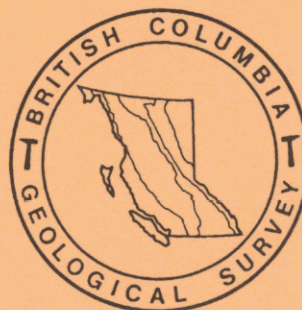




Ministry of Energy, Mines  
and Petroleum Resources  
Mineral Resources Division  
**Hon. Anne Edwards, Minister**



# **BRITISH COLUMBIA MINERAL EXPLORATION REVIEW 1995**

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*Information Circular 1996-1*



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## BRITISH COLUMBIA MINING, DEVELOPMENT AND EXPLORATION 1995 OVERVIEW

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### INTRODUCTION

Relatively high prices of copper (US\$1.30-\$1.40 per pound), gold (US\$380-\$390 per ounce), molybdenum oxide (US\$4-\$4.50 per pound) and silver (US\$5-\$5.50 per ounce) have led to increased value of output (approximately 57%) at existing mines. The **Eskay Creek** high-grade silver-gold mine began direct shipping ore by rail and ocean freight in January 1995. It is the first new metal mine to open in western Canada in several years. The **QR** gold project began production in June 1995. At the **Golden Bear** gold mine, the focus has turned to the potential for heap leaching of lower grade material. Significant new discoveries of both refractory and oxide mineralization have been made. After being in production since 1971, the **Island Copper** copper-molybdenum-gold mine closed at the end of 1995. Although no exploration or development work was carried out on the **Red Mountain** gold-silver project during 1995, an aggressive program is planned for 1996.

Production decisions are expected soon for the **Mount Polley**, **Kemess**, and **Huckleberry** projects, all porphyry copper±gold±molybdenum deposits. Total exploration expenditures in 1995 are estimated to be approximately \$88 million. Targets included many of the classic mineral deposit types for which British Columbia is known; for example, **Red Chris**, **Akie**, **Bralorne**, **Mount Polley**, **Polaris-Taku**, **Tsacha**, and porphyries in the **Babine Lake** area. Industrial minerals are receiving increasing attention with 1995 exploration expenditures estimated to be up slightly from 1994. The **Taurus** low-grade gold deposit is being explored for its heap-leach, bulk-mineable potential. The estimate for the number of claim units (approximately 32 800) recorded in 1995 also indicates an increase of about 8% in the level of activity over 1994; it is also the largest number since 1991. Several bulk sampling projects were carried out; some obtained revenue sales on a limited basis. A number of advanced projects in the Mine Development Assessment Process (now called Environmental Assessment Process) are in the feasibility stage. Some projects (e.g. **Cirque**, **Mt. Milligan** and **Mount Polley**) have received Mine Development Certificates and await production decisions.

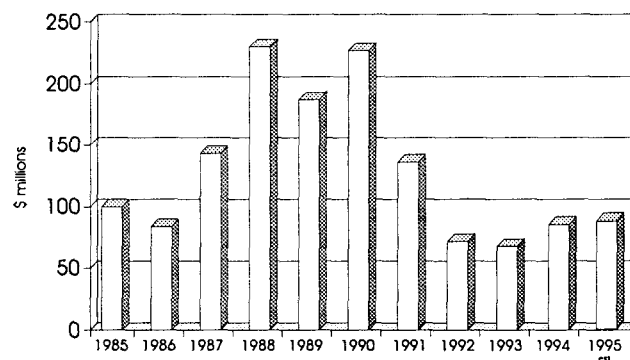
In 1995 the British Columbia government allocated approximately \$2.5 million for exploration under its **Explore**

**B.C.** program. The program is designed to assist and promote private sector mineral exploration, to extend the economic lives of existing mines and contribute to community stability in existing mining regions. The projects supported in 1995 have produced positive and encouraging results. The government funded an airborne geophysical survey over three specific areas in the East Kootenay region, designed to locate more Sullivan-type targets, as well as others.

### REGIONAL TRENDS

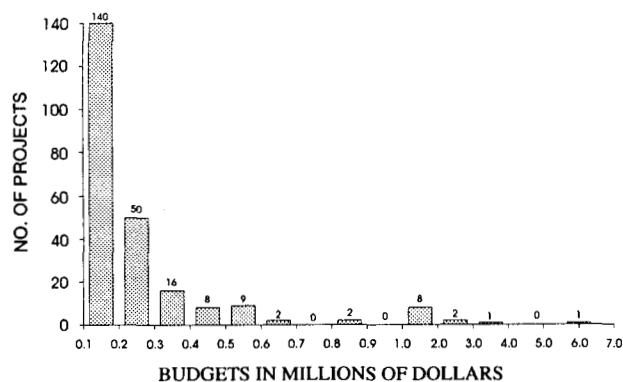
Preliminary estimates indicate that total expenditures on mineral exploration and development projects in British Columbia during 1995 will be approximately \$88 million, an increase of about 1% from 1994. As in previous years, it is estimated that over 40% of this total will be spent in the northwest part of the province.

Figure 1 illustrates the fluctuation of exploration expenditures over the past decade. The peak year 1988, with expenditures of \$225 million, coincided with the height of flow-through funding. In subsequent years, expenditures have shown a steady decline to a low of \$66 million in 1993; however, a significant increase to \$85 million was recorded in 1994. For the same ten-year period, the pattern of explo-

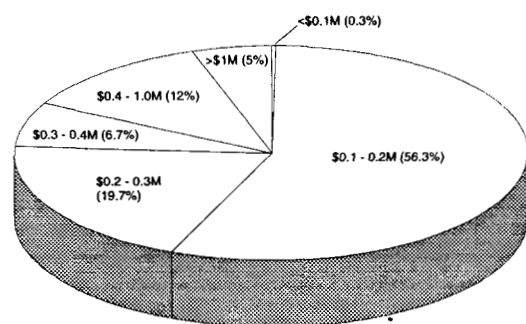


Source: MEMPR Land Management and Policy Branch

Figure 1. Mineral exploration expenditures in British Columbia: 1985 to 1995.



(a)



(b)

Figure 4. Estimated number of major projects (>\$1000,000) (a) by incremental \$0.1M; (b) by percentage of total expended.

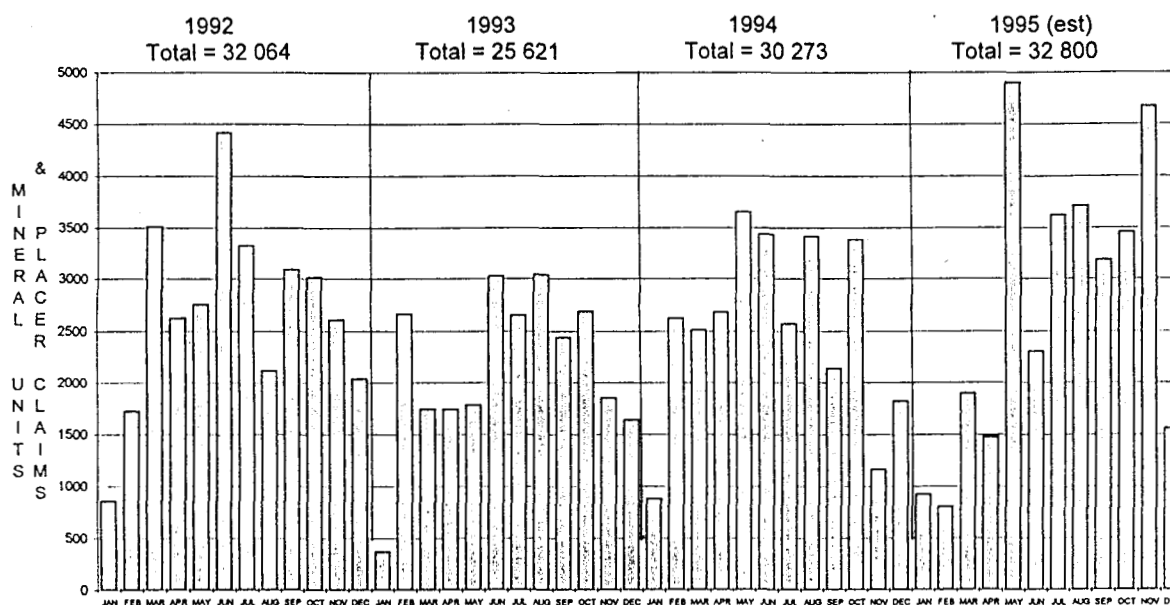
milling arrangements (Table 1; *see also* Operations). The **Table Mountain** gold mine continued to operate on a limited basis. The **Golden Bear** mine did not produce in 1995 but an aggressive exploration and development program was carried out (*see* Advanced Exploration and Development Projects).

