants in Calgary and Sumas, Washington. The company estimates the operation will employ 40 to 60 people once full production is attained.

On the Zeo claims at Princeton, Zeo-Tech Enviro

Corp. mined a 2200 tonne bulk sample of zeolite from the Bromley Vale deposit. The company has applied for a mining lease and is preparing a permit application for a 100 000 tonne per year quarry and micronizing plant. Zeo-Tech has formed a joint venture with  $C_2C$  Zeolite Corp. for research and development of agricultural and industrial uses for its zeolites.

Also near Princeton, the **Tulameen** thermal coal project of Pacific West Coal Inc. received a permit to operate a 100 000 tonne-per-year open-pit mine and washing plant. A ten tonne sample was shipped to Calgary for washability studies. Logging of part of the site took place late in the year, and the company plans to extract a 5000 tonne bulk sample during 2001. The proposed mine is located directly north of, and on strike from, the former producing. Blakeburn Collieries (1912-1954), which produced from underground and open-pit workings. The coal is high volatile bituminous B and C in rank and the company reports that preliminary studies indicate that it can be cleaned to produce a product with acceptable levels of ash, moisture, sulphur and energy content. Potential markets are industrial users in the Lower Mainland, Northwestern United States and overseas. The project could initially employ up to 30 people.

The **Prosperity** gold-copper porphyry deposit of Taseko Mines Ltd., is located southwest of Williams Lake. An environmental review of the project under the British Columbia and Canadian Environmental Assessment Acts has been stalled since mid-1998, and the company is now focused on restarting its Gibraltar copper mine north of Williams Lake. Prosperity reserves stand at 633 million tonnes grading 0.253% copper and 0.466 g/t gold. Recent feasibility work suggests the project could operate at a milling rate of 70 000 tonnes per day with an operating life of 19 years.

There was no activity on the **Getty North** porphyry copper deposit of Getty Copper Corp., although a \$430 000 financing was completed late in the year. The deposit is estimated to contain a resource of 72.1 million tonnes grading 0.31% copper, which includes a higher grade oxide resource of 10.0 million tonnes grading 0.40% copper. Getty plans to restart a feasibility study on mining and processing of the oxide resource by the solvent extraction - electro-winning (SX-EW) process.

Quinto Technology Inc. (formerly The Quinto Mining Corp.) continued with efforts to raise funds

to develop its 75 000 tonne per year graphite-sericite project at **Lumby**.

### **EXPLORATION PROJECTS**

### STRATIFORM BASE-METAL TARGETS

Exciting new discoveries were made on the Spire, Fox and Broken Hill properties in year 2000. All three will receive drilling in 2001 and additional staking and grassroots prospecting is expected nearby.

Besshi-type VMS copper-zinc mineralization was the focus of a grassroots prospecting program by Imperial Metals Corp. near the dormant Goldstream mine, north of Revelstoke. The company evaluated possible Goldstream-equivalent stratigraphy on the Spire claims, and discovered a potentially significant new copper-zinc-silver showing 7.5 kilometres southwest of the Goldstream mill. The showing was found on a new logging road in September, 2000 by Craig Lynes, a prospector contracted by Imperial. Grab samples ran up to 8.03% copper, 7.89% zinc and 51 g/t silver. Seven drill holes tested the showing late in the fall; the best intersections were 3.12 metres grading 0.51% copper and 1.08% zinc, and 3.7 metres grading 0.24% copper and 1.49% zinc. Additional drilling is planned for 2001.

The discovery is exciting because the mineralization is similar to Goldstream ore and the geological setting is similar that of the Goldstream deposit. In addition, a new orebody could easily be brought into production using the existing mothballed mill, which is said to be in good condition. Goldstream operated from 1983 to 1984 and between 1991 and 1996, milling 2.21 million tonnes at a recovered grade of 3.54% copper, 0.36% zinc, and 11.86 g/t silver.

The **Fox** claims, covering a new, high-grade copper-zinc massive sulphide showing, were staked in July by prospector/geologist Michael Moore. The property was quickly optioned by Gitennes Exploration Inc. who quietly staked a large block of claims covering perceived favourable stratigraphy. Now called the "Blacktop zone", the prospect is located in a roadcut on the west side of the Coquihalla highway, 27 kilometres north of Merritt (Photo 1). Mineralization has been traced in outcrop and rubble for 90 metres along a north-south direction. It is covered to the south by rip rap, and to the north plunges under the highway. Hand trenching in the fall exposed a 1 to 1.3 metre-thick, west-dipping massive sulphide layer that assayed 17% zinc, 1.6% copper, 0.47% lead, 76 g/t silver and 0.49 g/t gold across 1.1 metres. The massive sulphide is associated with sericite-carbonate alteration and is overlain by chert and barite. Host rocks are intermediate (and felsic?) volcanic rocks of the Western volcanic facies of the Upper Triassic Nicola group (Moore and Pettipas, 1990). Gitennes carried out a 526 line-kilometre airborne magnetic and electromagnetic survey, conducted geological mapping, and sampled stream sediments throughout the property. Subsequently, they carried out detailed IP and EM surveys in the area of the showing.

