Province of British Columbia
Ministry of Energy, Mines
and Petroleum Resources
Hon. Anne Edwards, Minister

MINERAL RESOURCES DIVISION
Geological Survey Branch

EXPLORATION IN BRITISH COLUMBIA 1994

1895 - 1995
100
YEARS OF GEOLOGICAL SURVEYING

1895 - 1995

100

YEARS OF GEOLOGICAL SURVEYING

1995 is the centennial of the British Columbia Bureau of Mines, the incumbent of the present Mineral Resources Division. The Bureau brought together into one department all government offices that dealt wholly with mining, including the Gold Commissioners, the Government Assay Office, the Inspector of Mines and the newly created Provincial Mineralogist.

The Provincial Mineralogist was charged with the collection of information relative to the various mines and mining projects of the province, for the publication of such information to make the mineral wealth of the province more widely known, and also for taking steps and advance the development of the mining industry. This is the origin of the British Columbia Geological Survey Branch.

In 1995 we celebrate 100 years of geological surveying; dedication and progress.

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August 1995

FOREWORD

British Columbia experienced a significant upswing in mining and exploration activity during 1994. Buoyed in part by improved prices for copper and gold, the Similco, Gibraltar and Afton/Ajax mines have reopened. Construction was completed on the Eskay Creek Ag-Au mine and it will be the fourth largest silver producer in the world. Exploration expenditures were in the $100 million range, a 40% increase over 1993. Activity was generally concentrated on small to medium sized-programs, primarily in areas with a good geoscience database, known resources and a corresponding high probability for new developments.

The 1994 solid mineral production in British Columbia was $2.63 billion, a 12% increase over 1993, and this reversed a 4-year trend of declining production. Copper accounts for 30%, and coal for 34% of the total. Gold production is forecast at 12.7 million grams with a value of about $214.7 million, down about 5% from 1993 due primarily to production decreases at the Myra Falls, Equity Silver and Similco mines. Silver production is down significantly to 125 million grams valued at $30 million due to reduced production at Myra Falls and the closure of Equity Silver. Zinc and lead production are forecast to be 104.6 million and 45 million kilograms respectively with a combined value of $178 million. Industrial minerals are forecast to contribute about $47 million to the economy and structural materials will account for a further $377.5 million.

A new government incentive program was initiated in 1994 to encourage mineral exploration and resource development. This five- year, $100 million program provides significant tax incentives for exploration and mining in British Columbia. Explore B.C., a key part of this program, is a three-year $13.5 million package designed to stimulate exploration, to extend the economic lives of existing mines and contribute to community stability in existing mining regions.

The British Columbia Geological Survey Branch maintained an active program of fieldwork in 1994, including a regional mapping program, mineral deposit studies, industrial minerals research, surficial geology and geological hazards investigations, and regional geochemistry studies. The results of these survey activities were published in Geological Fieldwork 1994, Paper 1995-1, released in early February, 1995.

W.R. Smyth
Chief Geologist

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BRITISH COLUMBIA MINING, DEVELOPMENT AND EXPLORATION 1994 HIGHLIGHTS

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INTRODUCTION

Buoyed in part by the increase in the copper price to the US$1.15-$1.20 per pound range, and the gold price, which approached the US$400 per ounce mark in late September and fell back in the US$390 range, three mines re-opened in the fall of 1994: **Similco, Gibraltar,** and **Afton/Ajax.** The **Myra Falls** mine also re-opened following resolution of a long labour dispute. Exploration and development programs at most mining operations in the province have been successful in adding reserves which will result in increased mine lives. Construction of the **Eskay Creek** high-grade silver-gold mine was completed by September; direct shipping ore transported by road to rail and ship load-outs began in January 1995. Eskay Creek is the first new metal mine to open in western Canada in several years. The **QR** (Quesnel River) gold project is under construction with production scheduled for April 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 ore have been made recently.

Despite the intense global competition for exploration dollars, several companies and individuals continued to conduct small to medium-sized programs, primarily in areas having a good database, known resources in the ground, and higher probability of development and production. Total exploration expenditures in 1994 are estimated to be approximately $100 million, a 40% increase over 1993. Targets included many of the classic mineral deposit types for which British Columbia is known; for example, **Eskay Creek, Red Mountain, Huckleberry, Akie**, and properties in the **Interior Plateau** region and the **Aiken-Johanson Lakes** areas. The number of mineral claim units (29 245) recorded in 1994 indicates about a 15% increase from 1993. The rally in the price of gold may enable small, high-grade gold operations to start up; several bulk sampling projects were carried out. A number of advanced projects have entered the Mine Development Assessment Process, with many in the feasibility stage. Some projects (*e.g.*, **Cirque, Mount Milligan and Mount Polley)** have received Mine Development Certificates and await production decisions.

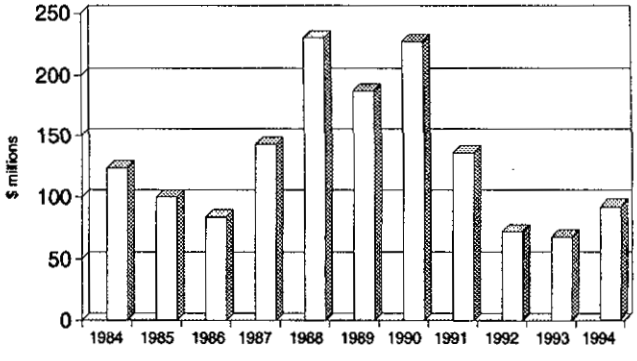
Coal production for 1994 is expected to be back to pre-1992 levels. Industrial minerals are receiving increasing attention with 1994 exploration expenditures estimated at $4.5 million, up from $2 million in 1993.

In 1994 the British Columbia government initiated the three-year $13.5 million **Explore B.C.** program. It 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. This program has had positive and encouraging results from those projects supported in 1994.

REGIONAL PERSPECTIVES AND TRENDS

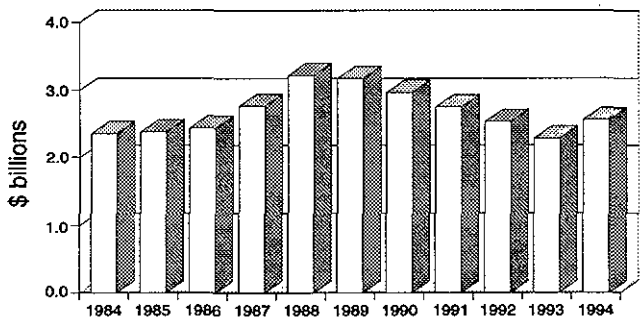
Preliminary estimates indicate that total on-the-ground expenditures on mineral exploration and development projects in British Columbia during 1994 will be approximately $100 million (all Canadian $ unless otherwise stated), a 40% increase in expenditures from 1993. Like 1993, it is estimated that more than half of this total will be spent in the northwest part of the province. This figure is compiled from estimates made on a project-by-project basis throughout the province, primarily from published sources, and is an estimate of the actual dollars spent on the ground. The official Mineral Statistics Survey, compiled in early 1995 and including non-property costs, estimates a total of $93 million.

Figure 1 illustrates the wide 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. Following the record level



Source: MEMPR, Land Management and Policy Branch

Figure 1. Mineral exploration expenditures in British Columbia: 1984 to 1994.



Source: MEMPR, Land Management and Policy Branch

Figure 2. Solid mineral production value in British Columbia: 1984 to 1994.

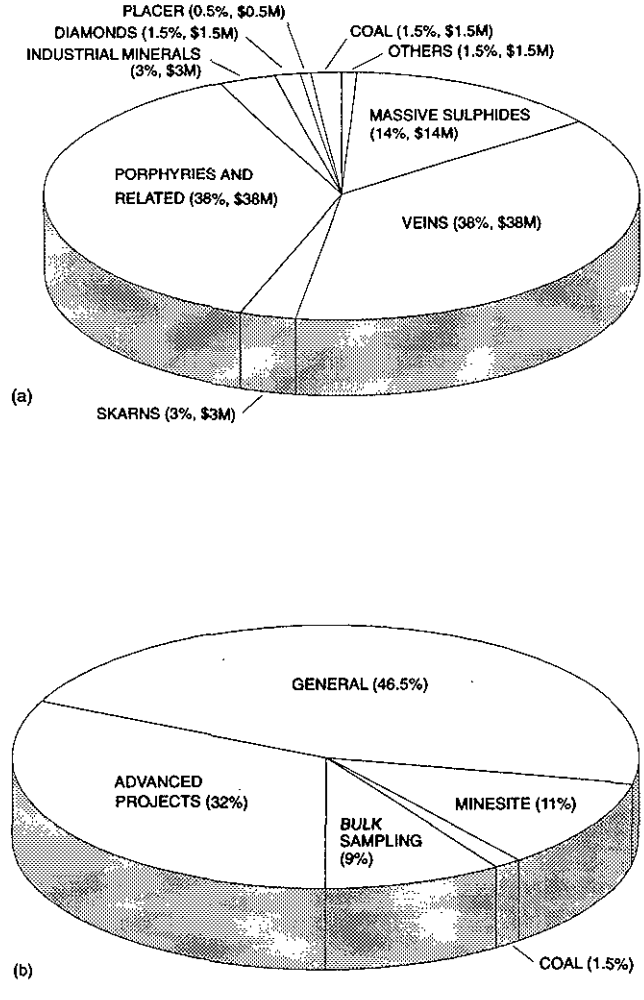


Figure 3. Exploration targets - 1994 (a) by deposit type (%, expenditures); (b) by level or category of program.

in 1988, expenditures have shown a steady decline to a low of $68 million in 1993. For the same ten-year period, the pattern of exploration spending mirrors changes in the total value of solid mineral production including an increase in 1994 values (Figure 2).

Exploration targets are varied and include: veins, volcanogenic, sedimentary and seafloor hydrothermal massive sulphides, porphyries and related deposits, skarns, industrial minerals (including diamonds), coal, placer deposits and others (Figure 3a).

Approximately 11% of exploration expenditures were at minesites, 9% on bulk sampling projects, and 32% on 'advanced' projects, including environmental studies and reclamation programs. Almost half (46.5%) was spent on less advanced and grassroots ('general') exploration programs (Figure 3b). In total, there were approximately 225 projects with budgets in excess of $100 000, up from the 100 projects in 1993. Figures 4a and 4b show the number of projects with expenditures in excess of this figure. As in 1993, by far the largest exploration/development program in the province was by Lac Minerals Limited on the **Red Mountain** gold project near Stewart, estimated around $15 million. In the early fall American Barrick Resources Ltd. gained control of Lac Minerals Ltd. and put the property up for sale.

Grassroots programs were carried out in north-central British Columbia in the Babine and Haha Creek areas for porphyries, in southeastern and northeastern parts of the province for sedex deposits, in the Interior Plateau region of south-central British Columbia for bonanza and bulk-mineable epithermal gold, in the Stewart Camp in the northwest for porphyry-related Red Mountain-type and Snip-type gold, and in the Rocky Mountains for diamonds. Exploration expenditures for industrial minerals increased by 45%, but decreased by 50% for coal.

Similar positive trends are apparent in the levels of new mineral titles recorded (Figure 5) and in the number of Free Miner Certificates issued. The number for mineral claim staking indicates a 15% increase from 1993. The number for Free Miner Certificates (5860) is approximately 4% above the 1993 figure.

HIGHLIGHTS AT OPERATING MINES

PRODUCTION LEVELS

The locations of operating mines in British Columbia in 1994 are shown in Figure 6. No new mines were opened in 1994; however, four mines (**Similco, Gibraltar, Afton-Ajax and Myra Falls**) re-opened. Three operations were closed down either permanently (**Equity Silver**) or indefinitely (**Silvana** and **Johnny Mountain**) due to exhausted ore reserves, low metal prices, or the inability to raise financing (*see* Operations). However, several small high-grade projects (*i.e.* **Elk, Iron Colt, Brett, Porcher Is-**

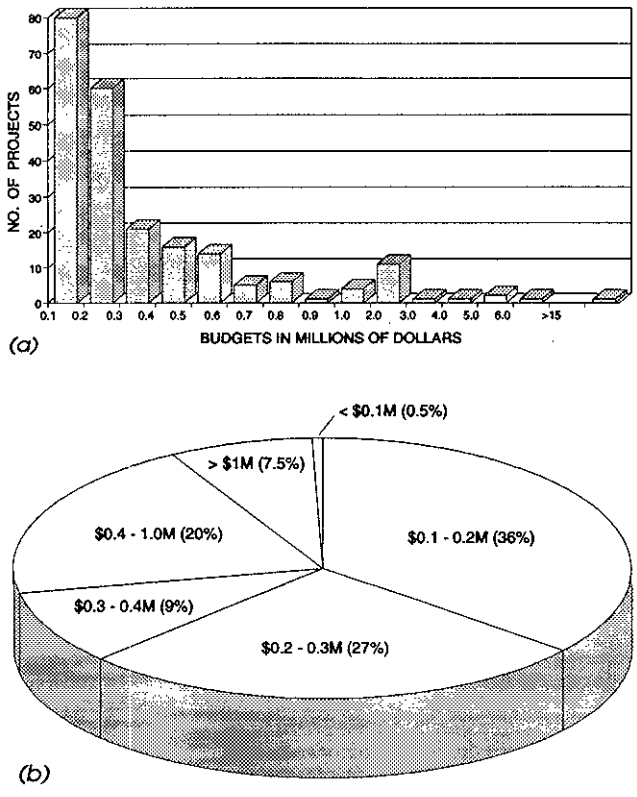
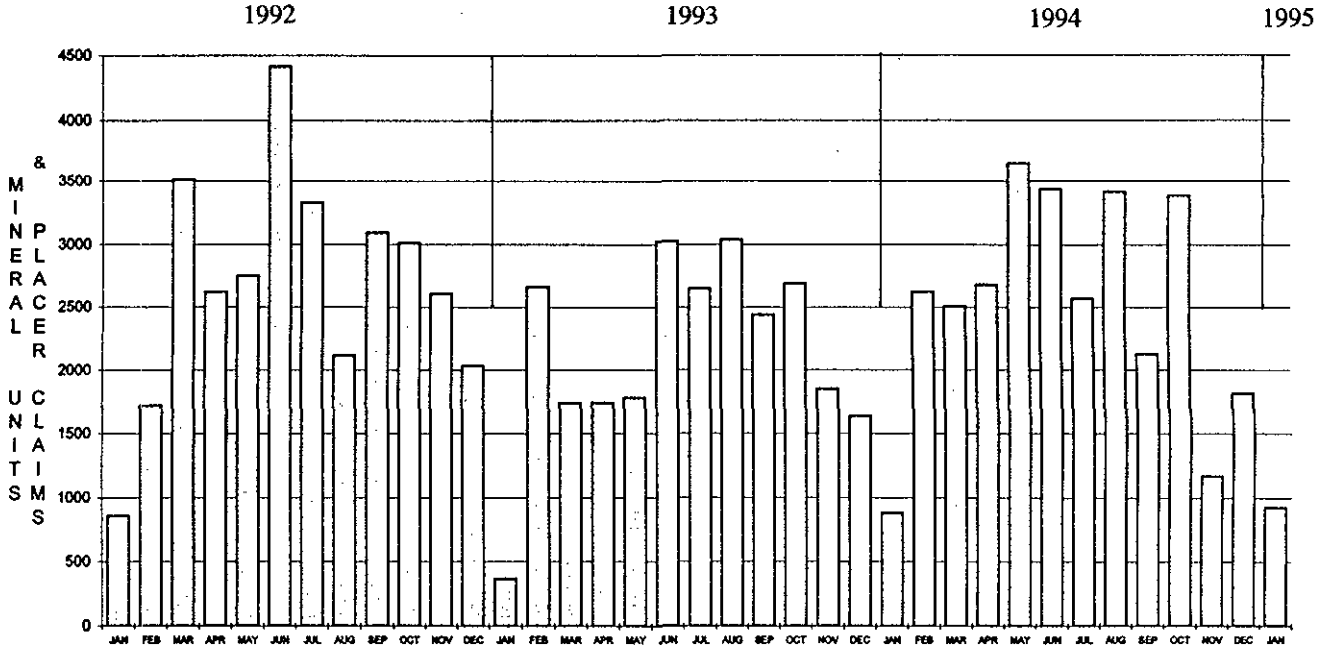


Figure 4. Estimated number of major projects (>$100 000) (a) by incremental $0.1M; (b) by percentage of total.

land, Bonaparte and **SB**) have continued to produce, or plan to produce, using custom milling arrangements (Table 2) (*see* Operations). The **Table Mountain** gold mine reopened on a limited basis. The **Golden Bear** gold mine ceased underground mining and milling of refractory ore from the Bear Main zone; development for heap leaching of the oxide ore from the Kodiak zones was initiated but later postponed to 1995, and development of the refractory ore from the underground Grizzly zone continued.