The forecast value of solid mineral production for 1995 in British Columbia is \$3.48 billion, a 38% increase from 1994 (Table 2). Copper represents 32.2%, at a projected value of approximately \$1.12 billion, reflecting full production levels for **Similco**, **Gibraltar**, **Ajax** and **Myra Falls** mines (*cf.* 1994). Coal represents 28.4%, at a projected value approaching \$1 billion. The production of gold is forecast to be 19.8 million grams (636 600 oz) valued at \$340 million, up from 12.6 million grams (405 100 oz) last year, primarily due to significant new production from the **Eskay Creek** and **QR** mines. Silver output is forecast at 392 million grams (12.6 million oz) valued at \$88 million, up significantly due to new production at the **Eskay Creek** mine. Zinc production in 1995 is forecast to be 120 million kilograms worth \$175 million, lead output is forecast to be 50 million kilograms valued at \$45 million. The total metals value is up approximately 57% from the 1994 estimate. Value of production of industrial minerals is forecast to be \$61 million; structural materials are expected to account for another \$380 million.

## OPERATIONS

### METAL MINES

The **Eskay Creek** gold-silver mine, operated by Homestake Canada Inc. through 50.6%-owned Prime Re-



Source: MEMPR, Mineral Titles Branch

Figure 5. All mineral tenure recorded by month; 1992 to 1995. Note: High value for May 1995 reflects reverted Crown Grant sales and a release of a Regional Geochemical Survey by the Geological Survey Branch.

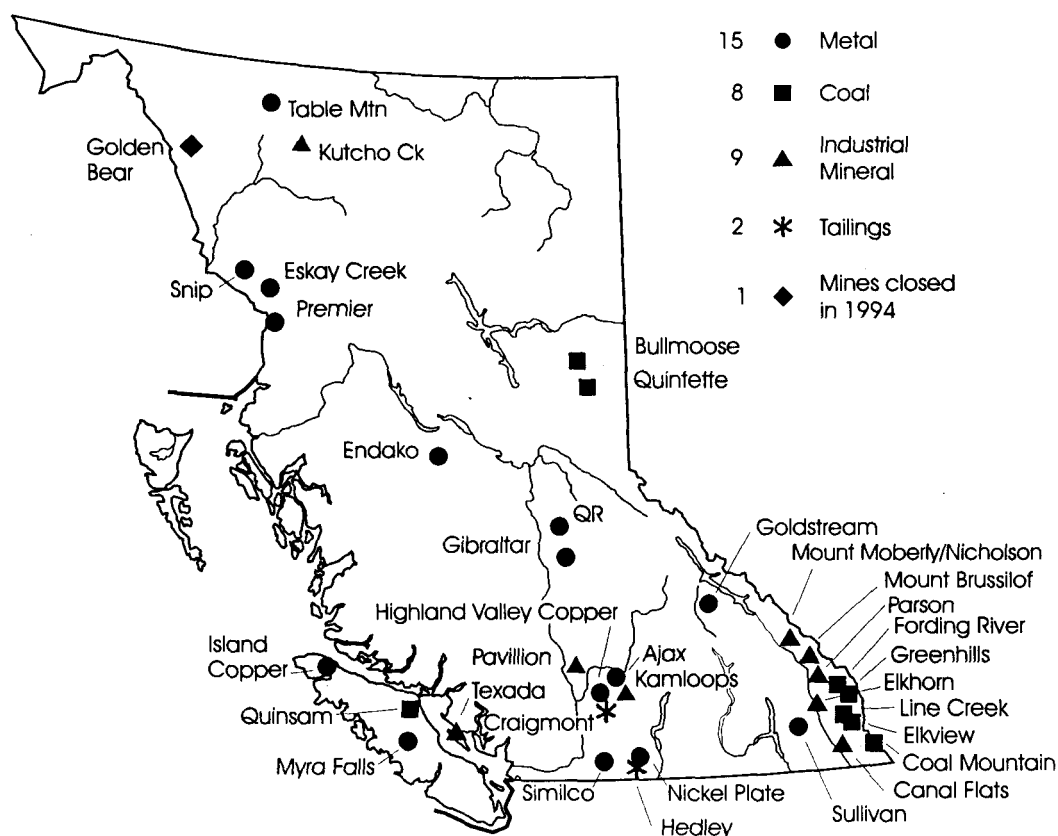


Figure 6. Operating mines in British Columbia - 1995.

sources Group Inc., started commercial production in January 1995 with proven and probable reserves for the 21B zone estimated at 1.09 million tonnes grading 65.14 g/t Au, 2949 g/t Ag, 5.6% Zn and 0.77% Cu. Eskay Creek is the fourth largest silver producer in the world, and one of the highest grade gold and silver deposits ever discovered in North America. Ore is being blended on site, trucked to load-out facilities, and shipped directly to smelters in Quebec and Japan, by rail and ship, respectively. Based on a production rate of 245 tonnes per day, Prime expects to produce 6220 kilograms (200 000 oz) of gold and 283 000 kilograms (9.1 million oz) of silver during 1995. In subsequent years, production is expected to average about 300 tonnes per day. Mining dilution, grades and production estimates have compared favourably with the feasibility predictions. An accelerated mine development program, implemented in April, has made more mining areas available, enabling Prime to optimize ore blending.

Exploration drilling at the minesite resulted in the discovery of high-grade mineralization (NEX zone) in what appears to be an extension of the northeast end of the main 21B zone orebody. Additional drilling is in progress to delineate this zone and underground development will be accelerated. Homestake Canada also completed a five-hole diamond drilling program on its Bonsai target, 10 kilome-

tres west of the mine, to test for down-dip mineralization over a surface strike length of 580 metres.

Mill start-up at the QR gold mine, located 70 kilometres by road southeast of Quesnel, was June 1, 1995. Drill-indicated ore reserves were estimated at 1.3 million tonnes grading 4.5 g/t Au. Kinross Gold Corporation has spent over \$20 million on construction to date. Operating cash costs are projected at US\$220 per ounce gold. Gross revenue is estimated at \$90 million in gold, and minor silver, over a five-year mine life, at a rate of about 1150 kilograms (37 000 oz) of gold recovered per year. Three separate orebodies, hosted in a gold skarn, have been discovered to date; there is good potential for additional discoveries. Initially, the Main zone, which contains an estimated 616 760 tonnes grading 4.4 g/t Au, will be mined by open-pit methods; Kinross expects the zone to be depleted at the end of 1996. In 1996, Kinross plans to drive a ramp from the pit wall of the Main zone to the hangingwall of the Midwest zone, a few hundred metres to the west. Production from the Midwest zone, with probable reserves of 440 800 tonnes grading 4.32 g/t Au, is expected to begin in October 1996. The West zone, with probable reserves of 168 700 tonnes grading 6.64 g/t Au, will be mined underground during the latter years of the mine's life. The mill facility was designed for 800 tonnes per day; early operation has achieved rates up to 1200 tonnes per day. Up to

of ore at a daily throughput of 35 825 tonnes. Production of cathode copper continued throughout 1994, with 2320 tonnes being recovered. Reserves estimated by the company at January 1, 1995 were 166 259 440 tonnes grading 0.291% Cu and 0.009% Mo. Gibraltar is expected to produce 30 400 tonnes of copper in 1995, at a daily mill throughput of 38 000 tonnes and an average cash cost of about US\$0.90 per lb. Reserves in the Pollyana zone have been increased by about 9 million tonnes at a grade of 0.33% Cu, reflecting the results of drilling completed in late 1994 on the GM claims. Drilling during 1995, totalling 3150 metres in 23 core holes, focused on induced polarization targets on two zones: the Pollyana - GM zone immediately east of the Pollyana pit, and the Connector zone between the Pollyana and Gib East zones. The latter was tested for the presence of near-surface oxide ore. In 1995 Gibraltar approved an expenditure of about \$1.3 million to recommission the molybdenum circuit. It was restarted in October and is expected to produce about 27 tonnes of molybdenum per month at a cash cost of about \$3.40 per pound.

The Homestake Canada Inc. **Nickel Plate** open-pit gold mine produced 2 554 kilograms (82 117 oz) of gold and minor silver from 1 269 800 tonnes of ore milled in 1994, at a daily throughput of 3570 tonnes. Reserves estimated by the company at January 1, 1995 were 2.9 million tonnes grading 2.64 g/t Au. Mining and milling are projected to cease towards the end of 1996. In 1995 Homestake drilled targets near Cahill Creek, testing a northerly trending zone extending from the French mine/Good Hope areas to the previously mined Canty open pit.