A small staking rush followed announcement of the Fox discovery, and by year end nearly 1450 claim units had been staked on the 92I/02 and 07 mapsheets. The largest land positions were acquired by Gitennes Exploration Inc., Fjordland Minerals Ltd. and Platinova A/S. Several other companies or individuals also staked key ground including Lloyd Addie, who staked the **LD** barite-gold-silver-zinclead-copper prospect at Iron Mountain, and Lorne Warner who staked the **Iron King** iron prospect south of Nicola Lake. To the south near Tulameen, the **Cousin Jack** showing (Rabbitt Mountain) and several other possible VMS prospects in the Nicola group were staked.

The Broken Hill property, located seven kilometres northeast of the village of Avola on the North Thompson River, was staked in September, 2000. It covers a series of new zinc-lead-silver prospects found by prospector/geologist Leo Lindinger, who was supported by the provincial Prospectors Assistance Program. In September, Lindinger optioned the property to Cassidy Gold Corp. who conducted additional prospecting, soil sampling and a gravity survey to define targets for an initial drill program in early 2001. The property covers the Vista, Navan and Mike prospects which are exposed by new logging road cuts along a 5.5 kilometre northerly trend (Photo 5). Mineralization occurs in highly metamorphosed sedimentary rocks and consists of thin (20-35 centimetre) layers of massive sphalerite, galena and pyrite adjacent to marble (locally altered to skarn near pegmatite dikes) and pyritic quartzite. Grab samples run up to 24.3% zinc, 4.89% lead and 62.6 g/t silver. The mineralization is very similar in setting and metal content to other nearby Shuswap-type occurrences such as Ruddock Creek and CK, which occur less than 25 kilometres to the east and west respectively. At those deposits, local thickening on



Photo 5. Panorama of the Broken Hill zinc-lead-silver property of Cassidy Gold Corp. The Vista and Navan showings occur along the road at the bottom of the left-hand and right-hand logged areas respectively.

fold noses created wider zones where modest tonnages of potentially ore-grade mineralization have been defined.

Teck Corporation's **Red Hill** property, located near Ashcroft, was explored with a small EM survey, whole rock geochemistry and geological mapping. Previous drilling on the property by BP Selco intersected 7.7 metres of VMS-style mineralization grading 2.5% copper, 2.8% zinc, 77 g/t silver, 0.37 g/t Au. The property is underlain by a package of Lower Triassic bimodal volcanics and sediments cut by, synvolcanic diorite. Recently, this package has been interpreted to be equivalent to the Kutcho Assemblage of northern British Columbia (Childe et al., 1997).

### PORPHYRY AND RELATED TARGETS

Over half the spending in the region in year 2000 targeted porphyry deposits . West of Kamloops, deep drilling beneath the **Afton** pit was conducted by DRC Resources Corp. (Photo 6) The former Teck Corporation copper-gold mine operated from 1977 to 1987, after which production came from the nearby Crescent, Pothook and Ajax pits. The Afton-Ajax operation was permanently closed by Teck in 1997 and reclamation of the site is ongoing. Much of the mining and milling equipment has been sold, although the mill building and heavy mill machinery are still on site.

After Teck let its mining lease lapse in 1999, the Afton-Pothook portion of the property was re-staked and optioned to DRC. DRC's work this year tested the down plunge extension of the steeply southwest-plunging Afton orebody beneath the pit bottom, a zone which had been previously tested by only ten holes drilled by Afton Mines/Teck Corp. in 1973 and 1980. These holes indicated a resource of 10.5 million tonnes grading 1.52% copper and 0.03 g/t gold,

and in-house scoping studies in the 1980s evaluated the potential economics of mining the zone using bulk underground mining methods.

The DRC drilling, totaling some 8000 metres in 22 holes by year end, appears to confirm and expand the previous Teck-defined resource. Most of the 2000 holes were drilled subparallel to the mineralized zone and had impressive intersections. Hole 2K-2, for example, cut 234.9 metres grading 2.37% copper, 1.1 g/t gold, 0.1 g/t palladium, and 0.89 g/t silver. Mineralization comprises mainly bornite and chalcocite with minor chalcopyrite and native copper. Much of the better mineralization is hosted in a breccia zone with volcanic and intrusive fragments and gouge. Early in 2001, DRC announced that it had hired Behre Dolbear and Company Ltd. to undertake a scoping study to evaluate mining, processing, infrastructure and permitting considerations, and to provide an estimate of capital and operating costs for an underground mine at Afton.



Photo 6. Diamond drill (lower left) in the Afton pit.