The forecast value of solid mineral production for 1994 in British Columbia is $2.63 billion, a 10% increase from 1993 (Table 1). Copper represents 30% of the total, at a projected value of approximately $790 million. Coal represents 34%, at a projected value of approximately $905 million. The production of gold is forecast to be 12.7 million grams (408 300 oz) valued at $214.7 million, down from 13.75 million grams (442 000 oz) last year, primarily due to decreases from the **Myra Falls, Equity Silver and Similco** operations. Silver output is forecast at 124.5 million grams (4 million oz) valued at $30 million, down significantly due to reduced production at the **Myra Falls** operation and closure of the **Equity Silver** mine. Zinc production in 1994 is forecast to be 104.6 million kilograms worth $144 million, lead output is forecast to be 45 million kilograms valued at $34 million. Value of production of industrial minerals is forecast to be $47 million; structural materials are expected to account for another $377.5 million.



Source: MEMPR, Mineral Titles Branch

Figure 5. All mineral tenure recorded by month; January 1992 to January 1995.

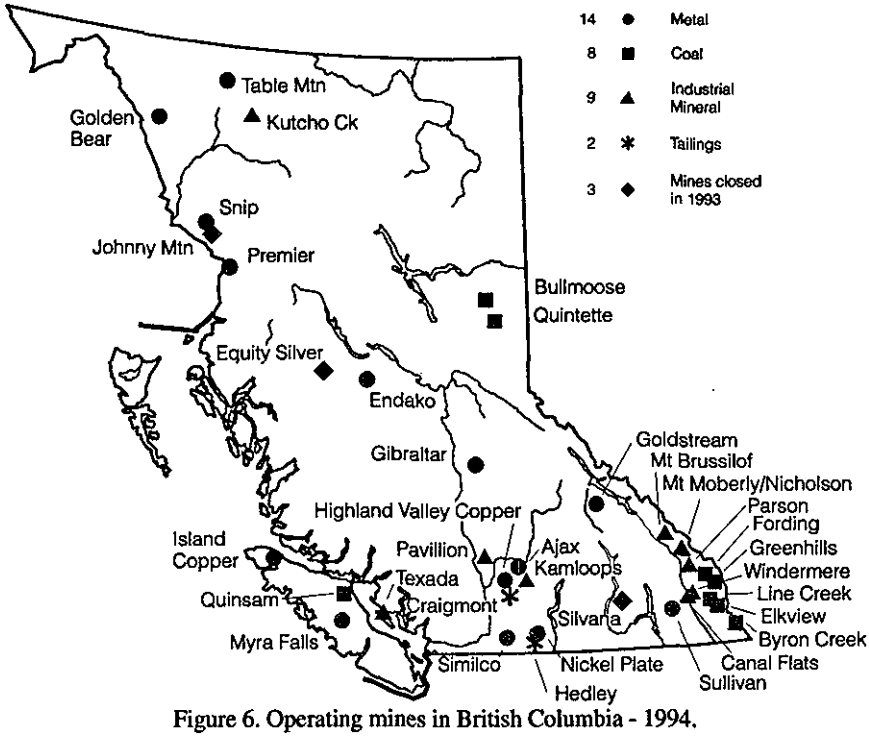


Figure 6. Operating mines in British Columbia - 1994.

OPERATIONS

METAL MINES

The **Snip** gold mine, owned and operated by Cominco Ltd. (60%) and Prime Resources Group Inc. (40%), produced 4.01 million grams (129 000 oz) of gold in 1994 at a cost of US$171 per ounce. The 15 000 kilogram (500 000 oz) production milestone was achieved in the early fall of 1994. Current milling is at 470 tonnes per day; recoveries are approximately 35% by gravity circuit and 56% by flotation, for an overall 91% recovery. The very clean concentrate typically grades 320 g/t Au and 150 g/t Ag. Production for 1994 was about 14% less then that for 1993 due to a 15% decline in ore grade. Mining is currently being conducted between the 180-metre and 470-metre levels; extensions are planned upwards to the 580 and 600-metre levels over the next two years. An active underground exploration drilling program (15 000 to 20 000 m) continues to add tonnage to reserves. Development drilling has resulted in confirming mineable reserves estimated by the company at 811 000 tonnes grading 26.4 g/t Au at January 1, 1994. Exploration is currently focused on the east part of the vein system, above and below the 180-metre level. Snip is the largest producer of gold in the province; it continues to be an extremely profitable low-cost operation. Cominco and Prime are confident of extending the operating life of the mine past the current four-year projection. The first shipment of concentrate to a B.C. mill was in 1994 to the Premier mill near Stewart.

The **Highland Valley Copper** mine, a partnership among Cominco Ltd. (50%), Rio Algom Limited (33.6%), Teck Corporation (13.9%) and Highmont Mining Company (2.5%) milled 43 484 000 tonnes during 1994 at an average daily throughput of 119 135 tonnes. Production totalled 166 400 tonnes of copper contained in concentrate, 60 620 kilograms (1.95 million oz) of silver, 395 kilograms (12 700 oz) of gold and 1.6 million kilograms of molybdenum. Mining was carried out in both the Valley and Lornex pits, with 93% of the ore coming from the former. The ore in the Lornex pit bottom was depeleted in 1994, and stripping of 15.5 million tonnes of waste rock was carried out on the upper east wall, which will allow production from the pit to resume in early 1995. Published reserves at January 1, 1994 are 539.7 million tonnes averaging 0.421% Cu and 0.0073% Mo. The mine is one of the largest operations in the world and employs about 1080 people.

The **Island Copper** mine produced 52 520 tonnes of copper, 1.3 million kilograms of molybdenum, 1138 kilograms (36 590 oz) of gold, and 14 800 kilograms (475 480 oz) of silver in 1994. Between 1971 and 1994 the mine has produced 1.2 million tonnes of copper, 27 300 tonnes of molybdenum, 32 700 kilograms (1 050 000 oz) of gold, 336 000 kilograms (10 800 000 oz) of silver, and 23 600 kilograms of rhenium. BHP Minerals Canada Ltd. continues to implement its closure plan for the mine; the mill is expected close in late 1995. Mining in the pit will end in June 1995 and from the beach dump in September 1995. Structural problems associated with the south wall of the pit may preclude mining of some reserves.

Production at the Westmin Resources Limited **Myra Falls** mine resumed in September, 1994 after a 16-month

TABLE 1
1994 FORECAST VALUE OF MINERAL PRODUCTION IN B.C.

Commodity	Quantity (millions)	$ Value (millions)	Percent of Total Value
Copper	249 kg	790	30%
Gold	12.7 g	215	8%
Zinc	105 kg	144	6%
Lead	45 kg	34	1%
Molybdenum	8.1 kg	82	3%
Silver	125 g	30	1%
Other		11	.4%
Total Metals		**1 305**	**50%**
Structural Materials		378	14%
Industrial Minerals		47	2%
Metallurgical Coal	19.95 t	860	33%
Thermal Coal	1.83 t	45	2%
Total Solid Minerals		**2 634**	**100%**

Source: MEMPR, Land Management and Policy Branch

TABLE 2
ACTIVE AND POTENTIAL CUSTOM MILLING PROJECTS

Mill or Smelter/ Location	Project Name (Potential)	Commodity	Operator
Asarco/Helena, Montana	*Elk	Au	Fairfield Minerals Ltd.
Bolivar/Vananda, B.C.	Texada Is.	Au	Metals Research Corp. Ltd.
Greenwood, B.C.	(Brett)	Au	Liquid Gold Res. Inc./Huntington Res. Ltd.
Island Copper, Port Hardy, B.C.	(Hushamu)	Cu, Au, Mo	BHP Minerals Canada Ltd./Jordex Res. Ltd.
Kettle/Republic, Washington	*Iron Colt	Au	Pacific Vangold Res. Inc./ Int'l Silver Ridge Res. Inc.
Premier/Stewart, B.C.	(Debbie)	Au	White Hawk Ventures Inc.
Premier	(Greens Creek, Alaska)	Au, Cu, Ag, Pb, Zn	Kennecott Corp./Hecla Mining Co./ CSX Energy Corp./Exalas Res.
Premier	(Johnson River)	Au, Cu, Ag, Pb, Zn	Westmin Res. Ltd.
Premier	(Jualin)	Au	Coeur d'Alene Mines Ltd.
Premier	(Porcher Island)	Au	Westmin Res. Ltd.
Premier	(Red Mtn.)	Au, Ag	American Barrick Res. Ltd.
Premier	(Skinner)	Au	Ottarasko Mines Ltd.
Premier	Snip	Au	Cominco Ltd./Prime Resource Group Inc.
Premier	(SB)	Au	Tenajon Res. Ltd./Westmin Res. Ltd.
Trail	*Bonaparte	Au	Claimstaker Res. Ltd.
?	(Engineer)	Au	Ampex Mining
?	(Valentine Mtn.)	Au	Beau Pre Explorations Ltd.

* = Active

mining hiatus due to a labour dispute. During 1994 the mine operated at 2675 tonnes per day and produced 16 389 tonnes of copper concentrate, 9555 tonnes of zinc concentrate, and 0.473 tonnes of gold concentrate. Geological reserves at January 1, 1995 were estimated by the company at 12.5 million tonnes grading 1.9% Cu, 0.5% Pb,7.1% Zn, 46.1 g/t Ag and 2.0 g/t Au. Proven and probable reserves in the Battle zone are estimated at 2.9 million tonnes grading 2.0% Cu, 0.4% Pb, 10.3% Zn, 0.9 g/t Au and 20 g/t Ag. The nearby Gap zone contains additional proven and probable reserves of 714 000 tonnes grading 1.5% Cu, 0.9% Pb, 10.6% Zn, 2.5 g/t Au and 121.2 g/t Ag. Westmin began development of the Battle/Gap zone with production scheduled for spring 1995. The Zn-Au-Ag-rich Battle ore will be blended with copper-rich ore from the H-W zone. Over the next five years Westmin plans to mine approximately 6.5 million tonnes of ore grading 1.7% Cu, 6.1% Zn, 1.7 g/t Au and 39 g/t Ag. The company estimates that less than 40% of the property has been 'properly' explored. Over the next five years it plans to spend $2.7 million annually on exploration, especially testing the Trumpeter zone located at the eastern end of the Myra Falls mining operations. Drilling late in 1994 extended the zone at least 140 metres to the northwest of previously known mineralization. In addition drilling also encountered two well mineralized zones above the Trumpeter zone; felsic fragmental hostrocks are very similar in nature to the Block 43 ore in the H-W mine approximately 1-kilometre to the west. If this upper zone turns out to be an extension of Block 43, it has significant tonnage implications for the eastern end of the H-W mine. The company plans to continue the drilling program to test the western extensions of the Trumpeter zone.

At the Gibraltar Mines Limited **Gibraltar** (McLeese Lake) mine, mining and milling resumed in September 1994. Operations had been suspended on December 1, 1993 due to low copper prices. Full production, with 277 employees, and shipping of concentrate began by year end. Production at a daily milling rate of 35 825 tonnes in 1994 totalled 9420 tonnes of copper. The company estimated reserves at January 1, 1995 at 166.3 million tonnes grading 0.291% Cu and 0.009% Mo. The improved price of copper, the lower value of the Canadian dollar, and cost reductions, together with the cooperation and contributions from the B.C. Job Protection Commissioner, the B.C. Ministry of Energy, Mines and Petroleum Resources, B.C. Hydro and the Cariboo Regional District, led to the decision to resume operations. Gibraltar has acquired the GM claims on the east (Pollyanna) side of the property and diamond drilling expanded the reserves in this area by about 9 million tonnes grading 0.33% Cu. The molybdenum circuit is expected to be restarted in late 1995.

At the **Equity Silver** mine, Equity Silver Mines Ltd. ceased milling in January 1994, after thirteen years of open-pit and underground production. Production totalled approximately 2 million kilograms (66.7 million oz) of silver, 15 900 kilograms (511 296 oz) of gold and 81 million kilograms (178.2 million pounds) of copper, from over 32 million tonnes mined at an average grade of 0.34% Cu, 101 g/t Ag and 1.1 g/t Au. Approximately 25 employees remain on site to carry out closure and reclamation, with costs estimated at $47.5 million. Equity Silver drill tested the adjacent SG claims on its eastern boundary in an inconclusive search for the source of ore-grade float boulders. An auction was held in August and most of the mine's assets were sold.

In 1994 the Homestake Canada Ltd. **Nickel Plate** open-pit mine produced 2554 kilograms (82 100 oz) of gold from 1 269 800 tonnes of ore at a daily mill throughput of 3570 tonnes. Cash costs increased to US$351 per ounce gold. Mining will be substantially reduced in 1995; the ore reserve is expected to be depleted by the end of 1996. Reserves at January 1, 1995 were estimated by the company at 2 590 110 tonnes grading 2.64 g/t Au.

Cominco Ltd. production at the **Sullivan** mine in 1994 was 47 000 tonnes of lead and 105 000 tonnes of zinc from 1 613 000 tonnes at a daily rate of 8000 tonnes. The average silver grade was 19 g/t. 1994 was the first full year of operation of the new lead regrind circuit in the mill, resulting in higher grade zinc concentrates, and improved lead and zinc recovery. Zinc concentrate production in 1994 was the highest level achieved in the last 30 years. Published reserves as of January 1, 1995 were 13 million tonnes grading 25.7 g/t Ag, 4.5% Pb and 7.9% Zn.

Production from the **Golden Bear** mine, now owned by Wheaton River Minerals Ltd., was 980 000 grams (31 506 oz) of gold and 286 kilograms (9200 oz) of silver from 88 920 tonnes of ore milled in 1994. From start-up in 1990 to the end of June, 1994, production totalled about 419 000 tonnes averaging 15.4 g/t Au. Mill recovery averaged 89%, netting a total of 5743 kilograms (184 640 oz) of gold. Lower grade surface material in the pit area was the last ore run through the mill in September. Reserves at January 1, 1995 were estimated by the operator at 473 000 tonnes grading 4.67 g/t Au. Production was slowed by a two-week shutdown in February and eventual temporary closure of operations in September.