During 1994 the Princeton Mining Corporation **Similco (Copper Mountain)** mine produced 5570 tonnes of copper, 230 kilograms (7390 oz) of gold, and 1000 kilograms (32 825 oz) of silver from 2 752 300 tonnes of ore milled at a daily throughput of 24 500 tonnes (Note: Similco re-opened on August 18, 1994 after a suspension of operations in November 1993 due to low metal prices). During 1995, the mine is forecast to produce 18 200 tonnes of copper, 746.5 kilograms (24 000 oz) of gold and over 3110 kilograms (100 000 oz) of silver at a daily mill throughput of 23 580 tonnes. Reserves estimated by the company at January 1, 1995 were 135 600 000 tonnes grading 0.36% Cu plus gold and silver credits. During 1995 Princeton has milled ore from the low-grade stockpile and from the Ingerbelle East (extension) pit (phase 1), with estimated reserves of 10.8 million tonnes grading 0.32% Cu and 0.24 g/t Au. It was planned that 75% of the millfeed would come from the Ingerbelle pit by August, and this should result in a significant rise in head grades. Elsewhere on the property, Princeton drilled the Alabama zone, and planned to drill-test induced polarization targets on the Diamond Dot, located immediately west of the Alabama zone, P4 and Mill (east of pit 2) zones. The drilling will begin after feasibility studies are completed on Ingerbelle phase 2 or pit 3 expansions.

Production at the Westmin Resources Limited **Premier** gold mine during 1994 totalled 522 kilograms (16 800 oz) of gold and 5280 kilograms (169 700 oz) of silver from 164 175 tonnes of ore milled at a daily throughput of 450 tonnes. In addition, custom treatment, primarily of Snip mine concentrates, yielded additional gold and silver. Reserves estimated by the company at January 1, 1995 were 113 225 tonnes grading 8.23 g/t Au and 85.8 g/t Ag. Current production is 550 tonnes per day, two-thirds from Glory Hole fill recovered through a decline from 515-bench in the open pit, and one-third from pillars and ore on 4-level. Exploration targets underground include 5-level and the West zone above 3-level. Westmin also conducted an intensive assessment of all its holdings in the region.

At the **Goldstream** mine, Bethlehem Resources Corporation, which owns a 50% interest and is the operator, produced 13 500 tonnes of copper, 1550 tonnes of zinc and 4614 kilograms (148 345 oz) of silver from 348 660 tonnes of ore milled. Reserves estimated by the company were approximately 600 000 tonnes grading 4.2% Cu, 2.3% Zn and 18.0 g/t Ag as of January 1, 1995. In mid-July, milling operations were temporarily shut down following slow ramp development and poorer than expected ore recovery in the 250-metre panel. Milling resumed in September and is scheduled to continue until January 31, 1996 when the economic limits of the existing orebody will have been reached. Underground exploration drilling was conducted on the 300-metre and 250-metre levels. A surface drilling program was carried out on the C-1 zone, approximately 10 kilometres west of the mine, where encouraging results were obtained in 1994 drilling.

At the **Ajax** copper-gold mine, Afton Operating Corporation resumed production in September, 1994 after a three-year suspension in operations because of depressed metal prices. Production from the Ajax East pit, which contained approximately 3.63 million tonnes of ore grading 0.46% Cu and 0.34 g/t Au, totalled 3600 tonnes of copper and 245 kilograms (7885 oz) of gold from 931 000 tonnes milled at a daily throughput of 8700 tonnes. Reserves for the Afton-Ajax deposits estimated by the company at January 1, 1995 were 13 200 000 tonnes grading 0.42% Cu and 0.34 g/t Au.

In 1995 Afton announced that it will re-open the Ajax West pit, with about 9 million tonnes of the same grade as Ajax East, extending the mine life from December 1996 to about December 1998. Pushback stripping of the Ajax West pit is in progress, and some ore is already being milled. Definition drilling on the southeast side of the pit has yielded encouraging results. This may allow Afton to redesign and enlarge the final pit. Drilling was also carried out on the south side of the Ajax East pit. Teck Corporation has also outlined significant resources on the Rainbow porphyry project, located between the Ajax mine and the Afton

\$30 million and will have a capacity of 7 million tonnes per year. When commissioned, operating costs will be substantially reduced. Currently, clean coal production is 2.2 million tonnes metallurgical coal and 0.6 million tonnes thermal coal. A new pit is being developed on Horseshoe Ridge and the haul road to this area is under construction. Approximately 15 000 metres of exploration and development drilling were completed in 1995.

At the **Elkview** mine, Teck Corporation has submitted a new mine plan, encompassing Natal Ridge, for government approval. The plan will increase production from approximately 2.8 million tonnes per year to 5 million tonnes per year over a period of five to six years. In 1995 exploration was mainly in active pits and consisted of 77 drill holes totalling approximately 10 000 metres.

In the northeast, the **Bullmoose** mine (Teck Corporation, 60.9%; Rio Algom Limited, 29.1%; Nissho Iwai Coal Development (Canada) Ltd., 10%) expects to ship 2 million tonnes of coal in 1995. This includes 400 000 tonnes transferred from the Quintette contract. The arrangement has been renewed for an additional two years, ensuring that Bullmoose stays at the 2 million tonnes production level until at least 1998. During 1995, twenty development holes were completed in the South Fork pit.

The **Quintette** mine, operated by Quintette Coal Limited, had a difficult year and expects to ship 3.8 million tonnes, down from the planned 4.3 million tonnes. Exploration expenditures, estimated at \$1 million, were focused on developing reserves for beyond 1998 on Babcock Mountain (35 drill holes) and in the Mesa Extension area (35 drill-holes).

## INDUSTRIAL MINERALS MINES

British Columbia is endowed with a variety of industrial minerals. Interest in a number of commodities has increased in 1995. There are a nine major mines and more than thirty smaller quarries. These operations are mainly located in the southern half of the province, close to tidewater or major transportation routes. The most economically significant minerals produced in 1994 were sulphur, magnesite, gypsum, silica, barite, limestone and construction materials, with lesser production of jade, diatomite, magnetite, dolomite, dimension stone, pyrophyllite, scoria, slate, flagstone, zeolite, clay and fuller's earth. Sand and gravel pits are located throughout the province. The forecast value of production of industrial minerals in 1995 is \$61 million (up from \$47.1 million in 1994); structural materials are forecast to account for another \$380 million (slightly higher than in 1994).

**Sulphur**, derived from natural gas, is produced at five extraction plants in the northeast of the province. Production during 1994 totalled 626 525 tonnes.

In the Rocky Mountains, Westroc Industries Limited moved production of **gypsum** from its Windermere quarry

to its **Elkhorn** quarry. It has not yet started the proposed Elkhorn II development designed to sustain production at 450 000 tonnes per year. After restructuring for sale of the company, Domtar Gypsum continued to ship gypsum from a three-year stockpile mined from the **Canal Flats** (J4) quarry in 1994.