On the Ann claims (Ophir Copper property) northeast of Lac La Hache, GWR Resources Inc.

drilled 25 holes totaling 5051 metres on the **Ann North** porphyry copper-gold prospect and adjacent targets. The Ann North mineralization consists of chalcopyrite, pyrite, bornite, chalcocite and minor native copper in fractures, veinlets and breccias hosted by porphyrytic monzonite. Pervasive potassium feldspar flooding, quartz and tourmaline veining, and local biotite and sericite alteration have also affected the rock (GWR Resources Inc. News Release, January 15, 2001). The best hole, DDH-00-15, had an intersection of 0.20% copper and 0.30 g/t gold over 125 metres, and many of the other holes had anomalous copper or gold values.

Dave Ridley, a Prospectors Assistance grantee, conducted soil sampling and prospecting on the **Fox 1 to 6 claims** north of Canim Lake and 25 kilometres east of the closed Boss Mountain molybdenum mine. Ridley further outlined an interesting new molybdenum-tungsten-zinc skarn prospect which he discovered late in the 1999 field season. Mineralization consists of coarse-grained molybdenite, lesser scheelite, pyrite, sphalerite and rare chalcopyrite hosted in garnet-diopside-quartz-vesuvianite skarn and in quartz veins cutting the skarn. Grab samples from scattered outcrop exposures returned values of up to 3% molybdenum and 1.6% tungsten from subcrop and float boulders over about 1000 metres of strike length.

### **VEIN TARGETS**

Lower gold prices in recent years reduced interest in precious metal vein deposits. Nevertheless, several properties were active. Twelve holes were drilled on the **Elk** property, located east of Merritt, by Fairfield Minerals Ltd. The drilling tested the extension of the Siwash North vein and several other narrow, high-grade gold-silver veins hosted in granitic rocks. Production from the Siwash North vein between 1992 and 1994 totaled more than 51,000 ounces gold.

At the **Pellaire** gold-silver project, located southwest of Williams Lake, Zelon Chemicals Ltd. conducted surface mining from the number 3, 4 and 5 veins. The material was stockpiled at the site of small gravity concentration plant which is being constructed for operation in 2001.

At East Barriere Lake, north of Kamloops, the **Pongo** property of Larry Ovington was optioned by Verdstone Gold Corp. and Molycor Gold Corp. The claims cover the Kajun showing (MINFILE 82M058), a polymetallic vein hosted by a thrust fault

in Eagle Bay Assemblage volcanic and sedimentary rocks. Chip samples collected by consultant D. Blanchflower assayed up to 5.8 g/t gold, 263 g/t silver, 9.75% lead, 7.89% zinc and 0.24% copper over two metres. The high precious metal grades of the mineralization and its association with a thrust fault suggest a similar setting to the Samatosum mine, 13 kilometres to the south.

Working on a Prospectors Assistance Grant, Gary Polischuk (Photo 7) searched for mesothermal gold-silver veins on the **Dave claims**, located on Mt. Brew, 8 kilometres southeast of Lillooet. Diligent prospecting located several new areas where visible gold is present in float of quartz-sulphide vein material or where gold can be panned from rusty soil. The new occurrences are locally associated with zones of iron carbonate-silica-mariposite (listwanite) alteration.



Photo 7. Prospector Gary Polischuk examining quartz veins on the Dave claims near Lillooet.

### MAGMATIC TARGETS

The strong increase in the price of platinum group metals in 2000 resulted in increased exploration and grassroots prospecting for these metals, primarily in ultramafic rocks. The **Dobbin** property at Whiterocks Mountain northwest of Kelowna was expanded through staking in early 2000. The claims, which are owned by Molycor Gold Corp. and Verdstone Gold Corp., cover the Whiterocks complex, a multiphase mafic alkalic complex. Drilling in 1997 intersected numerous wide zones of low-grade copper-platinum-palladium mineralization. The best hole, 97-21, intersected 111 metres grading 0.19% copper, 0.410 g/t platinum and 0.352 g/t palladium, including 15 metres grading 0.54% copper, 1.316 g/t platinum and 0.949 g/t palladium. Work in 2000 included prospecting, geological mapping and soil surveys which resulted in discovery of a new mineralized zone, which has not yet been tested with drilling or trenching.

Cusac Gold Mines Ltd. explored the Clearwater Platinum property (Golden Loon claims) near Little Fort with an excavator trenching program, and IP, VLF, magnetic and geochemical surveys. The property covers a six to ten kilometre-long, compositionally zoned, ultramafic body which occurs between the Upper Triassic Nicola Group and the Lower Jurassic Thuya batholith. The year 2000 work was designed to evaluate the PGM potential of the central part of the ultramafic complex, and to follow-up on a sample of dunite rubble from a road deactivation trench, collected by J.D. McDougall in 1999, which assayed 13.7 g/t platinum. Numerous chargeability and soil anomalies (nickel, cobalt, chromium, platinum and gold) were outlined by the 2000 work and these will be tested by a 1500 metre drill program in 2001.

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