In June 1994, Wheaton and North American Metals Ltd. announced a revised production plan and received a Mine Development Certificate from the provincial government in early August. The new plan, which involves heap-leach technology, predicts present rates of gold production to continue for up to five more years from currently known lode gold and stockpiles. Estimated total contained gold in the Kodiak A, B and C zones, and the low-grade stockpile is 967.3 kilograms grams (31 100 oz) in approximately 3 350 000 tonnes grading between 1.5 and 8.2 g/t Au and averaging 2.9 g/t Au. The original mining plan called

for approximately 325 000 tonnes of ore grading 4.6 g/t Au from the Kodiak A zone to be mined (open pit), crushed and stacked during August to November, at which time heap leaching was to have begun. Production costs were expected to be US$224 per ounce. Drilling during the summer increased the total mining reserve to 473 000 tonnes and increased the contained ounces by 18%. Column tests indicate a recovery of greater than 93% of the gold by heap leaching. Unfortunately, heavy rains during the latter part of September and early October washed out two bridges on the mine access road and damaged the airstrip. Consequently, the company has deferred installation of the liner on the leach bed until June 1995. Gold production is expected by September.

During the past summer and fall two new zones of gold mineralization were discovered on the Kodiak North (Ursa deposit) zone, 800 metres to the north of the Kodiak A open pit. The hostrock is a strongly hematized limestone breccia, similar to Kodiak ore, indicating good potential for heap leaching. Twelve holes drilled on the Ursa deposit have outlined a deposit along a strike length in excess of 100 metres and to a depth of up to 75 metres. The deepest hole returned an intersection grading 12.2 g/t Au across 27.2 metres. A second phase of drilling is planned for 1995.

Also in the fall of 1994, a new zone of high-grade gold mineralization was discovered during the advance of the Grizzly zone decline being driven to test previous ore-grade drilling intersections. A fault structure (Cub zone) grading 27.0 g/t Au across a true width of 3.9 metres was intersected 500 metres down the decline. This zone, east of the Footwall fault, is separate from the Grizzly zone and opens up another new exploration area on the property. The Cub zone mineralization is refractory and may be related to the Main Bear fault, which hosted most of the gold in the previously mined Main Bear zone, 400 metres above it. A nine-hole, 6500-metre drilling program will test this new zone. Overall, Wheaton River's exploration of the various deposits associated with the 22-kilometre-long Ophir Break during 1994 is estimated to have cost $5.5 million.

During 1994 the Princeton Mining Corporation's **Similco** mine produced 5565 tonnes of copper, 229 917 grams (7392 oz) of gold and 1021 kilograms (32 830 oz) of silver from 2 750 000 tonnes of ore at a daily milling rate of 24 500 tonnes. The mine closed in November 1993, due in part to low copper prices. During 1994 the company was restructured and the mine re-opened on August 18th. The planned operating rate of 22 675 tonnes per day was achieved by the end of September. Mitsubishi Materials Corporation provided Princeton with a US$3.6 million advance credit against the production and delivery of concentrate. In 1995, the operation is forecast to yield 19.8 million kilograms of copper and 840 kilograms (27 000 oz) of gold. Company proven and probable reserve estimates at January 1, 1995 were 135.6 million tonnes grading 0.36% Cu, 0.1 g/t Au (recoverable) and 0.98 g/t Ag (recoverable). During the year Princeton completed a definition drilling program at the Ingerbelle East deposit, 1200 metres from the mill. Results of the twenty-one hole, 4170-metre drilling program show that the mineralization is continuous. An evaluation of drilling results has led the company to announce an initial plan to conduct mining in two phases: phase 1 containing 13 million tonnes grding 0.32% Cu and 0.24 g/t Au, and phase 2 containing 38.4 million tonnes grading 0.33% Cu and 0.24 g/t Au. Similco intends to begin mining the phase 1 pit in the latter part of the first quarter of 1995. Approximately 35% of the 1995 mill throughput is expected to come from the Ingerbelle East zone, with the balance coming from the existing low-grade stockpile. Also during 1994, Princeton completed a phase 1 diamond drilling program totalling 4909 metres in 29 holes on the Alabama zone. A preliminary inventory of 20 million tonnes grading 0.31% Cu and 0.16 g/t Au is indicated. A phase 2, 4600-metre diamond drilling program commenced in November on the Alabama deposit, with the goal of defining a reserve base for a final pit design.

During 1994 the Westmin Resources Limited **Premier** gold mine produced 521 760 grams (16 775 oz) of gold and 5278 kilograms (169 675 oz) of silver from 164 175 tonnes of ore at a daily throughput of 700 tonnes. Custom milling of 3757 tonnes from five different sources yielded an additional 19.7 kilograms (633 oz) of gold and 50.9 kilograms (1636 oz) of silver. Mining was from two main areas, the Northern Light and the Glory Hole zones; proven and probable reserves as of January 1, 1995 were estimated by the company at 113 225 tonnes grading 8.23 g/t Au and 85.8 g/t Ag. 1994 production of 4-level and 450-sublevel ore through the 6-level portal at approximately 180 tonnes per day is expected to continue at least through 1995. An additional 450 tonnes of mill feed per day is from other areas in the mine. During 1994 Westmin carried out an exploration drilling program to test for a northerly extension of mineralization in the **Lesley Flats** area.

During 1994 the **Goldstream** mine, operated on a 50-50 basis by Goldnev Resources Inc. and Bethlehem Resources Corporation, produced 13 500 tonnes of copper, 1545 tonnes of zinc and 4610 kilograms (148 350 oz) of silver from 348 660 tonnes of ore at a daily throughput of 1000 tonnes. The mill was closed down from March 15 to April 15, 1994; mine development continued. Reserves as of January 1, 1995 were reported to be approximately 600 000 tonnes grading 4.2% Cu, 2.3% Zn and 18 g/t Ag. Exploration in the mine area in 1994 centred on a six-hole, 2330-metre definition drilling program on the down-plunge extension of the orebody. Preliminary results are very encouraging; an additional five holes further tested the zone between the 0 (surface) and 250-metre elevations. Exploration was also carried out on the **C-1** zone approximately 10 kilometres west of the mine.

In the last half of 1993, International Skyline Gold Corporation re-opened the **Johnny Mountain** gold mine and produced 247 kilograms (7940 oz) of gold and 482 kilograms (15 500 oz) of silver from 21 850 tonnes of ore at an average daily throughput of 350 tonnes. The mine did not re-open in 1994. Reserves estimated by the company as of January 1, 1994 were 24 000 tonnes grading 11.3 g/t Au, 22 g/t Ag and 0.23% Cu. Exploration by Skyline in 1994 was concentrated on the Bronson Slope porphyry area to the northwest of the mine. In September, Foremost Industries Inc. signed a letter of agreement with International Skyline whereby Foremost will own the mining and milling equipment and will become a participant in a joint venture to explore, develop and process ore from Skyline's mineral properties and other adjacent claims, on a custom milling basis.

At the **Endako** molybdenum mine, Placer Dome Inc. produced 6200 kilograms of molybdenum from 10.4 million tonnes of ore at a daily throughput of 28 200 tonnes. Published proven and probable reserves as of January 1, 1995 were 117 600 million tonnes grading 0.077% Mo. In 1994 Placer carried out an eight-hole, 914-metre diamond drilling program to delineate ore in the Endako Southeast pit. Additional exploration was conducted later in the year.

At the **Ajax** copper-gold mine, Afton Operating Corporation resumed production in September after a three-year suspension in operations because of depressed metal prices. During the three month operating period, Afton milled 931 000 tonnes of ore and produced 3586 tonnes of copper and 24 250 grams (7885 oz) of gold. The work force numbered 139 at year-end and will increase to 156 in early 1995, when mining resumes in the Ajax West pit. Reported reserves at January 1, 1995 were 13.2 million tonnes grading 0.42% Cu and 0.34 g/t Au. Mill capacity at the nearby Afton plant is 8500 tonnes per day.

Cusac Industries Ltd. re-opened the Table Mountain gold mine in late 1993. Development and mining centred on the Bain vein. Mining began in April 1994. Approximately 30 000 tonnes grading 14.1 g/t Au, primarily from the West Bain vein area, were mined and milled with cash operating costs totalling US $177 per ounce. In October, Cusac began to develop the Michelle high-grade zone (22 675 tonnes grading 35.0 g/t Au) from the old Eileen vein workings by driving an additional 200 metres to intersect the vein. In late October the mill was shutdown due to a decrease in grades down-dip on the West Bain vein.

COAL MINES

Coal production in 1994 is expected to be back to pre-1992 levels. In the Kootenay coalfields, Fording Coal Limited plans to increase production at its **Greenhills** mine by 50% to meet the stronger demand for metallurgical coal on world markets. Output will increase to 4.5 million tonnes in 1995 from 3 million tonnes last year. At its **Fording River** mine, Fording is also boosting production from 6.5 million tonnes to about 7 million. In October, Fording signed an agreement to buy the coal mining assets (**Byron Creek Collieries**) of Corbin Creek Resources Limited. Byron Creek produced about 300 000 tonnes of thermal and weak coking coal in 1994, well below the 2 million tonne capacity of its washing and drying plant. Fording produced about 13 million tonnes of coal in 1994 from its three southeast British Columbia operations. In a major breakthrough, coal from Fording Coal and Smoky River, Alberta operations is now being used as the primary product in coking coal blends. Initial results from a shipment to Croatia are very encouraging with all blast furnace coke-quality requirements being met. The owners are hopeful that new markets will open up. Production at Teck's Elkview mine was in the 2.5 million to 3 million tonne range.

In the Peace River coalfields, Japanese steel mills are taking contract tonnage from the Quintette (Quintette Coal Limited) and Bullmoose mines (Teck Corporation, 60.9%, Rio Algom Limited, 29.1%, and Nissho Iwai Coal Development (Canada) Ltd., 10%). Annual production at Quintette and Bullmoose is estimated at 4.2 million tonnes and 2 million tonnes respectively.

At the **Quinsam** mine on Vancouver Island, Quinsam Coal Corporation has finished open-pit production and is now dependent on coal from underground sources.

INDUSTRIAL MINERALS MINES

British Columbia is well endowed with a variety of industrial minerals. There are nine major mines and more than twenty-five 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 are sulphur, magnesite, gypsum, silica, barite, limestone and construction materials with lesser production of jade, diatomite, magnetite, dolomite, dimension stone, clay and fuller's earth. Sand and gravel pits are located throughout the province. In 1993 there was reported production of twelve industrial mineral commodities with a total value of $48.3 million; structural materials accounted for another $320 million.

Sulphur, derived from natural gas, is produced at five extraction plants in the northeastern part of the province. Production in 1993 totalled approximately 710 000 tonnes; up 20% from 1992. The new sulphur-recovery operation near Chetwynd started production in October 1994.

In the Rockies, Westroc Industries Limited is planning to sustain **gypsum** production at 450 000 tonnes per year by opening the **Elkhorn II** deposit which is an extension of the existing pit on Windermere Creek. The company has developed an excellent grade-control program and is able to ship a blended gypsum product with constant amounts of soluble salts and clay and limestone impurities.

Domtar Gypsum is being restructured into a public company called North American Gyprock Company. It opened a new pit between Swan Lake Provincial Park and Coyote Creek at its **Canal Flats** operation and continues to ship approximately 100 000 tonnes per year. Two wallboard plants in the Vancouver area are supplied by gypsum from the Kootenays.

In operation since 1982, Baymag Mines Company Limited continues to mine **magnesite** at **Mount Brussilof** at a rate of approximately 175 000 tonnes annually. The magnesite is shipped to a processing plant at Exshaw, Alberta to produce high-quality calcined and fused magnesia. The company is considering plans to increase production levels.

The **Mount Moberley** and **Nicholson silica** mines in the Golden area account for all of British Columbia's silica production. Mountain Minerals Ltd. is producing approximately 80 000 tonnes annually from the Moberley quarry and Bert Miller Contracting is producing approximately 50 000 tonnes annually from the Nicholson mine.

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 for filler applications is produced from deposits at **Benson Lake**, two quarries on Texada Island and the **Lost Creek** mine near Creston. Imasco Minerals Inc. is developing new resources in the upper part of the Lost Creek deposit. Limestone is processed by three cement plants and two lime production centres near Kamloops and Lillooet and in the Lower Mainland. White limestone is used as a filler in paints and plastics produced in Surrey and Creston. 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. With the current mine reserves sufficient for only four years, the company has acquired the Muncho Lake barite deposits close to the Alaska Highway west of Fort Nelson and is preparing a major drilling program.

Granite and **marble** are being produced by a number of companies, including Fox Island Granite Co. Ltd., B.C. Granite Ltd., Matrix Marble Corp., North West Granite Co. Ltd., and Quarry Pacific Industries Ltd. Stone-processing plants are being operated by Margranite Industries Ltd. in Surrey, Matrix Marble in Duncan and Westcoast Granite manufacturing Inc. in Delta. Revelstoke Flagstone Quarries and Begbie Flagstone Ltd. are together producing approximately 4000 tonnes of **mica schist flagstone**. Kootenay Stone Centre in Salmo is producing about 4000 tonnes of **quartzite flagstone**.

Clayburn Industries Ltd. of Vancouver is mining relatively small amounts of **fireclay, diatomite** and **pyrophyllite** at three different sites. Western Clay Products Ltd. in Kamloops rebuilt its plant last year, quadrupling its capacity. The production has doubled since last year; at present the company supplies approximately half of the kitty litter market in western Canada. The company is planning to undertake research and development for higher value products (catalyst carriers) using clay (**fuller's earth**) from its quarry near Kamloops. Production in 1994 is expected to reach 40 000 tonnes.

Near Sechelt, Tri-Sil Minerals Ltd. was briefly shipping from its **wollastonite** quarry, however, the only sales to date have been to cement plants.

Dolomite quarried in the Creston and Rock Creek areas is used for soil conditioning, as a component in stucco and roofing materials, and as white, ornamental aggregate rock.

TAILINGS

Candorado Operating Company Limited operated the **Hedley** tailings project at a designed rate of 36 000 tonnes per month and the target production for 1994 is 200 000 tonnes grading 1.34 g/t Au. Craigmont Mines Ltd. and M-7 Industries Ltd. continued to recover magnetite from the Craigmont mine tailings.

ADVANCED EXPLORATION AND DEVELOPMENT PROJECTS

METALS

A number of exploration projects advanced in 1994 to development or bulk sampling stages. The projects described in this section are shown on Figure 7 and listed with reserves in Table 3.

Proven and probable reserves for the 21B zone at the Prime Resources Group Inc. **Eskay Creek** property are estimated at 1.09 million tonnes grading 65.14 g/t Au, 2949 g/t Ag, 5.6% Zn and 0.77% Cu for a total *in situ* inventory of 71 000 kilograms (2 300 000 oz) of gold and 3172 tonnes (102 000 000 oz) of silver.