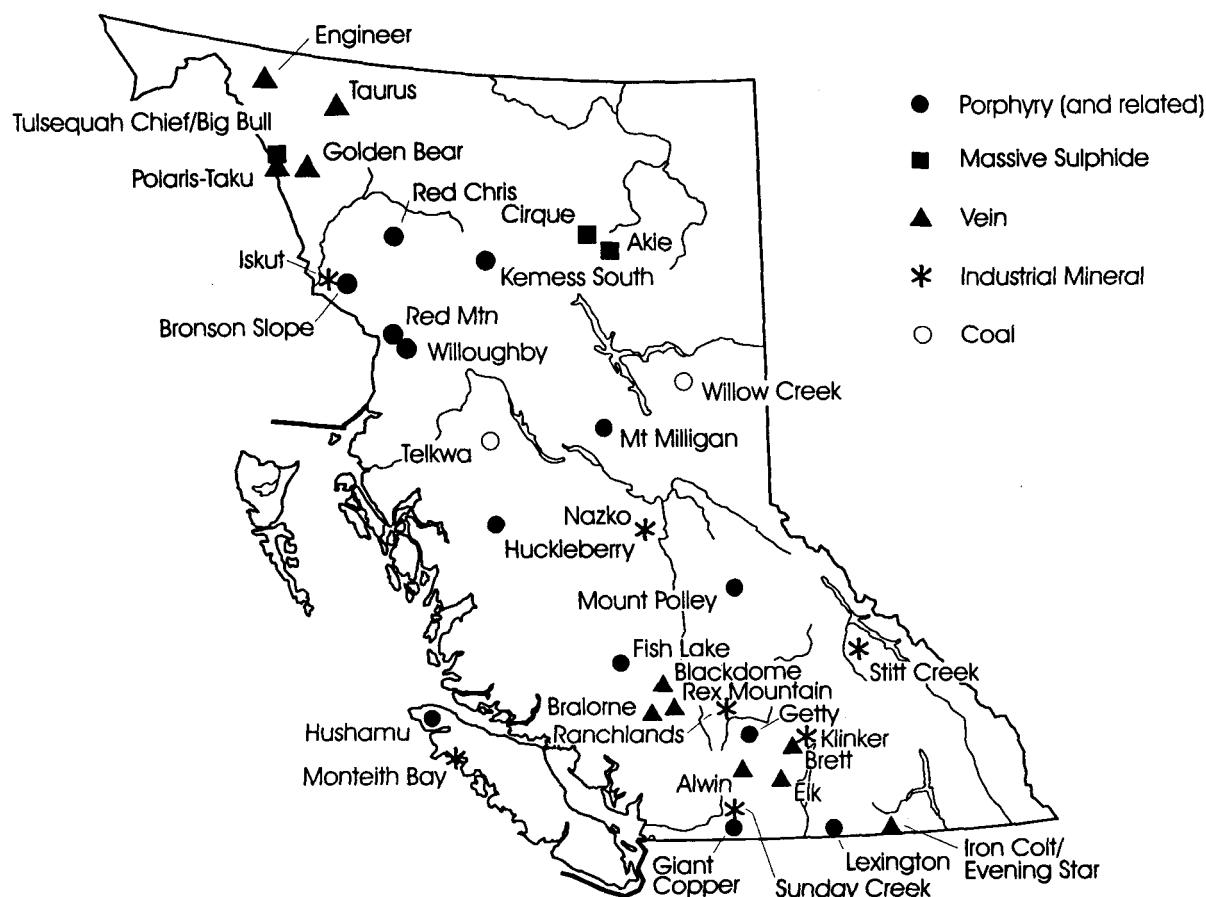
Baymag Mines Company Limited continued to mine **magnesite** at **Mount Brussilof** at an annual rate of approximately 175 000 tonnes. The magnesite is shipped to a processing plant at Exshaw, Alberta to produce high-quality calcined and fused magnesia. Construction of a new shaft kiln is in preparation at Exshaw and is expected to be in production in 1997, increasing Baymag's output by approximately 70%. The company plans to process and upgrade the lower grade magnesite (approximately 85%) presently wasted. The company also completed a drilling program over its claim block.

The **Mount Moberley** and **Nicholson** mines in the Golden area account for all of British Columbia's high-grade silica production. Mountain Minerals Company Ltd. is producing approximately 80 000 tonnes annually at Moberley for shipment to Springfield, Oregon. Bert Miller Trucking and Contracting Ltd. is producing approximately 60 000 tonnes annually and has started to process the under-size product, accumulating at a rate of some 10 000 tonnes annually, into a variety of fine to coarse aggregate products.

**Limestone** quarries at Gillies Bay and Blubber Bay on **Texada Island** ship some 5 million tonnes annually to pulp and paper mills, cement plants and lime producers along the coast from Alaska to northern California. White limestone is produced from deposits at **Benson Lake** (80 000 tonnes), **Gillies Bay** (20 000 tonnes) and **Lost Creek** (40 000 tonnes, mostly from the lower adit) and used as a filler in paints and plastics produced in Surrey and Creston. The **Dahl Lake** operation, 30 kilometres west of Prince George, re-opened recently, processing approximately 20 000 tonnes of decorative aggregate from its 1994 stockpile. Kode-Jerrat Quarries Ltd. (**Giscome**) sells about 50 000 tonnes of limestone a year to customers in the central part of the province. The company plans to build its own kiln to calcine limestone on site and increase its market value four-fold. Limestone is processed by three cement plants and two lime production centres near Kamloops and Lillooet and in the Lower Mainland. The Continental Lime Ltd. Pavilion Lake plant produces up to 200 000 tonnes of lime per year from its quarry near Cache Creek. The majority of pulp and paper mills produce their own lime from nearby limestone quarries.

Mountain Minerals Ltd. operates the **Parson** mine, British Columbia's only **barite** producer. Current reserves are limited (one to two years); exploration drilling at Parson did not locate additional reserves. Dresser Industries may consider re-opening the **Fireside** property near Watson Lake.





**Figure 7. Advanced exploration and development projects in British Columbia - 1995.**

ing the granting of a Mine Development Certificate. Mineable reserves are estimated by the companies at 45.5 million tonnes grading 0.2% Cu and 0.75 g/t Au (supergene) and 155 million tonnes grading 0.23% Cu and 0.59 g/t Au (hypogene) for an overall reserve of 200.4 million tonnes grading 0.22% Cu and 0.63 g/t Au. Mill throughput is proposed at 40 000 tonnes per day, providing a mine life in excess of 15 years. In August 1995 Royal Oak Mines Inc. embarked on a program to acquire 100% ownership of the Kemess project, as part of an integrated package involving compensation and economic development for mining in British Columbia offered by the provincial government. The effective date for approval of the Plan of Arrangement between Royal Oak and El Condor, St. Philips and Geddes Resources Limited was extended to Jan. 31, 1996 to facilitate the ongoing review process. A 1993 pre-feasibility study on the Kemess South gold-copper deposit by Kilborn Engineering Pacific Ltd. estimated capital costs at \$363 million, with annual metal production averaging 2600 tonnes of copper and 6625 kilograms (213 000 oz) of gold. Royal Oak extracted bulk samples from two pits (one in supergene, one in hypogene mineralization); metallurgical optimization testing is in progress. Initial results of bulk sample grades have correlated well with drill hole and block

model grades. It has placed contracts with Kilborn, which has begun definitive engineering and procurement of equipment for the project. Royal Oak plans construction in the spring of 1996; start-up is planned for the middle of 1998.

**Jordex Resources Ltd. continued evaluation of its Hushamu porphyry deposit located 25 kilometres west of the Island Copper mine.**

On the **Huckleberry** porphyry copper-molybdenum project, Huckleberry Mines Ltd. (formerly New Canamin Resources Ltd.) received a project approval certificate for the development of the mine. Discussions with the Government of British Columbia are continuing with respect to an infrastructure loan. Current reserves are estimated at 93.9 million tonnes grading 0.50% Cu, with minor recoverable amounts of gold, silver and molybdenum. The deposit would be mined by two open pits, the Main zone and the East zone. Planned mill throughput is 15 500 tonnes per day for the East zone and 14 000 tonnes per day for the Main zone, producing a total of 27 300 tonnes of copper annually over the anticipated 17-year mine life. Project costs for development, including inventory and working capital, are estimated to be \$137 million. In 1995 a consortium of Mitsubishi Materials Corporation, Dowa Mining Co. Ltd., Furukawa Co. Ltd. and Marubeni Corporation formed a

Placer Dome Inc.	Mt. Milligan	Cu, Au	298 400	0.22% Cu, 0.45 g/t Au	Placer Dome, MDC, 1993
American Bullion Minerals Ltd.	Red Chris	Cu, Au	157 000	0.48% Cu, 0.37 g/t Au	Amer. Bull., 1995
Princeton Mining	Similco - Ingerbelle East Alabama	Cu, Au	20 000 20 000	0.35% Cu 0.31% Cu, 0.16 g/t Au	Princeton, 1994
Gibraltar Mines Ltd.	Gibraltar	Cu	9000	est. 0.3% Cu	Gibraltar, 1995
Royal Oak Mines Inc.	Red Mountain	Au, Ag	2540	12.8 g/t Au 38.1 g/t Ag	Lac Minerals MDAP, 1993
International Skyline Gold Corp.	Bronson Slope	Cu, Au, Ag	90 000	0.75 g/t Au, 0.16% Cu, 4.17 g/t Ag	International Skyline, 1995
Britannia Gold Corp./ Bren-Mar Res. Ltd.	Lexington	Cu, Au	162	8.9 g/t Au 0.96% Cu	Bren-Mar, 1995
Camnor Res Ltd./ Gold Giant Res./ Royal Oak Mines Inc.	Willoughby	Au, Ag			
Getty Copper Corp.	Getty North (Krain) Getty South (Trojan) Getty West (Transvaal)	Cu	> 50 000	0.5% Cu	
Getchell Res./ Teck Corp.	Galaxy Rainbow (No. 2 Zone)	Cu, Au Cu, Au	3200 14 100	0.65% Cu, 0.34 g/t Au 0.5% Cu	Getchell, 1995 Getchell, 1995
Imperial Metals Corp.	Giant Copper (AM)	Cu, Au	20 700 3400	0.75% Cu, 0.4 g/t Au, 12 g/t Ag 1.17% Cu, 0.5 g/t Au, 20 g/t Ag	Imperial Metals, 1995