During 1994 the access road to the mine area was completed and all production facilities were commissioned and made fully operational. Production mining began in November and initial shipments of crushed ore were trucked to the transhipment facilities for delivery to smelters in January 1995. The mine came into production only two years after application to the provincial government for a Mine Development Certificate. The direct shipping ore is crushed and blended at the mine and then moved by rail from Kitwanga to Noranda's Horne smelter in Quebec, and by sea from Stewart to Dowa Mining's smelter in Japan. At a daily mining rate of 300 tonnes, annual production is estimated at 6530 kilograms (210 000 oz) of gold and 290 000 kilograms (9.3 million oz) of silver together with copper and zinc. The operating cost is forecast to be US$187 per

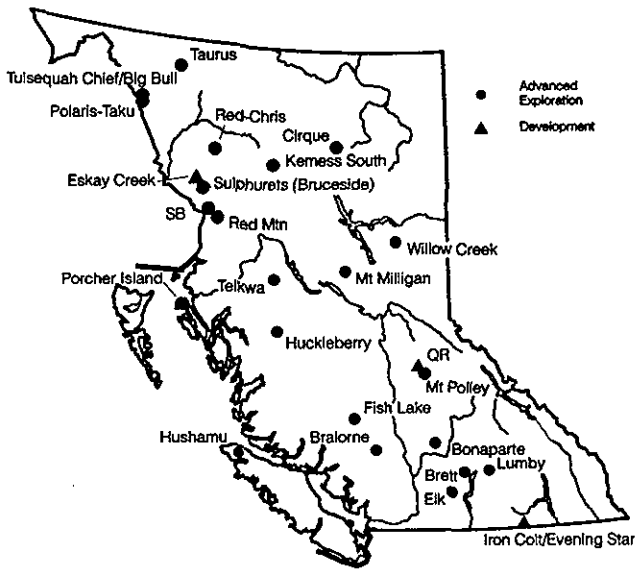


Figure 7. Advanced exploration and development projects in British Columbia - 1994.

ounce gold equivalent. Eskay Creek will become the fourth largest silver producer in the world. Zinc will be recovered using the solvent extraction - electrowinning method.

During excavation for a rock quarry to provide aggregate for road construction, a 0.4-metre sulphide bed was discovered approximately 150 metres stratigraphically above the favourable contact mudstone unit. Six deep drillholes tested the 'Eskay horizon' north and east of the deposit, on the IKS and GNC claim groups. New zones of gold mineralization were located during underground development. Prime has entered into agreements to acquire the remaining 50% interest in the IKS 1 mineral claim which is estimated to contain approximately 4975 kilograms (160 000 ounces) of gold equivalent, as part of the 21B zone orebody. The potential to increase reserves is considered very good.

In 1994 Lac Minerals Ltd. which has now been taken over by American Barrick Resources Corporation, carried out the largest exploration/development program in the province, with expenditures estimated in excess of $15 million on the **Red Mountain** project. The company previously reported the resource in the Marc and AV zones was 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. During 1994, 22 742 metres of surface drilling was completed in 63 holes and 16 390 metres of underground drilling in 66 holes. Five hundred and forty metres of underground development were completed in the decline for diamond-drill stations in the hangingwall and in the AV zone. The proposed development/production portal (1750-metre level) and decline was advanced for 12 metres of an estimated 1.3 kilometres to reach the Marc, AV and JW zones.

Surface exploration included mapping, soil sampling, trenching and down-hole geophysics. This year's focus was on the AV and 141 zones, and the south-southeastern part of the property.

The **Tulsequah Chief** and **Big Bull** projects, located 75 kilometres northeast of Juneau, Alaska were explored by Redfern Resources Ltd. with expenditures estimated at $900 000 on each. Underground drilling (4240 m) and surface drilling (1700 m) were completed on the Tulsequah Chief deposit. Underground drilling was mainly targeted on the northeast extensions of the H and G lenses which comprise most of the present geological reserve estimated by the company at 8 489 885 tonnes grading 1.41% Cu, 1.23% Pb, 6.65% Zn, 2.56 g/t Au and 103.4 g/t Ag. In-fill drilling on the H lens intersected a thick and high-grade zone (Hole TCU94-065, 13 m grading 2.92% Cu, 1.15% Pb, 11.65% Zn, 3.1 g/t Au, and 159 g/t Ag) which is expected to substantially improve the existing reserve in an area of low drilling density. Surface drilling confirmed the western extension of the host stratigraphy and alteration associated with the main deposit approximately 300 metres down-dip from its previously known limit. A Pre-application for a Mine Development Certificate has been filed with the Government of British Columbia.

At the Big Bull deposit, 8 kilometres south of the Tulsequah Chief, a surface diamond drilling program consisting of 5528 metres in fifteen holes was successful in expanding the size of the massive sulphide deposit mined by Cominco in the 1950s. The ore appears to be disrupted by faulting, and a distinct stratiform body has yet to be recognized. Drilling also confirmed the large size of the Big Bull alteration system, which has a minimum strike length of 1000 metres, and a minimum dip extent of 600 metres. A recently discovered and significant thickness (up to 40 m) of massive manganese oxide and jasper is interpreted by the company to be an exhalative deposit distal to the main vent area.

On the **Sulphurets (Bruceside)** project, owned 60% by Newhawk Gold Mines Ltd. and 40% by Granduc Mining Corporation, an estimated $1.5 million was spent on 7350 metres of drilling concentrated in three areas. Deep drilling (300 to 500-m holes) tested the Gossan Hill/Tommyknocker zones; areas with open intersections of mineralization in the West and Shore zones; and the up-dip extension of the R8 structure of the West zone at its eastern end. Exploration to date has identified over forty zones of gold-silver mineralization including the West zone, where geological reserves are estimated by the company at approximately 750 000 tonnes grading 15.43 g/t Au and 647 g/t Ag. Drilling at the western end of the West zone intersected a wide, low-grade halo, with higher grades within it, that provides some potential for additional reserves.

On the **Huckleberry** project, New Canamin Resources Ltd. completed 19 807 metres of drilling, including in-fill drilling (38 holes totalling 4585 m) on the Main zone; defi-

TABLE 3
NEW MINES, RE-OPENINGS, CLOSURES, DEVELOPMENT
AND ADVANCED EXPLORATION PROJECTS

Company Name	Project Name	Commodity	Estimated Tonnes (000s)	Estimated Grade	Reference	Estimated Employment
Re-Openings/Development						
Prime Res. Group Inc.	Eskay Creek/ 21B zone	Au,Ag	1019	65.14 g/t Au, 2949 g/t Ag, 5.6% Zn, 0.77% Cu	Homestake, MDC (prod. Spring '95)	125
Cusac Ind. Ltd.	Table Mtn. Bain zone Michelle zone	Au	 32.7 22.7	 23.6 g/t Au 35.0 g/t Au	Cusac, 1994	
Teck Corp.	Afton/Ajax	Au, Cu	14 100	0.46% Cu, 0.34 g/t Au	Teck Ann. Rpt., 1991	150
Westmin Res. Ltd.	Myra Falls	Cu, Pb, Zn, Ag, Au	12 500	1.9% Cu, 0.5% Pb, 6.3% Zn, 45.6 g/t Ag, 2.1 g/t Au	Westmin, 1994 (prod. of Battle z. Spring '95)	350
Princeton Mining Corp.	Similco	Cu, Au	94 800	0.399% Cu	Princeton, 1994	250
Gibraltar Mines Ltd.	Gibraltar (expansion)	Cu	170 100	0.3% Cu, 0.0095% Mo	Gibraltar, 1994	275
Kinross Gold Corp.	QR	Au	1300	4.77 g/t Au	Kinross, MDC 1994 (prod. Spring '95)	75
North American Metals Ltd./ Wheaton River Minerals Ltd.	Golden Bear (Kodiak)	Au	473	4.6 g/t Au	Wheaton, MDAP 1994	75
Bethlehem Res. Corp./ Goldnev Res. Inc.	Goldstream	Cu, Ag, Zn	1000	4.3% Cu, 2.94% Zn, 12 g/t Ag	Bethlehem, 1994	130
Closures (Indefinite)						
International Skyline Gold Corp.	(Johnny Mtn)	Au, Ag, Cu	24	11.3 g/t Au, 22 g/t Ag, 0.23% Cu	Skyline, 1994	
Amcorp Ind. Ltd.	(Silvana)	Pb, Zn, Ag	54	3.4% Pb, 4.7% Zn, 290 g/t Ag	SW, Oct. 13/94	
Equity Silver Mines Ltd.	Equity Silver	Ag, Au, Cu				
North American Metals Ltd. Wheaton River Minerals Ltd.	Golden Bear (Bear Main)	Au				265
Advanced Exploration						
Coal and Industrial Mineral Deposits						
Manalta Coal Ltd.	Telkwa	coal	38 670	thermal		
Globaltex Industries Ltd.	Willow Creek	coal		thermal		

Table 3 continued

Quinto Mining Corp. Ltd.	Lumby	graphite, sericite	27 000		Quinto, 1994	
Porphyry (and related) Deposits						
Imperial Metals Corp.	Mt. Polley	Cu, Au	49 000	0.38% Cu, 0.55 g/t Au	Imperial Metals MDC,1993	200
Taseko Mines Ltd.	Fish Lake	Cu, Au	675 000	0.236% Cu, 0.435 g/t Au	Taseko Mines, 1994	300+
El Condor Res. Ltd./ St. Philips Res. Ltd.	Kemess South	Cu, Au	200 400	0.22% Cu, 0.63 g/t Au	El Condor, MDAP, 1992	300+
Jordex Res. Ltd.	Hushamu (Expo)	Cu, Au, Mo	173 237	0.27% Cu, 0.34 g/t Au, 0.01% Mo	Jordex, 1992	
New Canamin Res. Ltd.	Huckleberry Main zone	Cu	30 900	0.48% Cu, 0.07 g/t Au, 2.17 g/t Ag, 0.013% Mo	New Canamin,	160
	East Zone		60 275	0.54% Cu, 0.06 g/t Au, 3.1 g/t Ag, 0.014% Mo	MDAP, 1994	
Placer Dome Inc.	Mount 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	100 100	0.58% Cu, 0.46 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	250
Gibraltar Mines Ltd.	Gibraltar	Cu	5+	est. 0.3% Cu	Gibraltar, 1994	275
American Barrick Res. Corp./ Lac Minerals Ltd.	Red Mountain	Au, Ag	2540	12.8 g/t Au 38.1 g/t Ag	Lac Minerals MDAP, 1993	
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	300+
Redfern Res. Ltd.	Tulsequah Chief/ Big Bull	Cu, Pb, Zn, Au, Ag	8490	1.41% Cu, 1.23% Pb 6.65% Zn, 2.56 g/t Au, 103.4 g/t Ag	Redfern, MDAP, 1994	
Vein Deposits						
Bralorne-Pioneer Gold Mines Ltd./ Avino Mines and Res. Ltd.	Bralorne Above 1000 level Below 1000 level	Au,Ag	 292 673	 12 g/t Au 8.2 g/t Au	Avino MDAP, 1992	50
Liquid Gold Res. Inc./ Huntington Res. Ltd.	Brett Bonanza zone	Au	2300	100 to 120 g/t Au	Huntington, 1993	

Table 3 continued

Canarc Res. Corp.	Polaris-Taku	Au	2200	14.7 g/t Au	Canarc, 1994	
Newhawk Gold Mines Ltd./ Granduc Mining Corp.	Sulphurets (Bruceside) West zone	Au,Ag	750	15.43 g/t Au, 647.2 g/t Ag	Newhawk MDAP, 1993	50 - 60
Fairfield Minerals Ltd.	Elk (Siwash North)	Au	122.5	54.5 g/t Au, 24.68 g/t Ag	Fairfield, 1994	
Tenajon Res. Ltd./ Westmin Resources Ltd.	SB	Au,Ag	313	3.07 g/t Au	Tenajon, 1994	
Westmin Res. Ltd.	Porcher Island	Au,Ag	82	13.7 g/t Au	Westmin, 1994	
Pacific Vangold Res. Inc./ Int'l Silver Ridge Res. Inc.	Iron Colt Evening Star	Au, Ag	90.7	11.3 g/t Au	SW Oct. 13/94	
Hera Res. Inc./ Int'l Taurus Res. Ltd.	Taurus	Au, Ag	436	7.2 g/t Au	Hera, 1994	
Claimstaker Res. Ltd.	Bonaparte	Au, Ag	6.4	25.4 g/t Au	SW, May 2/94	

Note: MDC = Mine Development Certificate; MDAP = Mine Development Review Process; SW = Stockwatch

nition drilling (fifty holes totalling 13 181 m) on the East zone; and 2041 metres of condemnation drilling. Two short holes tested the Far East zone. At a cut-off grade of 0.30% Cu, the company reported total mineable reserves at 91.2 million tonnes grading 0.52% Cu, 0.014% Mo, 0.06 g/t Au and 2.8 g/tAg. Reserves for the Main and East zones are reported to be 30.9 million tonnes grading 0.48% Cu , 0.066 g/t Au, 2.17 g/t Ag and 0.013% Mo; and 60.3 million tonnes grading 0.536% Cu, 0.063 g/t Au, 3.1 g/t Ag, and 0.014% Mo, respectively. The mining plan outlines two open pits, starting with the higher grade East zone, that would be developed sequentially over a mine life of 18 years at a daily production rate of 13 500 tonnes. The approximate annual production is estimated to be 23 800 kilograms of copper, 1674 kilograms of molybdenum, 9950 kilograms (320 000 oz) of silver, and 158.6 kilograms (5100 oz) of gold. New Canamin submitted a revised pre-application for a Mine Development Certificate in September and intends to submit an application in early 1995.

At the **Fish Lake** deposit, in excess of 96 000 metres was drilled in 305 holes over the period 1962 to 1993, outlining an open-pit reserve of 675 million tonnes grading 0.236% Cu and 0.435 g/t Au. Taseko Mines Ltd., has acquired the exclusive right to all of Cominco's residual interest in the property. The reserve is sufficient for a 30-year mine life at a milling rate of 60 000 tonnes per day. The initial capital cost estimate reported in a recently completed prefeasibility study is $460 million. An Application for a Mine Development Certificate will be submitted to the provincial government.

At the **Kemess South** project, El Condor Resources Ltd. (60%) and St. Philips Resources Inc. (40%) submitted an Application for a Mine Development Certificate in December 1993. Mineable reserves are estimated by the company at 45.4 million tonnes grading 0.20% 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 May, 1994, after an extensive due diligence program including a nine-hole confirmation diamond drilling program, Pegasus Gold Inc. decided not to proceed with its proposed acquisition of El Condor's outstanding shares. The results of the Pegasus program compare favourably with the pre-feasibility mine model completed by Kilborn Engineering Ltd. in July, 1993.

Placer Dome Inc.'s **Mount Milligan** project received a combined Mine Development and Energy Project Certificate in late November 1993. Reserves are estimated by the company at 298.4 million tonnes grading 0.22% Cu and 0.45 g/t Au. Capital costs were projected in the $500 to $600 million range. There was no significant activity in 1994.

In March 1994, Imperial Metals Corp. signed an agreement with Gibraltar Mines Ltd. for the formation of a 50/50

joint venture to develop Imperial's wholly owned **Mount Polley** copper-gold deposit. Gibraltar undertook an extensive due diligence study over a 15-month period to confirm tonnage, grade and metallurgy, as estimated by Wright Engineers Ltd. in its feasibility study of June 1990. Mineable reserves estimated by Imperial Metals are 49 million tonnes grading 0.38% Cu and 0.55 g/t Au. Capital costs were estimated at $150 million. A Mine Development Certificate was issued in October, 1993. In 1994 the joint venture parties hoped to establish the feasibility of linking the proposed Mount Polley mine to the Gibraltar concentrator by conveyor or other means of surface transport, allowing the milling of Mount Polley ore at Gibraltar. Gibraltar completed seven drill holes totalling 1220 metres within the proposed open-pit area to confirm ore grade and thickness. The company also conducted additional metallurgical tests on five bulk samples, essentially confirming previous recovery estimates of 76.6% for copper and 81.2% for gold. In early September, 1994 Gibraltar gave notice that it will not proceed with phase II of its program. In November, Imperial Metals Corporation and Bethlehem Resources Corporation agreed to merge. The primary focus of the new company will be the financing and development of the Mount Polley project.

In February 1993, Kinross Gold Corporation's request to increase production levels from 500 to 800 tonnes per day for the proposed **QR** (Quesnel River) gold project was granted, and in March 1993 a Mine Development Certificate was issued. The mineable reserve is estimated by the company at 1.3 million tonnes grading 4.77 g/t Au. Expected mine life is about five years. When fully operational, the mine will produce about 1244 kilograms (40 000 oz) of gold annually. The mine will begin as an open-pit operation, supplemented by reserves from two underground areas. During 1994 purchasing of equipment and hiring of people continued, with production scheduled for the spring of 1995.

The **Polaris-Taku** gold project lies directly across the Tulsequah River from the Tulsequah Chief site. Geological reserves at the beginning of the 1994 season were estimated by Canarc Resource Corporation at 2.2 million tonnes grading 14.7 g/t Au. Surface work in 1994 has identified a 1525-metre northerly strike extension of the property's three main vein systems. The discovery is more than 520 metres higher than the area of existing gold reserves and past production, affording significant depth potential. To the end of October, a total of twenty-nine drill holes were completed including eight holes in the C vein, five holes in the Y vein and sixteen holes in the new North zone. As a result of the 1994 drilling program Canarc reported an increased resource estimate of 35 770 kilograms (1 150 000 oz) gold.

No work was carried out on the **Cirque** project, owned 25% by each of Teck Corporation, Cominco Ltd., Korea Zinc and Samsung. Reserves in the North orebody are estimated at 24.7 million tonnes grading 2.3% Pb, 8.5% Zn and 50.8 g/t Ag. A Mine Development Certificate was issued in December 1992. However, the surrounding Gataga belt was actively explored in 1994 (*see* Exploration Highlights).

Jordex Resources Ltd. conducted a modest diamond drilling program in the spring of 1994 on its **Hushamu (Expo)** property located approximately 25 kilometres west of the Island Copper mine. Proven and probable reserves are estimated by the company at 173 237 000 tonnes grading 0.27% Cu, 0.009% Mo and 0.34 g/t Au. After Jordex completed its 45% earn-in with BHP Minerals Canada Ltd. in the spring of 1994, BHP became manager of the project. A seven-hole diamond drilling program was completed to test a zone of advanced argillic alteration located 12 kilometres northwest of the Hushamu deposit.

Westmin Resources Limited in 1994 acquired an option to earn 50% of the **Porcher Island** property, owned by Cathedral Gold Corporation, by completing a mine evaluation, a feasibility study and by giving notice by December 31, 1994 of its intention to place the property into production. Proven and probable reserves are estimated by the company at 300 000 tonnes grading 7.8 g/t Au; possible reserves are estimated at 190 000 tonnes grading 7.8 g/t Au; and further possible deep reserves are estimated at 800 000 tonnes grading 6.9 g/t Au. Included in these reserves are 82 000 tonnes of direct-shipping ore grading 13.7 g/t Au, all accessible above the existing mine levels. Westmin is exploring the possibility of mining the Porcher Island ore, crushing it on site and transporting the crushed ore by barge 240 kilometres north to its Premier mill near Stewart. Westmin completed metallurgical tests, preliminary concentrate-marketing studies, detailed capital and transportation cost estimates and has held public meetings in connection with permitting the mine. Work continues on the final feasibility study.

American Bullion Minerals Ltd. (80%) and Teck Corp. (20%) conducted a fifty-eight-hole diamond drilling program totalling approximately 21 400 metres on the **Red-Chris** property, designed to expand a higher grade core within the deposit, which is estimated by the company to contain 30 million tonnes grading 0.73% Cu and 0.48 g/t Au. Previous work outlined a drill-indicated inventory of 41 million tonnes grading 0.56% Cu and 0.34 g/t Au available for open-pit mining to a depth of about 275 metres. Deeper drilling (below 300 m) is testing the higher grade stockwork zone. The Red-Chris deposit is currently defined over a 1100 metre length, widths ranging from 150 to 500 metres, and to depths greater than 300 metres. An I.P. survey was conducted to define the edges of a 4 kilometre by 1 kilometre anomaly over the Red stock. In January 1995 geological reserves were estimated ato 100.1 million tonnes grading 0.58% Cu and 0.46 g/t Au at a 0.40% Cu cutoff.

Tenajon Resources Corporation, together with its 50/50 joint venture partner Westmin Resources Limited, conducted underground development drifting, bulk sampling and diamond drilling on the Kansas/West Kansas zones of the **SB** property, north of Stewart. Work in 1993 resulted in the definition of a mineable reserve of 312 700 tonnes grading 3.07 g/t Au based on development drifting and diamond drilling of a 50-metre strike length of the ore zone. Prior wide-spaced surface drilling indicates there is potential to increase this reserve to several million tonnes at a similar grade. A further 140 metres of strike length within the mineralized zone was tested by 168 metres of exploration sub-drifting in 1994. A total of 3507 metres of underground diamond drilling in 62 drill holes tested the newly accessible strike length at 20-metre intervals. Early indications are that the mineralized silicified zone has a strike length of more than 280 metres. A total of 1481 tonnes of development material from the sub-drifting was processed through Westmin's adjacent Premier gold mill. This material was composed of about 40% from within the reserve and 60% sub-grade material outside of the reserve blocks. The average millhead grade of this material was 1.66 g/t Au. The in situ undiluted geological reserves for the KWK zone are estimated by the company to total 1 774 000 tonnes grading 2.2 g/t Au over 295 metres of strike length. A bulk sampling program is proposed to further test the reserve.

Bralorne-Pioneer Gold Mines Ltd, in a joint venture with Avino Mines and Resources Ltd., completed a 2134-metre diamond drilling program on the Peter vein and the newly discovered, parallel Big Solly vein on the **Bralorne mine** (King mine) property. The program tested the downward extensions of two veins on the northeast side of the Ferguson fault. In July, 1994 Avino submitted an Application for a Mine Development Certificate. Proven and probable reserves are estimated by the company at 292 000 tonnes grading 12 g/t Au above the 1000 level, and an additional 673 000 tonnes grading 8.2 g/t Au below the 1000 level. Also, two veins on the Loco prospect are estimated to contain 362 800 tonnes grading 17.2 g/t Au.

At the **Taurus** project in the Cassiar camp, Hera Resources Inc. and International Taurus Resources Ltd. spent over $1.5 million on exploration in 1994. Work included approximately 300 metres of underground exploration and development, approximately 3700 metres of surface drilling, 1850 metres of trenching, 40 kilometres of induced polarization surveying and cleaning up the 135 tonne per day mill. Three phases of underground development from the Sable (Hopeful) decline were carried out to further define the previously reported geological resource of 436 000 tonnes grading 7.2 g/t Au. A higher grade vein, with reserves of 29 000 tonnes grading 17 g/t Au, has been identified within this resource. A trenching and surface drilling program on the 88-1 zone to the west of the Sable decline extended the known vein system an additional 290 metres along strike and 120 metres in width. Trenching on the eastern portion of this zone has also returned good values. Recent drilling on I.P. anomalies has encountered a new broad zone of low-grade quartz stockwork and altered volcanic rocks. If this lower grade material is leachable, there is potential for several million tonnes of leach ore. Recent drilling on the Taurus West zone has resulted in a loss of potential reserves previously reported; however, this loss has been offset with the addition of potential reserves in the new (B.M.) and 88-1 zones. The camp facilities have been expanded for a winter program, and mine permitting is in progress.

Huntington Resources Ltd. (50%) and Liquid Gold Resources Inc. (50%) received approval for the removal of an 8000-tonne bulk sample from their **Brett** property. Between mid-1993 and mid-1994 Liquid Gold has spent approximately $325 000 on surface drilling, engineering and feasibility studies, and completion of the haulage road. The drilling confirmed earlier grade estimates of 68 to 108 g/t Au on the Bonanza zone and average grades of 41.1 g/t Au on the R.W. vein which is accessible for surface mining. In September 1994, Liquid Gold began driving an adit from the portal site approximately 180 metres to the Bonanza zone. Stockpiling of material from the zone began in mid-January 1995.

In 1994 Fairfield Minerals Ltd. recovered 932 kilograms (29 965 oz) of gold and 1220 kilograms (39 224 oz) of silver from 10 400 tonnes of ore treated at the Asarco smelter at Helena, Montana, from its bulk sampling program on the Siwash North vein on the **Elk** property. Total cost of open-pit production was US$160 per ounce of gold. Reserves at January 1, 1995 were estimated by the company at 156 000 tonnes grading 36.55 g/t Au and 50.0 g/t Ag. A stockpile inventory of 3900 tonnes of ore containing approximately 373 kilograms (12 000 oz) of gold remains on hand for future sales. Since late 1993, 1540 tonnes of ore averaging 77.14 g/t Au, test mined from underground, has yielded 118 kilograms (3800 oz) of gold from drifts, raises and a stope below the open pit. This high-grade ore was mined over an average width of 0.55 metre. Eighty-three drill holes, totalling 2410 metres, drilled from underground stations to intersect the vein, expanded and further defined ore shoots. Underground exploration, development and test mining, with a $1.5 million budget, resumed in October following completion of open-pit operations. The resumed underground program will include 400 metres of additional decline to accommodate future mining and further diamond drilling. Since mid-1992 the Siwash (Elk) mine has produced over 1555 kilograms (50 000 oz) of gold from ore averaging 95.7 g/t Au. This production exceeded drill-indicated estimates by a factor of two. Fairfield is also exploring two nearby gold properties, the Crest and the Oka.

In the Rossland camp, International Silver Ridge Resources Inc. and Pacific Vangold Mines Ltd. have been conducting underground development work on the Iron Colt and Evening Star projects. On the **Iron Colt**, the companies have a bulk sampling permit allowing the mining and testing of 10 000 tonnes of ore. Underground exploration and development is being facilitated by a 40-metre drift, four box holes that test the upward extension of the vein, and a crosscut which has been driven to test the width of the main vein. The first 450 tonnes of material stockpiled graded approximately 51.4 g/t Au. The companies signed a letter of intent with Echo Bay Mines Ltd. in September, under which Echo Bay has agreed to treat ore supplied by the Iron Colt joint venture in the Kettle River mill in Republic, Washington. The first shipment of 635 tonnes, estimated by the company to grade in excess of 34 g/t Au, commenced November 15, 1994. Continuous production is planned at a daily mining rate of 55 tonnes. Estimated production costs are US$162 per ounce gold. By late December 1994, development on the **Evening Star** vein, with an estimated reserve of 90 700 tonnes grading 11.3 g/t Au, was completed. An application for a bulk sampling permit was in preparation by the company. Pacific Vangold plans extensive underground drilling to test the western extension of this orebody. Elsewhere in the Rossland district, Pacific Vangold Mines Ltd. conducted an extensive diamond drilling program on the Gertrude claim adjacent to the War Eagle mine and the Georgia claim, where the company theorizes that the LeRoi and North veins converge.

Claimstaker Resources Ltd., under an option agreement with Beaton Engineering Ltd. and Cleveland Capital Company Ltd., began shipping ore to the Trail smelter at a daily rate of 75 tonnes from the **Bonaparte** gold property located north of Kamloops. The reported assays from the first shipment averaged 27.8 g/t Au. The company has a permit to remove a 2700-tonne bulk sample of ore and shipments continued to the end of October. The company expected to receive payment for approximately 93 kilograms (3000 oz) of gold. The sample results will be used to confirm the average grade and general mineability of the ore. A diamond drilling program also explored strike and dip extensions of other mineralized zones on the property.

INDUSTRIAL MINERALS

Exploration and market interest in industrial minerals continues to increase. In 1993, exploration expenditures reached at least $2 million, with approximately half that amount spent on the search for diamonds in the southeastern part of the province. In 1994, exploration expenditures are estimated at $4.5 million, including $1.5 million for diamonds.

B.C. Chrysotile Limited did not complete the assembly of its pilot plant to process the **asbestos tailings at Cassiar** and because of advancing winter weather, decided to postpone its completion until the spring of 1995. The pilot plant will be used to produce sample material to supply to potential customers.

Cassiar Coal Company Ltd. initiated a feasibility study on its **Stitt Creek placer garnet** deposit, north of Revelstoke in the Goldstream mine area. The company estimates that the deposit contains substantial reserves of almandine garnet; mine life is estimated at ten years.

Zeolite beds have been identified in seven areas throughout the interior of British Columbia. Trial production by Mountain Minerals Ltd. in 1992-1993 tested the market. Potential buyers on the Prairies responded positively to the variety of agricultural uses. IMPACT Minerals Inc. has entered into a letter of intent to acquire the **Allenby** and **Bromley Vale** (Sunday Creek) zeolite properties near Princeton from Princeton Zeolite Products Inc. and the Princeton Industrial Mineral Joint Venture. The company plans a bulk sampling program to obtain material for product testing and market development. Surface sampling has identified the **zeolite** as a high quality clinoptilolite variety.

Gemstones are attracting more interest in British Columbia as new discoveries are made. In addition to the **sapphire** from the **Blu Starr** claims, there are two new finds in the Slocan valley. In the **Airey Creek** area prospectors have found gem quality aquamarine in pegmatite dikes. High quality black and smoky grey quartz crystals are also common. The **Klinker fire opal** locality near Vernon continues to attract attention, although there has been no significant development to date.

Canada Pumice Corporation is developing a market for **scoria** from the **Nazko** cinder cone, located west of Quesnel. Black scoria in the deposit is used mostly as light-weight aggregate, antiskid highway sand and barbecue rock. The company is finding buyers for the extensive red cinder used mainly in landscaping and other ornamental aggregate applications, including golf course sand traps.

A bulk sample was collected at the **Lumby feldspar** deposit in 1993. The material is being tested by Lakefield Laboratories for use in the glass plant in Lavington.

Highland Talc Ltd. has been conducting marketing studies and product development on its **talc** property, jointly with the Finnish owners of proprietary technology.

Lang Bay Resources Ltd. is planning a large bulk sample and is seeking financing for its **kaolin** property near Sechelt. The feasibility of underground mining is an unresolved issue. The B.C. pulp and paper industry has recently identified an emerging market for precipitated and ground calcium carbonate and kaolin as fillers in paper making, to add value to its products.

In 1993 New Global Resources Ltd. shipped a 9000-tonne bulk sample of **pyrophyllite-silica (geyserite)** from its **Monteith Bay (Easy Inlet)** property on the west coast of Vancouver Island to the Tilbury portland cement plant in

Delta. The cement plant found the product acceptable. The project is in the Mine Development Assessment Process.