### Massive Sulphide Deposits

Teck Corp./Cominco Ltd./ Samsung/Korea Zinc	Cirque	Pb, Zn, Ag	24 700	2.3% Pb, 8.5 % Zn, 50.8 g/t Ag	Curragh MDC, 1991
Redfern Res. Ltd.	Tulsequah Chief/ Big Bull	Cu, Pb, Zn, Au, Ag	7200	1.24% Cu, 1.18% Pb 6.32% Zn, 2.41 g/t Au, 99.33 g/t Ag	Redfern, MDAP, 1995
Ecstall Mining Corp./ Inmet Mining	Akie	Zn, Pb, Ag			

### Vein Deposits

Bralorne-Pioneer Gold Mines Ltd./ Avino Mines and Res. Ltd.	Bralorne Above 1000 level Below 1000 level 51 vein Loco veins	Au, Ag	432.5 673 110.7 363	10.6 g/t Au 8.2 g/t Au 12.7 g/t Au 17.14 g/t Au	Bralorne-Pioneer, 1995
Liquid Gold Res. Inc./ Huntington Res. Ltd.	Brett Bonanza Zone R.W. vein	Au	12	39.12 g/t Au 41.1 g/t Au	Huntington, 1993
Claimstaker Res. Ltd.	Alwin	Cu, Ag	390	2.5 % Cu	Claimstaker, 1995

on a cut-off grade of 0.3% Cu in an open pit 300 metres deep, at 157 million tonnes grading 0.48% Cu and 0.37 g/t Au. Two near-surface, higher grade stockwork copper-gold zones containing 100 million tonnes grading 0.58% Cu and 0.46 g/t Au are potential starter pits. Drilling in phase 1 of the 1995 program has increased the resource base estimated by American Bullion to in excess of 200 million tonnes. The company hopes to delineate an additional 80 million tonnes of ore in the Yellow Chris zone this year.

The phase 2 program included fill-in drilling in the western part of the Red Chris deposit to facilitate revision of mining reserve calculations for preliminary feasibility study purposes. On the Far West deposit, which occupies the northern part of the Yellow Chris zone, copper-gold mineralization has been intersected to a depth of 250 metres over a 300-metre length and a 200-metre width. This deposit has the highest gold-to-copper ratio so far encountered at the Red Chris project. Fill-in drilling was also carried out on the Gully deposit to the south in order that this resource can be incorporated in preliminary feasibility study reserve calculations.

Geotechnical drilling was carried out in the fall for proposed tailings impoundment and open-pit design. American Bullion has retained Fluor Daniel Wright to complete a preliminary feasibility study on the Red Chris project by early 1996. American Bullion has filed an application for a project approval certificate, based on a resource of approximately 250 million tonnes grading 0.4% Cu and 0.3 g/t Au.

After evaluating bids on its **Red Mountain** gold-silver deposit near Stewart, Barrick Gold Corporation decided to keep it in its portfolio of properties. No further work was planned for 1995, a stark contrast to the previous owner's (Lac Minerals Ltd.) expenditures in excess of \$15 million in 1994. Reserves previously reported by Lac in the Marc and AV zones were 2 539 000 tonnes grading 12.8 g/t Au and 38.1 g/t Ag at a cut-off grade of 3 g/t Au. In August 1995, Royal Oak Mines Inc. embarked on a program to acquire the Red Mountain gold project from Barrick Gold, as part of the same development initiative that led to its acquisition of the Kemess South project. Royal Oak's proposal involved a \$3 million work commitment over three years, a 1% net smelter return royalty, payable to Barrick on the first 57 540 kilograms (1 850 000 oz) of gold recovered, and a \$10 per ounce royalty on gold recovered in excess of that amount. Subject to completing a positive feasibility study, commercial production could start as soon as 1998. Capital costs of development of the orebody and construction of mining and processing facilities have been estimated at \$100 million. Royal Oak plans to create a B.C. Division, with headquarters and offices in northern British Columbia, to carry on exploration, development, construction and administration for the Kemess and Red Mountain properties

International Skyline Gold Corporation initiated several studies required for the preparation of a preliminary feasibility study on its **Bronson Slope** polymetallic porphyry property located adjacent to the Snip mine. The study is expected to be completed by year end.. In August 1995, the company estimated a drill-indicated and inferred inventory of 90 million tonnes grading 0.16% Cu, 0.75 g/t Au and 4.17 g/t Ag, plus the potential for recovery of molybdenum and iron from magnetite. A higher grade potential open-pit starter resource of 17 million tonnes grading 0.23% Cu, 0.72 g/t Au and 3.10 g/t Ag is indicated within this inventory. During 1995 Skyline completed a 610-metre drilling program in the spring and a 2400-metre program in the fall, both designed to confirm previous mineral inventory estimates. Skyline has also re-split and re-assayed over 1800 metres of drill core taken in 1988. New assays from the previously drilled core did not result in any material change in the overall grade or size of the deposit; however, higher grade gold in one hole has prompted the company to consider a reconnaissance drilling program to test the continuity of this possible vein target. The company has applied for a project approval certificate under the Environmental Assessment Act to develop a 12 000 tonne per day open-pit mine.

In the Greenwood camp, in southern British Columbia, Britannia Gold Corporation and Bren-Mar Resources Ltd. widened the Grenoble adit and commenced work on a 700-metre decline to the **Lexington Main** zone containing a drill-indicated reserve estimated at 162 000 tonnes grading 8.9 g/t Au and 0.96% Cu. The decline will provide access for a test mining program. Preliminary bulk metallurgical testing and a base-line environmental study are also planned. Mining of approximately 180 tonnes of material is proposed for testing purposes; a larger bulk sampling program may follow if results are positive. Material will be processed at the Roberts mill at Greenwood.

During 1995 Camnor Resources Ltd., under a joint venture agreement with Gold Giant Minerals Inc., drilled twenty-seven core holes totalling 3013 metres on the **Willoughby** gold-silver project adjacent to the Royal Oak Mines' Red Mountain property. Gold Giant has entered into a subsidiary agreement with Royal Oak whereby Royal Oak has been granted the right to acquire up to a 35% interest in the property and the joint venture. The surface drilling program tested the North, Wilby, Willow, Kiwi, North/North and Icefall (Upper and Lower) zones. In order to better explore the North zone, Camnor completed 50 metres of a proposed 100-metre adit, before curtailing the planned excavation of underground drill stations due to a lack of water. This program is scheduled to restart in the spring.

In the northern part of the Highland Valley, southwest of Kamloops, Getty Copper Corporation is conducting an induced polarization survey and drilling program (9150 m) on the **Getty North** (Krain) porphyry copper-molybdenum

metres deep by 20 metres thick. Considerable other surface exploration work was completed elsewhere on the property and several large lead-zinc soil anomalies were discovered on strike.

## VEIN DEPOSITS

Bralorne-Pioneer Gold Mines Ltd., in a joint venture with International Avino Mines Ltd., plans to re-open the historic **Bralorne** mine encompassing the combined Bralorne, Pioneer and Loco properties, following issuance of a Mine Development Certificate in March 1995. Development and exploration work, together with final permitting application, are in progress. Initial underground mining will be from the formerly producing Bralorne 51-vein area where detailed exploration programs, in recent years, have outlined proven, probable and possible reserves of 570 000 tonnes grading 8.22 g/t Au. Proven and probable reserves above the 800 level and readily available for extraction total 432 500 tonnes grading 10.63 g/t Au. There are also reserves of 673 000 tonnes grading 8.23 g/t Au, proven and possible, between the 1000 and 2600 levels, accessible by dewatering the shaft. The nearby Countless vein on the Loco property has 110 000 tonnes probable and possible reserves grading 17.1 g/t Au. Mining and milling operations are forecast to start at about 225 tonnes per day, increasing to 400 tonnes per day at a later date. The initial capital cost is estimated between \$5 and \$7 million, based on a 225 tonne per day operation with annual output of 860 kilograms (27 500 oz) of gold at an average cash cost of US\$250 per ounce. Over \$2 million for underground vein development is included in this cost estimate. Milling machinery is being assembled at the property and the mill building has been rehabilitated. Mill tune-up is scheduled for the spring of 1996.