Consolidated Ramrod Corporation Ltd. spent approximately $0.45 million exploring for **diamonds** on its large **Ice** property which includes the Crossing Creek kimberlite near Elkford. Grassroots exploration was also carried out elsewhere in the Rocky Mountains, the Horsethief - Toby Creek area, and near Midway and south of Grand Forks.

Quadra Stone opened a new **granite** quarry at **Grano Creek** in Christina Valley, as well as two new sites in the **Beaverdell** area. Quarry Pacific Industries Ltd. opened two new **granite** quarries at **Idabel Lake,** east of Kelowna.

Franz Capital Corporation Ltd. is working on development of its **Kingfisher** white marble property east of Vernon. The property also has a very attractive white pegmatitic granite 250 metres east of the marble zone that may be another development target. The company estimates a geological potential of at least 5.5 million tonnes of marble. Permitting has been applied for block sampling and ASTM testing.

In 1994 Jade West Resources Ltd. purchased the remaining Mohawk Oil **jade** properties in the Kutcho Creek area and concentrated production there. The Ogden Mountain area has been left idle. The jade is processed at Jade West's South Surrey site.

Quinto Mining Corporation Ltd. is developing its 27 million tonne **Lumby** (Chaput) **graphite** and **sericite** deposit 37 kilometres east of Vernon. The microcrystalline graphite is intergrown with mica and cannot be upgraded to a marketable graphite concentrate. However, the company is examining the possibility of marketing a muscovite-graphite product for special filler applications. USIG Inc. of California has earned a 30% interest in the property. Work during 1994 included underground bulk sampling and construction of a test lab and pilot flotation plant.

COAL

1994 saw a decrease of about 50% in coal exploration in four areas of the province: the Kootenays, Telkwa, Peace River and Vancouver Island. Total estimated expenditures for coal exploration are $1.5 million of which $1.0 million was spent on the investigation of thermal coal potential, principally at the Telkwa, Tsolum Creek and Willow Creek coalfields.

In the Kootenay coalfields, Fording Coal Limited conducted exploration programs at its **Fording River** and **Greenhills** operations. A total of 76 holes were drilled for coal sampling and down-hole geophysics, and one test pit was excavated. At the **Line Creek** and adjacent properties, Manalta Coal Ltd. drilled 15 rotary holes. The total exploration expenditure in the Kootenay coalfields in 1994 is estimated at $500 000. On Vancouver Island, Canadian Occidental Petroleum Ltd. conducted a modest drilling program, consisting of approximately 2000 metres in six holes on the **Tsolum River** property, at an estimated cost of $150 000. On the **Quinsam** property, Quinsam Coal Ltd. drilled three PQ holes to test the down-dip depth and continuity of the main coal seams north of the 2N/3N mine block. Results were encouraging. The company also drilled seven PQ holes between the 2N and 3N blocks, to confirm thickness, quality and local structure in an area not adequately tested prior to open-pit production. Total expenditures are estimated at $150 000.

At the **Telkwa** thermal coal project, Manalta Coal Ltd.'s focus in 1994 was reconnaissance drilling (500 m spacing) of the large property, as well as in-fill drilling on the Tenas deposit. A total of 8550 metres was completed in 57 rotary-drill holes. Geological reserves on the main deposit are estimated to be 38.7 million tonnes contained within four pit areas. The application to the Mine Development Assessment Process, originally filed in 1990, is currently under review.

In the Peace River area, Globaltex Coal Corporation drilled 101 rotary-drill holes totalling 5000 metres at an estimated cost of $300 000 on three coal licenses on the **Willow Creek** thermal coal property. Bulk samples from each of the four major seams were taken for detailed testing, product development, and initial customer samples. Preliminary results indicate the seams have excellent cleaning characteristics. The company is planning for production of coking and thermal/industrial coals. Detailed design engineering and environmental studies continue. Mine start-up is planned for 1995 at an initial production rate of 500 000 tonnes per year.

There was no exploration at either **Quintette** or **Bullmoose** coal mines.

HIGHLIGHTS OF EXPLORATION PROJECTS

Gold-enriched porphyry copper deposits, polymetallic massive sulphide deposits (volcanogenic, seafloor hydrothermal and sedex), and veins and porphyry-related to transitional deposits accounted for approximately 90% of 1994 exploration expenditures in British Columbia. The remainder were directed to coal, industrial minerals, skarn, diamonds and less traditional targets such as sedimentary copper. Of the total estimated $100 million exploration expenditures, approximately 45% 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. These keyed on: sedex deposits in the southeast (especially in the Purcell Supergroup) and northeast (*e.g.*,**Cirque-Driftpile** area); diamonds in the Rocky Mountains; gold deposits in the Interior Plateau of south-central British Columbia; porphyry

deposits in the Babine Lake area and epithermal precious metal veins and porphyry-related deposits in the Stewart camp in the northwest. Some of these projects have advanced very quickly and are mentioned in the previous section (*i.e.,* **Huckleberry, Red Mountain**). 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 **Snip**, continue to make British Columbia a good place to explore. The properties mentioned below are shown on Figure 8 and listed in Table 4, with estimated preliminary reserves, where available.

PORPHYRY AND PORPHYRY-RELATED COPPER-GOLD DEPOSITS

At the **Hearne Hill** deposit, located close to the recently closed Bell Copper mine in the Babine Lake area, Booker Gold Explorations Ltd. completed extensive ground magnetometer and EM surveys to delineate more breccia pipe targets, and follow-up percussion and diamond drilling. A total of seven new magnetic anomalies, all larger than the Chapman breccia pipe anomaly, were identified within or peripheral to an extensive porphyry copper system. In the fall of 1994 the company drilled eight core holes, intersecting stockwork porphyry and a weaker style of breccia mineralization over 250 metres to the northeast of previously mapped limits. Elsewhere in the Babine region, Hera Resources Inc. recently acquired the Nak prospect and conducted a large I.P. survey in early 1995.

Lysander Gold Corporation reached an agreement in principal with Kennecott Canada Inc. to acquire an option to purchase a 100% interest in the **Lorraine** property. Previous work outlined geological reserves of 10 million tonnes grading 0.67% Cu and 0.34 g/t Au in the Main zone deposits. Three other anomalous zones have been identified, including the Extension (Bishop) zone. Drilling of 1216 metres in ten holes in 1994 concentrated on the Extension zone (seven holes) and, to a lesser extent, the Main zone (three holes). Intersections well mineralized with chalcopyrite and bornite have been reported, including hole L94-8 which assayed 1.48% Cu and 0.65 g/t Au over 92 metres, in the upper Main zone.

International Skyline Gold Corporation drilled 870 metres on the **Bronson Slope** property in late 1993 and calculated a mineral inventory of 100 million tonnes grading 0.65 g/ t Au, 0.14% Cu, 3.4 g/t Ag and 0.01% Mo. A drill-indicated probable and possible mineral resource of 20 million tonnes grading 0.25% Cu, 0.71 g/t Au and 2.65 g/t Ag is contained within the larger resource. A second phase

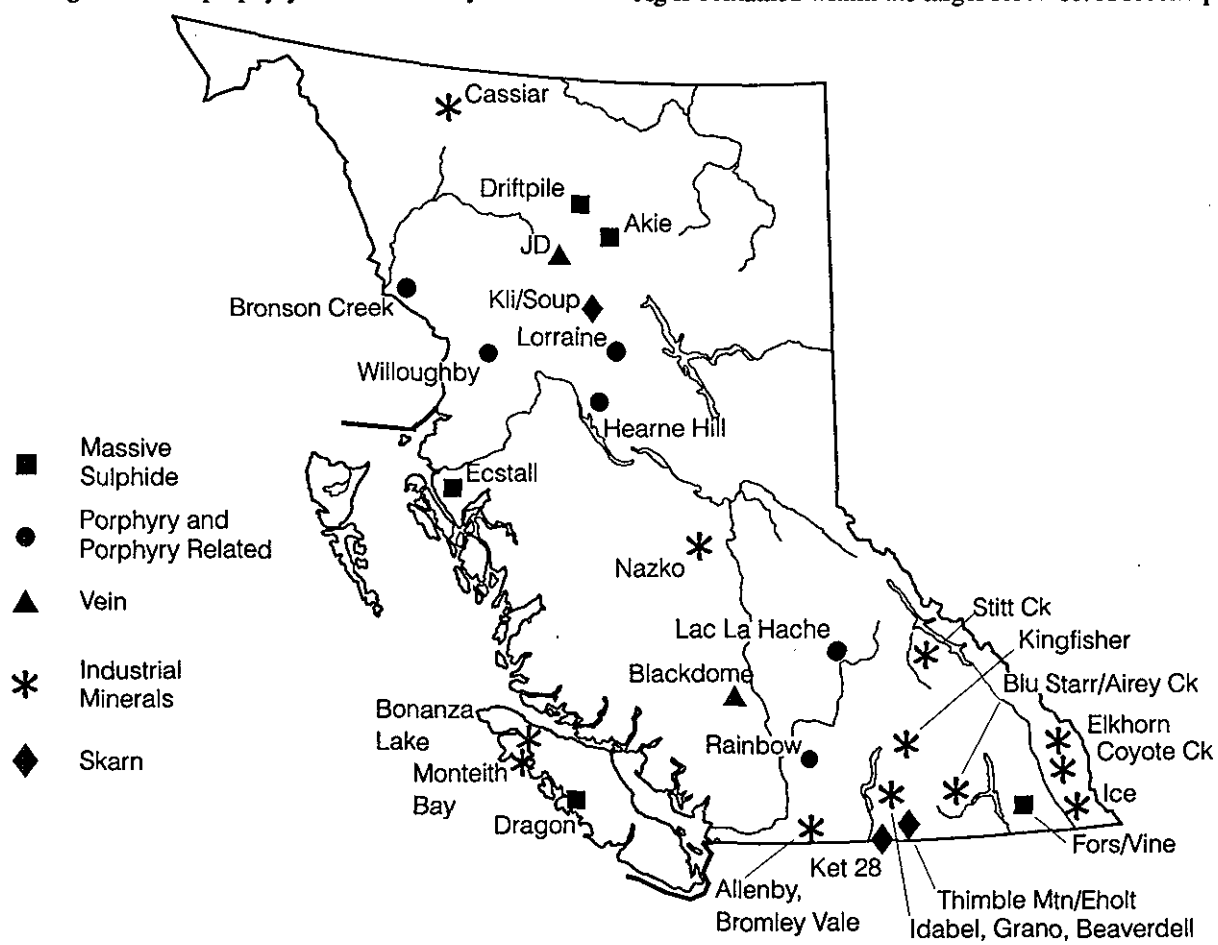


Figure 8. Exploration highlights projects in British Columbia - 1994.

TABLE 4
1994 EXPLORATION HIGHLIGHTS

Company Name	Project Name	Commodity	Estimated Tonnes (000s)	Estimated Grade	Reference
Massive Sulphide Deposits					
Ecstall Mining Corp./ Metall Mining Corp.	Akie	Pb,Zn,Ag			GCNL Oct. 5/94
Teck Corp.	Driftpile	Pb,Zn,Ag	20 000	2.4% Pb + Zn	NM, Oct. 18/93
Consolidated Ramrod Gold Corp.	Fors/Vine	Pb,Zn,Ag			
Ecstall Mining Corp./ Atna Res. Ltd.	Ecstall Red Gulch	Cu,Zn,Ag	6350	0.6% Cu, 2.5% Zn, 0.5 g/t Au, 20 g/t Ag	Atna, 1994
Porphyry (and related) Deposits					
International Skyline Gold Corp.	Bronson Creek	Cu,Au,Ag,Mo	100 000	0.14% Cu, 0.65 g/t Au, 3.4 g/t Ag, 0.01% MoS2	Skyline, 1994
Brooker Gold Explorations Ltd.	Hearne Hill	Cu,Au	180	1.7% Cu	Prospectus MDAP, 1992
Camnor Res. Ltd./ Gold Giant Minerals Inc.	Willoughby	Au, Ag			NM, Oct. 10/94
Lysander Gold Corp./ Kennecott Canada Inc.	Lorraine	Cu,Au	10 000	0.67% Cu, 0.34 g/t Au	Kennecott, 1993
Getchell Res. Inc./ Teck Corp. Ltd.	Rainbow No. 2 zone	Cu,Au	3000	0.7% Cu	Getchell, 1994
Skarn Deposits					
GWR Resources Inc./ Regional Resources Ltd.	Lac La Hache (Peach Lake)	Cu,Au	544	1.54% Cu, 0.17 g/t Au, 49% Fe_3O_4	GWR Res. Inc., 1993
Orvana Minerals Corp.	Eholt/Thimble Mtn.	Cu,Au			SW, Aug. 8/94
Hemlo Gold Mines Inc./ Athlone Res. Ltd./ Kennecott Canada Inc./ Vital Pacific Res. Ltd.	Kli	Cu,Au	2300	0.31% Cu, 1.3 g/t Au, 6.9 g/t Ag	SW, Feb. 2/93
Gold City Res. Inc./ Sway Res. Inc./ Phoenix Gold Res. Ltd.	Ket 28	Au	-	-	-
Vein Deposits					
AGC Americas Gold Corp.	JD	Au	-	-	SW, Oct. 20/94

Table 4 continued

Industrial Minerals

B.C. Chrysotile Ltd.	Cassiar	asbestos	-	-	-
Canada Pumice Corp.	Nazko	red cinder	-	-	-
Cassiar Coal Co. Ltd.	Stitt Creek	placer garnet	-	-	-
Quadra Stone	Grano Creek/ Beaverdell	granite	-	-	-
Quarry Pacific Ind. Ltd.	Idabel	granite	-	-	-
Franz Capital Corp. Ltd.	Kingfisher	marble, pegmatite	-	-	-
IMPACT Minerals Inc.	Allenby/ Bromely Vale (Princeton)	zeolite	-	-	-
Trueman/Currie	Lumby	feldspar	-	-	-
Westroc Ind.	Elkhorn	gypsum	-	-	-
Northamerican Gyprock Co.	Coyote Creek	gypsum	-	-	-
Consolidated Ramrod Gold Corp.	Ice (Cross)	diamond	-	-	-
Luchansky/Demers Barkley	Blu Starr, Airey Creek	sapphire, aquamarine	-	-	-
Leo D'Or Marble	Bonanza Lake (Leo D'Or)	limestone	-	-	-
Blue Emerald Res. Ltd. B. Yorke - Hardy/ G. Grywacheski	Klinker	fire opal	-	-	-
New Global Res. Ltd.	Monteith Bay (Easy Inlet)	pyrophyllite - silica	-	-	-

Note: SW = Stockwatch; NM = Northern Miner; MDAP = Mine Development Review Process; GCNL = George Cross News Letter

of drilling was suspended due to severe winter conditions after completion of 610 metres in two holes to test down to the 200-metre elevation. The company considers this drilling successfully confirmed results from previous drilling in higher grade zones and traced these previously defined zones to a greater depth. A revised mineral inventory by the company is estimated to be 100 million tonnes grading 0.72 g/t Au, 0.15% Cu, 4.1 g/t Ag and 0.007% Mo. Preliminary mine planning, metallurgical testing and preparation of a preliminary feasibility study is under way.

On the **Lac La Hache** property, Regional Resources Ltd. and GWR Resources Inc. conducted I.P. surveys over six target areas outlined during the 1993 season. Regional also conducted an I.P. survey on claims and adjoining the Nemrude bornite skarn zone and planned to conduct a winter drilling program on the Nemrude zone. The company previously estimated reserves of 544 200 tonnes grading 1.54% Cu, and 49% magnetite in the Peach Lake skarn zone.