During late 1994 and early 1995, an underground drilling program from the 400 level of the Bralorne mine intersected extensions of the Bralorne and Pioneer veins in the 610-metre gap between the two veins which has never been explored. Two of three veins intersected returned encouraging assays over mineable widths. A 13-hole drilling program in 1995 on the Peter, Millchuck and Big Solly veins on the Loco property also returned encouraging results. Bralorne-Pioneer has started to develop the Peter vein underground on the 800 level, 305 metres below the surface. Trenching on the northeast side of the Bralorne property uncovered a new gold-bearing zone, the Maddy zone, over an 850-metre length; follow-up drilling is in progress.

Huntington Resources Ltd. concentrated its 1995 work on surface mining in the high-grade R.W. gold vein on its **Brett** property. Closely spaced sampling of the vein returned an average grade of 34.35 g/t Au over a strike length of 51.3 metres and across a true width of 0.44 metre. Drilling in previous programs has tested the vein over a vertical range of at least 25 metres. Mining began in August and by

the end of the year an estimated 225 tonnes of ore grading 34.18 g/t Au and 63.43 g/t Ag had been stockpiled. Surface mining is scheduled to recommence in the spring concurrent with underground development on the Bonanza zone. Huntington is negotiating to custom mill ore off site.

Claimstaker Resources Ltd. signed an agreement with Afton Operating Corporation whereby it will ship high-grade copper ore from its **Alwin** mine in the Highland Valley to be custom milled by Afton. The company hopes to submit a mining plan and application to re-open the mine and commence underground mining at a proposed rate of 100 tonnes per day. Reserves estimated by the previous owners total 390 000 tonnes grading 2.50% Cu. In January 1995 the underground workings were re-opened to help prepare the No. 4 - North orebody for future production. During 1995, Claimstaker shipped a few thousand tonnes of oversize high-grade copper boulders to Afton.

At the **Engineer** gold mine, Ampex Mining, under an agreement with Winslow Gold Corporation, mined and milled approximately 345 tonnes of vein material from stopes on the Engineer and Double Decker veins during a bulk sampling program. Ampex installed tracks and mobilized equipment to improve mining efficiency. A further program of exploration, limited milling of material from near-surface veins and preparation for dewatering the lower levels on the Engineer vein is planned. The company hopes to bring the 27 500 to 45 300 tonnes of indicated reserves into the proven reserves category.

The Canarc Resource Corporation exploration program on the **Polaris-Taku** gold project in the Tulsequah area involved deep (up to over 730 m) drilling to test the potential of the C-vein and drilling on the North zone. Two new vein intersections were cut by the deep drilling. They are tentatively interpreted to be an extension of the Y-vein system, 610 metres south and 90 metres below the deepest existing Y-vein reserves. Drill-indicated geological reserves, estimated by an independent study in early 1995, total 2.54 million tonnes grading 14.1 g/t Au. Drilling was also conducted on the North zone where the target is one or more gold-bearing quartz-carbonate vein systems within a favourable alteration zone up to 30 metres thick. A total of 27 drill holes have delineated the North zone over a strike length of 670 metres, with an additional 240 metres of strike length indicated by soil geochemical anomalies. The average width of the zone is about 7 metres grading 5.14 g/t Au. The 1995 program has shown that it has a gentle dip with similar gold grades throughout. Bulk underground mining and bioleaching are being investigated for this low-grade ore. The North zone, resource is estimated at 204 000 tonnes grading 6.51 g/t Au. Fluor Daniel Wright Ltd. has been retained to carry out engineering, metallurgical, environmental and financial studies to assess the potential for a moderate tonnage, underground gold mining operation.

130 million tonnes grading 0.95 g/t Au. During late 1995 Cyprus will complete metallurgical testing of different ore types. Follow-up drilling on induced polarization targets and closer spaced drilling to test and define a starter pit are planned for early 1996.

Production at the Wheaton River Minerals Ltd./North American Metals Ltd. **Golden Bear** mine during 1994 totalled 980 kilograms (31 500 oz) of gold and 286 (9200 oz) of silver from 88 920 tonnes of ore milled at a daily throughput of 325 tonnes. The mine closed in September of 1994 due to exhaustion of refractory ore reserves in the Bear Main zone. An aggressive exploration program on the Kodiak A oxide ore zone during 1994 increased the mineable reserve to 472 000 tonnes grading 4.67 g/t Au. A Mine Development Certificate for a revised production plan to heap leach the Kodiak A ore has been issued. Unfortunately, heavy rains during the latter part of September and early October forced postponement of the project until 1996.

In the fall of 1994, a new zone (Ursa) of both higher grade refractory and lower grade, potentially leachable oxide ore, was discovered north of the Kodiak A zone. A follow-up program during 1995 has identified a geological reserve of 208 877 tonnes grading 23.3 g/t Au. A feasibility study is in progress; it will evaluate the potential to process the higher grade ore from both oxide deposits in the existing mill, while utilizing heap-leach extraction methods for the lower grade material.

North American Metals proposes to open-pit mine and mill about 150 000 tonnes of Ursa high-grade ore in 1996. Concurrently, it proposes to heap leach 100 000 to 150 000 tonnes of Ursa low-grade ore on the already permitted Kodiak A heap-leach pad, together with 60 000 tonnes of stockpiled Kodiak A ore.

The first two benches on Kodiak A were mined in late 1994 and the ore stockpiled. Feasibility studies on the Kodiak B and C deposits and the east low-grade stockpile are yet to be completed. Total mineral reserves and resources are estimated at 3.7 million tonnes grading 4.46 g/t Au. In 1997 a new 500 000 tonne capacity leach pad would be constructed at a yet to be determined site for the remainder of the Kodiak A ore.

A decline was driven during the fall of 1994 and the spring of 1995 on the Grizzly zone, approximately 400 metres below the mined out Bear Main zone. Geological reserves are estimated at 153 000 tonnes grading 20.5 g/t Au. Underground drilling was suspended in the summer due to lower than expected grades and widths of mineralization. Elsewhere on the property, geochemical, geophysical and geological surveys, and trenching approximately 200 to 300 metres west and north-northwest of the Kodiak A zone, have identified several anomalies in carbonate rocks. A follow-up drilling program discovered several new gold-bearing zones. The mine will be on a care and maintenance basis over the winter.

Spokane Resources Ltd. completed a 5800-metre drilling program, designed to extend the zone of gold-copper mineralization on its **Rex Mountain** property, 40 kilometres northwest of Lillooet, both laterally and at depth. The zone has been defined over a strike length of 700 metres, a width of approximately 6.5 metres and to a depth of 100 metres. Results confirm that the mesothermal gold-bearing vein system contains at least three quartz veins in a steeply dipping shear zone. The most significant gold-copper intersections occur within the quartz vein close to the contact with altered serpentinite (listwanite). Drilling is continuing to extend the system to the west and also at depth. Spokane Resources also plans to evaluate the nearby Shulap property which it recently acquired.

At the **Blackdome** gold mine, Claimstaker Resources Ltd. and joint venture partner Aurizon Mines Ltd. conducted a program of drilling and underground drifting in search of new reserves on veins identified by previous drilling and trenching. If successful, the operators believe the existing 200 tonne per day mill could be placed back in production very quickly. The main objective of the underground drilling program from the rehabilitated 1870 level is to test two areas on the No. 18, No. 19 and No. 11 veins, where a 1994 surface drilling program intersected high-grade gold mineralization. Prior to 1994, an independent study indicated a possible 70 800 tonnes grading 14.1 g/t Au; the 1994 and 1995 programs are expected to increase this tonnage.

Soil sampling and follow-up trenching in the southeast part of the vein system located several anomalies, and mineralized quartz float along fault structures. A bulk sample of approximately 2000 tonnes was taken from a trench 3-metres wide on the surface exposure of an ore shoot on the No. 11 vein. This ore has been stockpiled at the mill for future treatment. Aurizon has since terminated its agreement with Claimstaker.

## INDUSTRIAL MINERALS DEPOSITS

Exploration and market interest in industrial minerals continues to increase. In 1995 exploration expenditures are estimated over \$4.5 million.

**Zeolite** beds have been identified in several areas throughout the interior of British Columbia. Mountain Minerals Company Ltd. mined 1000-tonne bulk samples from each of its **Ranchlands Z-1** and **Z-2** deposits near Cache Creek and will ship them to Alberta for test marketing for agricultural applications. The company has indicated its intention to begin limited production from the Cache Creek (Z-1) and McAbee (Z-2) pits at a proposed mining rate of 8000 to 9000 tonnes per year for each. The material would be shipped to Alberta for processing. Canmark International Resources Inc. is stripping overburden on its **Sunday Creek** zeolite property near Princeton, preparatory to mining a 10 000-tonne bulk sample for market development in the Lower Mainland. The zeolite is a high-quality clinop-



million tonnes. A 20-year mine and reclamation plan has been approved and a Mine Development Certificate granted in the spring of 1995.

Global Metals Ltd. drilled 29 shallow holes on its **Green jade** property on the north side of O'Ne-el Creek in north-central British Columbia. The company estimates that 2.8 million kilograms of nephrite jade and tremolite exist within the area tested.

### COAL

Advanced exploration expenditures outside existing coal mine leases are estimated at \$1.5 million in 1995. The increase in metallurgical and thermal coal prices has stimulated a number of companies to explore for additional coal reserves.

At the **Telkwa** thermal coal project, Manalta Coal Limited conducted an extensive exploration program south of the Telkwa River, designed to better define reserves in the Tenas Creek area, to better delineate the reserve potential of the license block as a whole and to explore the Cabinet Creek area. A total of 83 holes were drilled at a cost of around \$1 million. Preliminary indications are that the Tenas Creek and Cabinet Creek areas are complicated by normal faulting; additional drilling will be required to fully evaluate these areas. Coal quality is very good, with high heat value, low sulphur content and locally clean enough not to require washing. The company continues to evaluate production feasibility. Geological reserves in the main deposit are estimated to be 38.7 million tonnes contained within four pit areas.

There was no exploration activity at the Globaltex Industries Inc. **Willow Creek** coal property. Mitsui Matsushima Co. Ltd. is conducting a due diligence examination which was expected to be completed by the end of the year. The initial mine plan, as proposed by Globaltex, contemplates a production level of 600 000 tonnes per year, beginning in 1997, with a minimum 15-year life. The mine would produce metallurgical and low-volatile thermal coal for the export market.

In southeast British Columbia, McGillivray Mining Ltd. undertook exploration and test mining on its **Loop Ridge** metallurgical coal property in the Crowsnest Pass. A 10 000-tonne bulk sample was mined and trucked to the Elkview plant for washing. It is hoped that a minimum of 400 000 tonnes can be mined from the property over a period of two to five years, and sold raw to the Elkview mine.

### HIGHLIGHTS OF GRASSROOTS METAL EXPLORATION

Gold-enriched porphyry copper and porphyry-related gold deposits, polymetallic massive sulphide deposits (volcanogenic, seafloor hydrothermal and sedex), and vein deposits (epithermal and mesothermal) accounted for approximately 82% of 1995 exploration expenditures in

British Columbia. The remainder were directed to coal, industrial minerals, skarns and less traditional targets such as sedimentary copper and ultramafic-associated nickel. Of the total estimated \$88 million exploration expenditures, approximately 40% fits into the less advanced to grassroots category addressed in this section. Although most of the programs were focused in and around areas with mines or known showings and existing infrastructure, several new, relatively low budget, regional programs were conducted throughout the province. The diversity of targets, their large size (some world class such as Highland Valley Copper and Sullivan), and the profitability of smaller, higher grade deposits such as Eskay Creek and Snip, continue to make British Columbia a good place to explore. The properties reported on are shown on Figure 8 and listed in Table 4, with estimated reserves, where available.

### PORPHYRY AND PORPHYRY-RELATED DEPOSITS

The **Babine Camp** was very active in 1995. Hera Resources Inc. conducted a 43-hole diamond drilling program, totalling 9450 metres on the **Nak** porphyry copper-gold-molybdenum prospect, 30 kilometres northeast of the Bell mine, at an estimated cost of about \$1.5 million. Much of the property was also covered by induced polarization surveys, resulting in the identification of several anomalous zones yet to be drill tested. At the **Hearne Hill** deposit, located close to the Bell mine, Booker Gold Explorations Ltd. continued to diamond drill high chargeability and low resistivity targets. The drilling encountered previously unknown mineralization in an area to the northeast of the mineralized zone explored by Texas Gulf Sulphur Company in the 1960s and by Booker Gold over the past few years. Copper and gold values are very encouraging. Drilling on this new zone is now expected to continue throughout the winter. Elsewhere, Pacific Sentinel Gold Corp. and Northern Dynasty Minerals Ltd. have agreed to jointly explore the **Babs** property. An aggressive exploration program is underway. Also, Hera Resources Inc. optioned the **Trail Peak** prospect and plans work in 1996. Teck Corporation conducted a regional airborne geophysical survey over the Babine area in the fall.

On the **Lorraine** copper-gold-silver deposit, Lysander Gold Corporation, under an agreement subject to a back-in right held by Kennecott Canada Inc., conducted a 24-hole, 2900-metre drilling program focused on the Upper Main zone where previous operators had outlined a preliminary resource of 4.5 million tonnes grading 0.75% Cu and 0.34 g/t Au. Lysander envisages a small-tonnage, high-grade operation. The 1995 program also included the collection of seven bulk samples from the mineralized talus apron in the valley. The company believes that the talus may represent the eroded upper part of the Upper Main zone. Preliminary metallurgical testing has been initiated

TABLE 4  
1995 EXPLORATION HIGHLIGHTS

Company Name	Project Name	Commodity	Estimated Tonnes (000s)	Estimated Grade	Reference
<b>Massive Sulphide Deposits</b>					
Doromin Res. Ltd./ Westmin Res. Ltd.	Dragon	Cu, Pb, Zn, Ag, Au			
La Rock Mining Corp.	Brandywine/ Dave's Pond	Cu, Zn, Au			
Ecstall Mining Corp./ Atna Res. Ltd.	Horsefly Ecstall	Cu, Zn, Ag	6350	0.6% Cu, 2.5% Zn, 0.5 g/t Au, 20 g/t Ag	Atna, 1994
CanQuest Res. Corp.	Cottonbelt	Zn, Pb, Ag	725	11% (Pb + Zn), 58.3 g/t Ag	
Kenrich Mining Corp.	Corey	Au, Ag, Zn, Pb			
<b>Porphyry (and related) Deposits</b>					
Hera Res. Ltd.	Nak	Cu, Mo, Au			
Booker Gold Exploration Ltd.	Hearne Hill	Cu, Au	180	1.7% Cu	Prospectus MDAP, 1992
Spokane Res. Ltd./ Rio Algom Ltd.	Mac	Mo, Cu			
Lysander Gold Corp./ Kennecott Canada Inc.	Lorraine	Cu, Au	10 000	0.67% Cu, 0.34 g/t Au	Kennecott, 1993
<b>Skarn Deposits</b>					
Orvana Minerals Corp.	Eholt	Cu, Au			
Hemlo Gold Mines Inc./ Athlone Res. Ltd./ Vital Pacific Res. Ltd.	Soup	Au			
<b>Vein Deposits</b>					
AGC Americas Gold Corp.	JD	Au			
Teck Corp.	Tsacha	Au, Ag			
Romulus Res. Ltd.	Harmony Gold (Specogna)	Au	31 300	2.2 g/t Au	
Gold City Mining Corp./ International Wayside Mines Ltd.	Cariboo Gold Quartz - Sanders Zone	Au	690	3.84 g/t Au	Gold City, 1995
Mosquito Cons. Gold Mines	Rainbow Zone		907	4.53 g/t Au	
Athabasca Gold Res. Ltd.	Ladner Creek (Carolyn)	Au	900	4.4 g/t Au	Athabasca, 1995

Note: MDAP = Mine Development Assessment Process. Estimated tonnes and grade are "resources."

side of the Muchalat River. Several new areas of massive sulphide mineralization and alteration associated with lead-zinc soil anomalies and airborne geophysical anomalies were identified over a length of 3.5 kilometres to the south of the Main showing and to the east for over 4.5 kilometres. Three drill holes totalling 722 metres tested coincident geochemical anomalies and alteration zones, approximately 2.5 kilometres south of the Dragon massive sulphide showings (Falls, North and Dragon).