In the area between the Afton and Ajax deposits, Teck Corporation, under an option agreement with Getchell Resources Inc., drill-tested the **Rainbow** property. Previous operators had outlined three zones of copper-gold mineralization. Teck's phase I program in 1994 included ground magnetic and I.P. surveys, detailed lithologic and alteration mapping, trenching and approximately 2600 metres of diamond drilling in sixteen holes. Targeted areas included extensions of known mineralized zones, previously untested intrusive contact areas and possible fault intersections as interpreted from data acquired from airborne surveys. Following encouraging results from the phase I program, Teck entered a second phase consisting of at least 1500 metres of drilling in seven core holes designed to follow-up an intersection of 0.7% Cu and 0.1 g/t Au across 62 metres in hole 94-14. Hole 94-17 returned a 176-metre interval which averaged 0.61% Cu. Drilling tested on-strike and down-dip extensions of this new zone which has been intersected over an east-west width of 100 to 150 metres, a north-south strike length of 200 to 250 metres, and to depths of 250 metres. The company suggests that this mineralization may relate to the No. 2 zone in which it has estimated a reserve of 3 million tonnes grading 0.76% Cu. A third phase of drilling, totalling approximately 1830 metres in eight holes, tested the up-dip extent of the mineralized intrusion. Getchell also controls the **Galaxy** property 1.5 kilometres to the north of Teck's Ajax mine.

The company reports that property hosts an estimated 3.2 million tonnes grading 0.65% Cu and 0.34 g/t Au.

Camnor Resources Ltd., under an option agreement with Gold Giant Minerals Inc., drilled 1775 metres in seventeen holes on the **Willoughby** property, 6 kilometres east of Lac Minerals' Red Mountain project. The property is geologically similar to the Red Mountain deposit. Drilling (hole NZ89.06) on the North zone of the Willoughby property by Bond Gold Canada in 1989 returned 20.1 metres grading 25 g/t Au and 171.4 g/t Ag. At least nine surface showings have been identified to date in or near the Willoughby nunatak. Four of the showings were drill tested. The North zone is a mineralized vein stockwork in an altered porphyry in a structure 30 metres long and 65 metres deep. Mineralized intercepts include 6 metres grading 712 g/t Ag and 18.2 g/t Au in hole 94-26. Based on the results, Camnor is considering a modest underground exploration program for 1995. The Wilby zone, defined by six holes 425 metres southeast of the North zone, is 55 metres long, 35 metres deep and 26 metres wide. Mineralization occurs as a replacement body of semimassive sulphides in altered, bedded tuff. Hole 94.22 returned 2.7 metres grading 15.8 g/t Au.

POLYMETALLIC MASSIVE SULHPIDE DEPOSITS

Both base metal rich (sedex and volcanogenic) and precious metal rich ("Eskay Creek" or seafloor hydrothermal type) massive sulphide deposits were very important targets in 1994. The success of projects at Myra Falls (Battle/Gap zones), Tulsequah Chief/Big Bull, Eskay Creek, Fors/Vine, Goldstream and Akie/Driftpile over the past few years bears good testimony to the exploration potential of these deposit types.

In the **Gataga** district, where the **Cirque** deposit has been delineated, Metall Mining Corporation, under an option agreement with Ecstall Mining Corporation, reported a new discovery (Cardiac Creek zone) on the **Akie** sedex property. The discovery drill hole (A-94-5) intersected 31.9 metres of bedded pyrite, sphalerite and massive barite within which 13.1 metres assayed 3.56% Zn, 0.61% Pb, and 5.05 g/t Ag. Further drilling has intersected sulphides along a strike length in excess of 1.4 kilometres and a dip length of 300 metres. Hole A-94-12 intersected 40.4 metres of mineralized sedimentary rocks, including a 9.3-metre interval grading 8.42% Zn and 1.61% Pb, adding 150 metres to the previously tested dip length. Results from drill holes A-94-11 and A-94-12 indicate the grade of the deposit is increasing at depth. The program was suspended following the completion of drill hole A-94-12 due to deteriorating weather. Drilling will resume in the spring of 1995.

On the **Driftpile Creek** property, Teck Exploration Ltd. drilled twenty-six holes totalling 4377 metres in 1994. The drilling tested five mineralized targets beyond the Main zone drilled in 1993. Twenty-one of the twenty-six holes intersected sulphide-barite mineralization. Best results included 7.93% Zn over 2.0 metres and 17.5% Zn over 1.0 metre, both in drill hole 94-88 on the East zone. Significant ore grade intercepts were not encountered. Improved understanding of the structure and stratigraphy indicates that mineralization in the East zone may represent a stratigraphically higher and more weakly mineralized horizon than high-grade intersections recorded in 1993. The potential for a deeper high-grade mineralized horizon, similar to that tested in the Main zone in 1993, is indicated. Conodont dating by the Geological Survey of Canada should confirm the stratigraphic position of the East zone mineralization. Additional work is planned for 1995. Teck also completed drilling on the **Bear** sedex property, located approximately 10 kilometres to the southeast.

In the Purcell Mountains, Consolidated Ramrod Gold Corporation drilled three deep holes on the **Fors** sedex prospect in the search for a Sullivan-type deposit. A modest drilling program on the **Vine** prospect was planned for late in 1994. Drilling in 1993 identified an extensive vent complex with widespread alteration and mineralization in the vicinity of the "Sullivan horizon".

On the **Dragon** polymetallic prospect located near Gold River, Westmin Resources Limited exercised a right of first refusal with Doromin Resources Ltd. The property is underlain by Paleozoic stratigraphy, similar to that at the nearby Myra Falls mine, over a strike length in excess of 8 kilometres. Noranda Exploration Company, Limited drilled the Falls and North showings in 1993, but did not renew its option agreement with Doromin.

Exploration by Atna Resources Ltd. on the **Ecstall** volcanogenic massive sulphide deposits focused on the Thirteen Creek and Red Gulch areas. The Ecstall deposit in the Red Gulch area has a reserve estimated by the company at 6.35 million tonnes grading 0.6% Cu, 2.5% Zn, 0.5 g/t Au and 20 g/t Ag. In the Thirteen Creek area disseminated and vein-type copper mineralization was discovered along a zone 2 kilometres long.

PRECIOUS METAL BEARING VEIN AND BULK-MINEABLE DEPOSITS

Exploration targets in this category cover a broad spectrum of hydrothermal, epigenetic mineral deposits. They include high-level epithermal and deeper level mesothermal deposits.

In the northern Toodoggone district, AGC Americas Gold Corporation drilled thirty-two holes on the **JD** property. Geochemical, geophysical and geological surveys were carried out over a gold-bearing structure 2.5 kilometres long. Drilling tested the Gumbo-Finn zone which has large-tonnage open-pit potential, and the JD West-Schmitt zone of high-grade vein mineralization. Drilling on the Finn zone returned an intersection of 13.2 g/t Au over 8.84 me-

tres in 'discovery' hole 94-18. Further drilling along strike and down dip indicates that the shallow dipping mineralized structure has potential to host a significant tonnage.

In the **Interior Plateau** region in the central part of the province, numerous projects were carried out in the search for epithermal bonanza and bulk-mineable (heap leachable) deposits: **Wolf** (Metall Mining Corporation), **Baez** (Phelps Dodge Corporation of Canada Ltd.), **Blackwater-Davidson** (Granges Inc.), **Cutoff, Holy Cross** and **Yellow Moose** (Cogema Resources Inc.), **Loon** (Hudson Bay Mining and Smelting), **Uduk Lake** (Pioneer Metals Corporation), Fawn/Buck (Western Keltic Mines Inc.), **Tsacha** (Teck Exploration Ltd.), Bent (Kennecott Canada Inc.) and **Greg** (Cominco Ltd.)

On the Blackdome epithermal gold property, Claimstaker Resources Limited completed in excess of 2000 metres of drilling in 20 diamond-drill holes testing the No. 11 and No. 18 vein systems. Results indicate an additional mineable resource may be outlined by further drilling. Prior to 1994 exploration, an in-mine resource of approximately 73 000 tonnes grading 14 g/t Au had been estimated. The property includes a 200 tonne per day mill and a permitted tailings pond. Production is planned for 1995.

SKARN DEPOSITS

In north-central B.C., Hemlo Gold Mines Inc. worked on the **Soup** property (see Figure 8) under an option agreement with Vital Pacific Resources Ltd. (75%) and Athlone Resources Ltd. (25%). Strongly anomalous gold-copper geochemical values extend over an area greater than 1 square kilometre. These correlate with ground and airborne magnetic anomalies in areas of diorite and magnetite skarn in andesitic flows. In 1994, Hemlo discovered magnetite-silica-sulphide mineralization identified by an airborne magnetic and coincident gold-copper geochemical anomaly over an area 90 to 275 metres wide and 1200 metres long. A 1989 drill hole in the target zone averaged 5.4 g/t Au and 0.1% Cu over 40 metres.

On the **Kli** property, Hemlo, under an option agreement with Athlone Resources Ltd. (25%), Kennecott Canada Inc. (45%) and Vital Pacific Resources Ltd. (30%), completed ten diamond-drill holes totalling 1120 metres testing auriferous and cupriferous magnetite-silica replacement zones within altered and fractured andesitic, dioritic and monzonitic rocks. Previous drilling had outlined about 2.3 million tonnes grading 0.45% Cu, 1.3 g/t Au and 6.9 g/t Ag. Elsewhere in the area, Hemlo optioned Major General Resources Ltd.'s **Joh** and **Darb** claims which adjoin the Kli property to the north. The target is gold-copper skarn associated with porphyry-style mineralization. Several new claims have been staked in the area.

In the **Rock Creek** area, Gold City Resources Inc., Sway Resources Inc. and Phoenix Gold Resources Ltd. announced a drill-hole intersection assaying 52.1 g/t Au across 3.35 metres within 10 metres of surface on their **Ket 28** claim. The gold zone is associated with a pyritic matrix-supported breccia, in chloritized, epidotized and silicified greenstone. The Ket 28 property, located 12 kilometres northwest of Battle Mountain Gold Company's 56 000 kilogram (1.8 million oz) Crown Jewel gold skarn deposit, lies along the 18-kilometre Rock Creek - Jolly Creek structural trend.

To the east, in the **Greenwood** camp, Orvana Minerals Corporation drilled the **Thimble Mountain** and **Eholt** gold-copper skarn targets.

OTHER TARGETS

Both property-scale and regional exploration programs were conducted for sedimentary copper±cobalt±silver deposits in the southeast (*e.g.*, **Junction/Delta** properties) and northeast (*e.g.*, **Tuchodi Lakes area**) of the province.

NEW INITIATIVES IN BRITISH COLUMBIA

Several new government programs that will influence future mineral resource planning, exploration and development in British Columbia were initiated in 1994.

- 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 was announced in April.

  Explore B.C., a part of this program, is a three-year $13.5 million program designed to provide part of the risk capital required by mineral exploration companies to finance their programs, to extend the economic lives of existing mines and contribute to community stability in existing mining regions. The program has two components:

(1) **Mineral Exploration Incentive Program** - (MEIP) provides grants to eligible exploration companies or individuals, to cover up to one-third of eligible exploration expenses on properties with identified economic potential. Maximum assistance is $150 000 per project. In July 1994, 56 exploration and mining companies were awarded grants totalling $2.4 million under the MEIP program. This figure includes grants totalling $0.2 million to ten industrial mineral targets.

(2) **Accelerated Mine Exploration Program** - (AMEP) provides grants to mining companies to cover up to one-third of eligible exploration expenses at existing mines for the purpose of discovering additional reserves. Maximum assistance is $150 000 per project. Under the AMEP program, grants totalling approximately $1 million were awarded to eleven projects.

- The **Prospectors' Assistance Grant Program** is designed to promote grassroots prospecting for new mineral deposits in British Columbia. It will contribute up to 75% of eligible costs of an approved project to a maximum of $10 000. Sixty-nine grants, totalling approximately $500 000, were awarded in 1994.
- The 1994 Budget amended the **Mineral Tax Act** to allow companies with more than one operating mine in the province to pool exploration expenditures, providing new flexibility for mining companies in using exploration deductions.
- Effective January 1, 1995 a five-year program will begin whereby the allowable deduction for capital costs for a new mine or major expansion will be increased by one-third for the calculation of Mineral Tax.
- British Columbia spent **$1.6 million** in 1994/95 on the **Federal/Provincial Mineral Development Agreement**. This program runs to 1995/1996 and coordinates the efforts of Canada and British Columbia to strengthen and diversify the province's mineral industry. Activities sponsored under the agreement include the funding of geological, market and technology studies. New value-added opportunities will also be examined.
- The new **Environmental Assessment Act** has passed third reading in the Legislative Assembly of British Columbia and will be proclaimed in 1995, following completion of drafting the regulations. The Act builds on the strengths of the existing Mine Development Assessment Act in establishing a process through which the potential effects of projects are identified and means of preventing or mitigating adverse impacts are developed and evaluated,
- A provincial initiative which includes a **partnership with B.C. Trade Development Corporation** to promote the marketing of industrial minerals in the province, Pacific Rim countries and Europe.
- Creation of the **Premier's Forum** on mining, involving cooperation and consultation between government and industry at the highest levels to develop concrete solutions to the industry's competitive position.
- The **Geological Survey Branch's** multidisciplinary programs continue to be focused on regions where existing mines are forecast to close in the next few years (northern Vancouver Island, East Kootenays and northern Selkirks) and in areas with significant identified potential (Interior Plateau, Tulsequah, Gataga and Tatogga). Results of these programs are expected to encourage base and precious metal exploration in these areas and elsewhere.
- The **Mineral Potential Mapping Initiative** will see completion of 1:250 000-scale mineral potential maps for the province in 1996. These data are being used in many land-use planning processes.
- Initiation of a multi-year project to develop an inventory of sand and gravel resources in the province.
- Initiation of a pilot program to produce an earthquake microzonation map of part of the Fraser Valley.
- Development of a joint strategic plan of selected geoscience needs for British Columbia between the British Columbia Geological Survey Branch and the Geological Survey of Canada. The "Geoscience Cooperation for British Columbia" plan is intended to guide both organizations in planning operations for the next five years.
- Completion of part of the Geological Survey Branch's **"Mineral Deposit Profiles"** project to describe the types of mineral deposits found around the world, with special emphasis on examples and deposit characteristics relating to British Columbia.
- After two years of consultation between the mining industry, government officials, the labour unions, environmentalists and First Nations groups, the **Whitehorse Mining Initiative** Leadership Accord was signed in September 1994. The mining industry is committed to establishing guidelines for protecting the environment during all mining activities and to improving training and human resource development in the industry. In return, the industry hopes that governments will encourage Canadian and international mining companies to explore and invest in new mines by, amongst other things, providing greater exploration incentives and revising tax policies on mine reclamation.
- Discussions continued with the **First Nations,** spearheaded through the Treaty Commission in British Columbia, designed to provide them with a more equitable role in mineral exploration and development decision making within their traditional territories.
- In March 1994 an agreement signed between the provincial government and Cominco Ltd. will see a new lead smelter constructed at Trail at a cost of approximately $145 million and a zinc plant expansion costing approximately $25 million.