During 1995, La Rock Mining Corporation focused its work on diamond drilling programs on the Dave's Pond zone on its **Brandywine** property, 110 kilometres north of Vancouver. This zone is one of seven geologically similar gold targets on the property, hosted by sheared rhyolitic and andesitic rocks of the Gambier Group. The drilling expanded the potential gold reserves in the Dave's Pond zone, and also tested a large gold geochemical anomaly in soils, coincident with an electromagnetic anomaly, approximately 450 metres along strike to the southeast. A winter drilling program of over 2200 metres began in late October to further test both areas.

Exploration on the **Horsefly** property, 80 kilometres southeast of Prince Rupert, by Atna Resources Ltd., under a joint venture agreement with Ecstall Mining Corporation, included a ground electromagnetic survey and follow-up diamond drilling. The geophysical survey indicates several strong conductive anomalies coincident with a sequence of mineralized rhyolitic volcanic rocks more than 2 kilometres long. The drilling (1075 m in eight holes) tested the Horsefly and Steelhead showings which lie immediately east of the Packsack deposit and approximately 15 kilometres southeast of the Ecstall (Red Gulch) deposit within the Ecstall River felsic volcanic belt. Disseminated, laminated and semimassive pyrrhotite, pyrite and chalcopyrite were intersected in altered volcanic rocks.

At the **Cottonbelt** lead-zinc-copper-silver-gold massive sulphide project in the Revelstoke area, CanQuest Resource Corporation drilled the Cottonbelt showing and the Bass showing, about 1 kilometre to the north. Encouraging results are reported. Mineralization has been traced on surface for a distance of 10 kilometres within both limbs of the west-dipping Mount Grace syncline. Drilling partially defined two stratabound zones of massive to semimassive sulphides in the west limb. Also, drilling around the old Cottonbelt workings is designed to increase the existing resource estimated at 725 000 tonnes grading 11% combined lead and zinc and 58 g/t Ag.

At the **Corey** property, 10 kilometres south of the high-grade Eskay Creek gold-silver-zinc-copper mine, drilling of 22 core holes by Kenrich Mining Corporation, resulted in the discovery of significant stratabound massive to semimassive gold-silver-zinc-lead mineralization (Hutchings horizon) in the TV zone. Mineralization is hosted by a foot-wall rhyolite unit and overlying breccia and black

mudstone, similar to the stratigraphy hosting the Eskay Creek deposits. Soil geochemical surveys have outlined significant anomalies coincident with induced polarization anomalies, over approximately 800 metres of the projected strike length of the mineralization. The TV zone has been traced 1500 metres on strike with widths over 90 metres. Other targets on the property include the Bench, Battlement and Cumberland zones. Two new high-grade gold veins were also discovered on the GFJ prospect, varying in width from 0.25 to 1.2 metres. Drilling programs are planned for all zones in 1996.

### SKARN DEPOSITS

In the Greenwood camp, Orvana Minerals Corporation drilled the **Eholt** skarn target in the spring. Extensive, strong sulphide mineralization containing significant gold and copper values within the large (1 by 1.5 km) skarn system was encountered over a strike length of 750 metres and widths ranging from 10 to 40 metres. An eleven-hole, 3100 metre drilling program was completed in the fall on the Dead Honda showing and the east flank of Eholt Mountain. The geology is similar to that at the Phoenix deposit, 10 kilometres on strike to the southwest.

In north-central British Columbia, Hemlo Gold Mines Inc. drilled four holes on the **Soup** property, under an option agreement with Vital Pacific Resources Ltd. (75%) and Athlone Resources Ltd. (25%). Unfortunately, due to technical problems, none of the holes reached target depth. The holes were drilled on coincident airborne potassium radiometric and ground magnetic anomalies in an area of quartz-magnetite stockwork associated with diorite intrusive into andesitic flows, up-dip from a hole which intersected 5.4 g/t Au and 0.1% Cu over 40 metres and ended in mineralization grading 2.5 g/t Au. The fourth hole cut two sections of gold-copper mineralization within magnetite-silica stockworks, apparently above the target zone.

### OTHER TARGETS

Both property-scale and regional exploration programs for sedimentary copper deposits were conducted in the southeast part of the province (e.g., Junction property). Nickel and copper occurrences associated with ultramafic rocks were explored northwest of Fort St. James.

### INITIATIVES IN BRITISH COLUMBIA

Several new or continuing government programs that will influence future mineral resource planning, exploration and development in British Columbia were active during 1995.

- **Explore B.C.**, part of a five-year \$100 million program to provide significant tax reductions and exploration incentives to assist and promote private sector mineral exploration in British Columbia, continued in its second year of a three-year, \$13.5 million program.

The objectives are to identify possible Sullivan-type orebodies and other targets.

- Completion of a **Regional Geochemical Survey** of the Cry Lake (1041) map sheet during 1995, with results to be released in 1996.
- Bill 13, which amends the **Mineral Tenure Act**, will streamline regulations, including those pertaining to bulk sampling and the acquisition of industrial mineral rights.
- As a result of the proclamation of the **Forest Practices Code of British Columbia Act** on June 15, 1995, the Ministries of Energy, Mines and Petroleum Resources; Forests; and Environment, Lands and Parks initiated a comprehensive review of mineral exploration practices and permitting procedures to develop standards compatible with Forest Practices Code.

## SUMMARY AND OUTLOOK FOR 1996

Many of the signs that indicated an upswing in the mining industry in British Columbia in 1995 continue to be valid for 1996. Solid mineral production value in 1995 is estimated at \$3.48 billion, the highest recorded in over 30 years. Exploration expenditures increased from \$85 million in 1994 to about \$88 million in 1995, even allowing for a significant decrease in exploration expenditures at the Red Mountain project. Claim staking in 1995 increased above 1994 levels; a further increase is expected in 1996. The number of valid Free Miners Certificates is up slightly in 1995 and is expected to rise again in 1996. Two new metal mines, Eskay Creek and QR, opened in 1995 and production decisions for several other advanced projects may be made in 1996 [e.g. Kemess, Huckleberry and Golden Bear (re-open)]. The Island Copper mine closed in late 1995. Successful exploration and development projects at several mines have increased reserves and mine life (e.g., Snip, Table Mountain, Myra Falls and Ajax). Many smaller gold projects utilized custom milling facilities by obtaining the necessary permitting for bulk sampling; potential for other such projects will be important in the future. Production from southeastern coal mines increased significantly, with a strong demand for metallurgical coal. Several major expansions (e.g., Quinsam, Fording River, Greenhills, Line Creek and Coal Mountain) were undertaken and bode well for the future of these operations. In general, the level of less advanced, grassroots exploration remained relatively high in 1995 at around 40% of total expenditures; this is expected to increase slightly in 1996.

Several advanced projects will receive further work in 1996, provided relatively high metal prices are sustained and uncertainties in land-use policies and First Nations' negotiations are dealt with in an orderly manner.

The many copper and gold-bearing porphyry deposits discovered during the 1960s and 1970s (e.g., **Red Chris**,

**Huckleberry**, **Lorraine**) will continue to be explored and developed. Sedex (e.g., **Akie**) and volcanogenic polymetallic sulphide (e.g., **Tulsequah Chief**) deposits offer small to medium tonnage and high-grade potential, particularly those enriched in precious metals. The stratiform, gold-enriched (seafloor hydrothermal) **Eskay Creek**-type deposits are examples of low-tonnage, but potentially extremely profitable, high-grade targets. The transitional setting, which includes vein and skarn deposits related to porphyry systems (e.g., **Red Mountain**, **Willoughby**, **Snip**), offers similar small to medium tonnage and high-grade potential.

The potential for bulk-mineable (heap-leachable) gold deposits will continue to be examined. Current exploration and future development at the **Golden Bear** mine continue to be focused on the heap-leaching characteristics of recently discovered "no seeum" gold mineralization associated with silicified limestones and dolomites. In the Cassiar gold camp, the **Taurus** gold property will continue to be explored for its bulk-mineable potential. The potential for heap leaching low-grade material is also being investigated at the **QR** gold mine.

The completion of the access road into the Eskay Creek mine, and the infrastructure associated with the new mine development, will continue to assist other exploration programs (e.g., **Corey**, **Bonsai**) in the region. The increase in exploration expenditures on industrial minerals is forecast to continue, with new discoveries made and new markets being developed. The release of results from both the Regional Geochemical Survey carried out in the Cry Lake map area and the airborne geophysical surveys in the East Kootenay region are expected to attract considerable attention. In general, the long-term outlook for mineral markets is very good throughout the Pacific Rim; British Columbia is well positioned to compete.

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