SUMMARY AND OUTLOOK FOR 1995

Many signs indicate an upswing in the mining industry in British Columbia. Exploration expenditures in 1994 are forecast to be approximately $100 million, a 40% increase

from 1993; claim staking is forecast to be up 15%; the number of valid Free Miner Certificates is up, four metal mines have recently re-opened, production from southeastern coal mines is expected to reach pre-1992 levels with a strong demand for metallurgical coal, and the general increased level of grassroots activity are all key factors. Several advanced projects will receive further work in anticipation of improved metal markets and favourable resolution of uncertainties in land-use policies. Several smaller, high-grade gold projects have and will continue to take advantage of the custom milling facilities available in the province by obtaining the necessary permitting for bulk sampling.

The many copper and gold-bearing porphyry deposits discovered during the 1960s and 1970s (*e.g.*, **Red-Chris, Lorraine, Huckleberry**) will continue to attract attention. Sedex (*e.g.*, **Akie, Driftpile**) and volcanogenic polymetallic sulphide (*e.g.*,**Ecstall, 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 will focus on the heap leaching characteristics of recently discovered "no seeum" mineralization associated with silicified limestones. In the **Interior Plateau** region bonanza and bulk-mineable targets (*e.g.*, Wolf, Baez, Uduk Lake, Loon) are being recognized.

The completion of the access road into the Eskay Creek property and production in January, 1995 will provide improved infrastructure for future exploration programs in this area. The increase in exploration expenditures on industrial minerals is forecast to continue, with new discoveries and new markets being developed. In general, the long-term outlook for markets for minerals, and mineral products is very good throughout the Pacific Rim; British Columbia is well positioned to compete in the international market.

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EXPLORATION AND DEVELOPMENT HIGHLIGHTS NORTHWESTERN REGION - 1994

By Paul Wojdak, P. Geo.
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OVERVIEW

For the third successive year exploration activity in northwestern British Columbia increased substantially over the previous year. Expenditures in 1994 were $49.0 million. The level of exploration spending now approachs one-half of the 1990 peak achieved during the flow-through financing era (Figure 9). Contributing factors include government financial assistance to mineral exploration through the Explore B.C. program and improvement in base and precious metal prices.

Some of the year's highlights include:

- Eskay Creek mine was developed by Prime Resources Group Inc., with ore shipments to commence in January, 1995.
- Lac Minerals Ltd. continued to conduct a very large exploration program for gold at Red Mountain that included road construction, underground development and intensive diamond drilling.
- North American Metals Corporation's Kodiak A deposit, British Columbia's first gold heap-leach project was discovered, engineered and approved in just ten months.
- Two more projects entered the mine permitting process, the Tulsequah Chief zinc-copper-silver-gold massive sulphide deposit of Redfern Resources Ltd. and the Huckleberry porphyry copper deposit of New Canamin Resources Ltd.
- American Bullion Minerals Ltd. commenced a major exploration program on the Red-Chris porphyry copper-gold property.
- A high level of activity continued in the Cassiar gold and asbestos mining camp.
- Exploration was revived on targets as diverse as the Toodoggone epithermal gold camp and the Ecstall volcanogenic massive sulphide belt.
- Prospector Assistance was re-instituted after a three year absence.

Exploration in 1994 focused on major programs and advanced properties. Table 5 lists the 30 projects with expenditures in excess of $200 000, the base line for major projects is revised from $100 000 used in 1993. Nine had budgets over $1million. Intrusive-related gold deposits such as Red Mountain and Willoughby accounted for 40% of exploration dollars (Figure 10). Porphyry copper-molybdenum-gold deposits attracted 18%, and 8% was directed to volcanogenic massive sulphide deposits, including the Tulsequah and Eskay camps. Among precious metal deposits, epithermal targets including Sulphurets-Bruceside, Premier, Golden Bear and the Toodoggone camp received 20% whereas mesothermal deposits, including Polaris-Taku, the Cassiar camp and Snip, received 10%. The remainder, a diverse group of asbestos, coal and jade projects, amounted to 4%.

Information contained in this report is derived from property visits by the Regional Geologist and other MEMPR - Smithers staff, news releases and other publications and,

MINERAL EXPLORATION EXPENDITURES
NORTHWEST BRITISH COLUMBIA

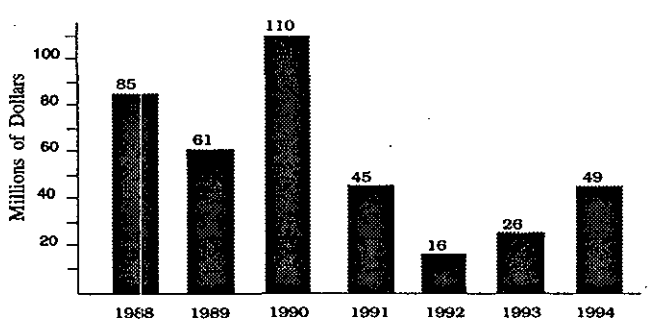

Figure 9

DISTRIBUTION OF EXPLORATION EXPENDITURES BY DEPOSIT TYPE

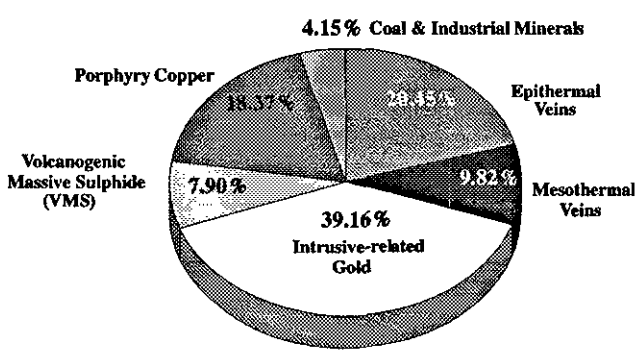

Figure 10

TABLE 5
1994 MAJOR PROJECTS IN NORTHWEST REGION

Property	Operator	Mining Division	NTS	MINFILE Number	Commodity	Type	Work Done
Ashwood	Aquaterre Mineral Dev. Ltd.	Skeena	103P/12, 13	n/a	Zn, Cu, Au, Ag	VMS	Geol; air mag/EM; 7 ddh, 1200 m
Baker/Chappelle	Baker Lake Gold Mines Inc.	Omineca	094E/6	026	Au, Ag	Epithermal vein	Trenching, 1000 m; 30 km IP; ddh, 900 m
Bandit	North American Metals Corp.	Atlin	104K/1	086	Au, Ag	Epithermal replacement	Mag EM, 6.2-km; geochem; 5 ddh, 931 m
Bronson Slope	International Skyline Gold Corp.	Liard	104B/11	077	Cu, Au	Porphyry	Geol; 9 ddh,1550 m
Cassiar	Canadian Chrysotile Mgmt. Corp.	Liard	104P/5	005	Asbestos	Industrial mineral	Pilot mill
Ecstall	Atna Res. Ltd.	Skeena	103H/13, 14	011, 053, 069	Cu, Zn, Ag, Au	VMS	Grid; geol; geochem
Engineer	Ampex Mining	Atlin	104M/8	014	Au	Epithermal vein	Install test mill
Eskay Creek	Prime Res. Group Inc.	Skeena	104B/9	008	Au, Ag, Zn, Cu	VMS	Geol; 11 ddh, 4081 m
Golden Bear	North American Metals Corp.	Atlin	104K/1	088	Au	Epithermal carbonate replacement	Geol; geochem; VLF-Mag; trench; 58 ddh, 6060 m; Ug develop., 900 m
Hearne Hill	Booker Gold Expl. Ltd.	Omineca	093M/1	006	Cu, Au	Porphyry, breccia	20 pc. dh, 1500 m; 12 ddh, 2000 m
Huckleberry	New Canamin Res. Ltd.	Omineca	093E/11	037	Cu, Mo	Porphyry	135 ddh, 20049 m; geotech; Env.
JD	AGC Americas Gold Corp.	Omineca	094E/6	032, 065	Au, Ag	Epithermal vein	Geochem; IP; 31 ddh, 2084 m
Limonite	Limonite Creek Limited Partnership	Omineca	093L/12	075	Cu, Au, Ag	Epithermal acid sulphate	Geol; IP; 9 ddh, 1162 m
Polaris-Taku	Golden Angus Mines Ltd.	Atlin	104K/12	003	Au	Mesothermal vein	27 ddh, 5258 m
Premier Gold	Westmin Res. Ltd.	Skeena	104B/1	153	Au, Ag, Zn, Pb	Epithermal vein	6 ddh, 4332 m
Red-Chris	American Bullion Minerals Ltd.	Liard	104H/12	005	Cu, Au	Porphyry	Geochem; IP; Mag; 58 ddh, 21384m
Red Mountain	American Barrick Res. Corp	Skeena	103P/13	86	Au, Ag	Intrusive-related gold	U/g devel., 540 m; access road, 12 km; geophys; geol; prosp; 129 ddh, 39132m
SB	Westmin Res. Ltd.	Skeena	104B/1	150	Au, Ag	Epithermal vein	U/g devel., 160 m; 70 ddh, 3505 m; 1700 t bulk sample
Silver Pond/Law	Ocean Crystal Res. Inc.	Omineca	094E/6	069	Au, Ag	Epithermal vein/breccia	Geol; IP; 8 ddh, 551 m
Snip (Bronson)	Cominco Ltd.	Liard	104B/11	4, 264	Au	Shear vein	13 ddh, 4200 m
Snip (Jim)	Cominco Ltd.	Liard	104B/11	250	Au	Shear vein	33 ddh, 13090 m
Sulphurets - Bruceside	Newhawk Gold Mines Ltd.	Skeena	104B/8, 9	190	Au, Ag	Epithermal	Geol; channel sample; 20 ddh, 7574 m
Table Mountain	Cusac Industries Ltd.	Liard	104P/4, 5	70, 113, 034	Au	Mesothermal vein	U/g devel., 70 m; ddh not available
Taurus	International Taurus Res. Inc. & Hera Res. Inc.	Liard	104P/5	010, 011	Au	Mesothermal vein	Geol; IP; Ug devel. 350 m; trench; 81 ddh, 4300 m
Telkwa	Manalta Coal Ltd.	Omineca	093L/11	156	Coal		ARD study; 56 ddh, 6727 m
Todd	Oracle Minerals Ltd.	Skeena	104A/4, 5	105, 106, 107	Au, Cu	Intrusive-related gold	Geol; airborne EM/mag
Treaty Creek	Prime Res. Group Inc.	Skeena	104B/9	078	Au, Ag	Epithermal acid sulphate	Geol; trench; 8 ddh, 875m
Tulsequah	Redfern Res. Ltd.	Atlin	104K/11, 12	002	Cu, Pb, Zn, Ag, Au	VMS	Geol; 30 ddh, 11469 m; downhole IP
Willoughby	Camnor Res. Ltd.	Skeena	103P/13	006	Au	Intrusive-related gold	Geol; geochem; 17 ddh, 1747 m
Zo	Firesteel Resources Inc.	Atlin	104K/11	052	Ag, Au, Pb, Zn, Sb	Epithermal vein	14 ddh, 1313 m

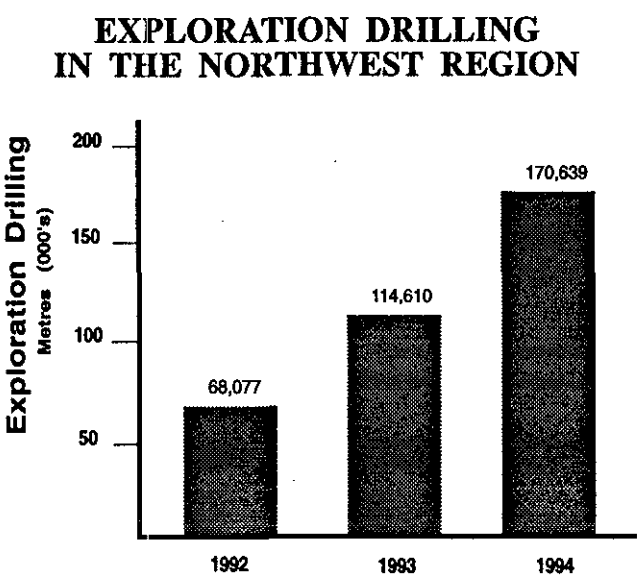

Figure 11.

most significantly, from mine and exploration geologists whose work and ideas are acknowledged throughout the text.

TRENDS AND OPPORTUNITIES

Northwestern British Columbia comprises all of Skeena, Atlin and large parts of Omineca and Liard Mining Divisions. A tally of new and forfeited claims for Northwestern Region during the first eleven months of 1994, reported by Mineral Titles Branch is summarized in Table 6. Overall, there were 9775 new mineral claim units recorded and 12 131 claim units forfeited, yielding a net reduction of 2356 units. The statistics reveal the decrease in mineral tenure occurred in all mining divisions except Skeena where there is a pronounced net gain, a reflection of continuing activity in the Stewart and Iskut camps. The decrease in other mining divisions may be a delayed effect of the 1987-1991 exploration boom during which several years work was recorded on many claims which are now coming due. With respect to placer tenure, there is a net gain attributable to a strong increase in the Atlin Mining Division.

Claim staking is a good indication of the health of the mining industry at the grassroots level. A low level of claim forfeitures indicates the esteem of existing mineral tenure, another measure of the industry's vitality. Total exploration drilling, a good indication of the level of activity on intermediate and advanced exploration projects, increased to 170 854 metres in 1994 (Figure 11). Over a period of years comparative statistics on mineral tenure and drilling will provide meaningful trends on exploration activity. Many other statistics are potentially not as reliable. Total exploration spending for example is subject to inflation and may include substantial non-exploration costs such as aboriginal consultation and environmental studies. Tracking the number of Notices of Work has many deficiencies: large and small projects count equally, staged projects may submit several notices, some planned programs are not completed due to financing problems and permits for reclamation programs may be included with exploration activity.

Several developments and trends have emerged in 1994 that are expected to impact on exploration in 1995. First, the growing revival in porphyry copper exploration is the most apparent new trend in northwestern British Columbia. The porphyry component of exploration spending increased to $9.01 million in 1994 from $2.86 million in 1993. This increase reflects not only the addition of a major program at Red-Chris and continuation of the Huckleberry project, but also new activity in the Houston-Babine area. High copper price and demand for copper concentrate are likely to maintain interest in porphyry copper exploration in 1995. The possibility of significant Tertiary supergene zones in central British Columbia is an additional consideration for porphyry explorationists targeting deposits amenable to SxEw recovery methods. Supergene mineralization may have been preserved from erosion in grabens of the basin-and-range tectonic regime that characterizes west-central British Columbia. Growing interest in copper may lead to exploration for other deposit types such as redox fronts as at Sustut, and skarns.

Preliminary reports on the Red Mountain gold deposit and the scale of the Lac Minerals Ltd exploration program in 1993 and 1994 generated considerable activity by competitors in the Bear Pass - Cambria Icefield area. The widely publicized acquisition of Lac Minerals Ltd. by American Barrick Resources Corporation and subsequent decision to

TABLE 6
SUMMARY OF CHANGES IN CLAIM STATUS,
NORTHWESTERN REGION

	MINERAL TENURE		PLACER TENURE	
MINING DIVISION	NEW	FORFEITS	NEW	FORFEITS
Atlin	455	1762	114	49
Liard	1332	4893	50	82
Omineca	1981	2935	8	2
Skeena	6007	2541	0	2
TOTAL	9775	12131	172	135

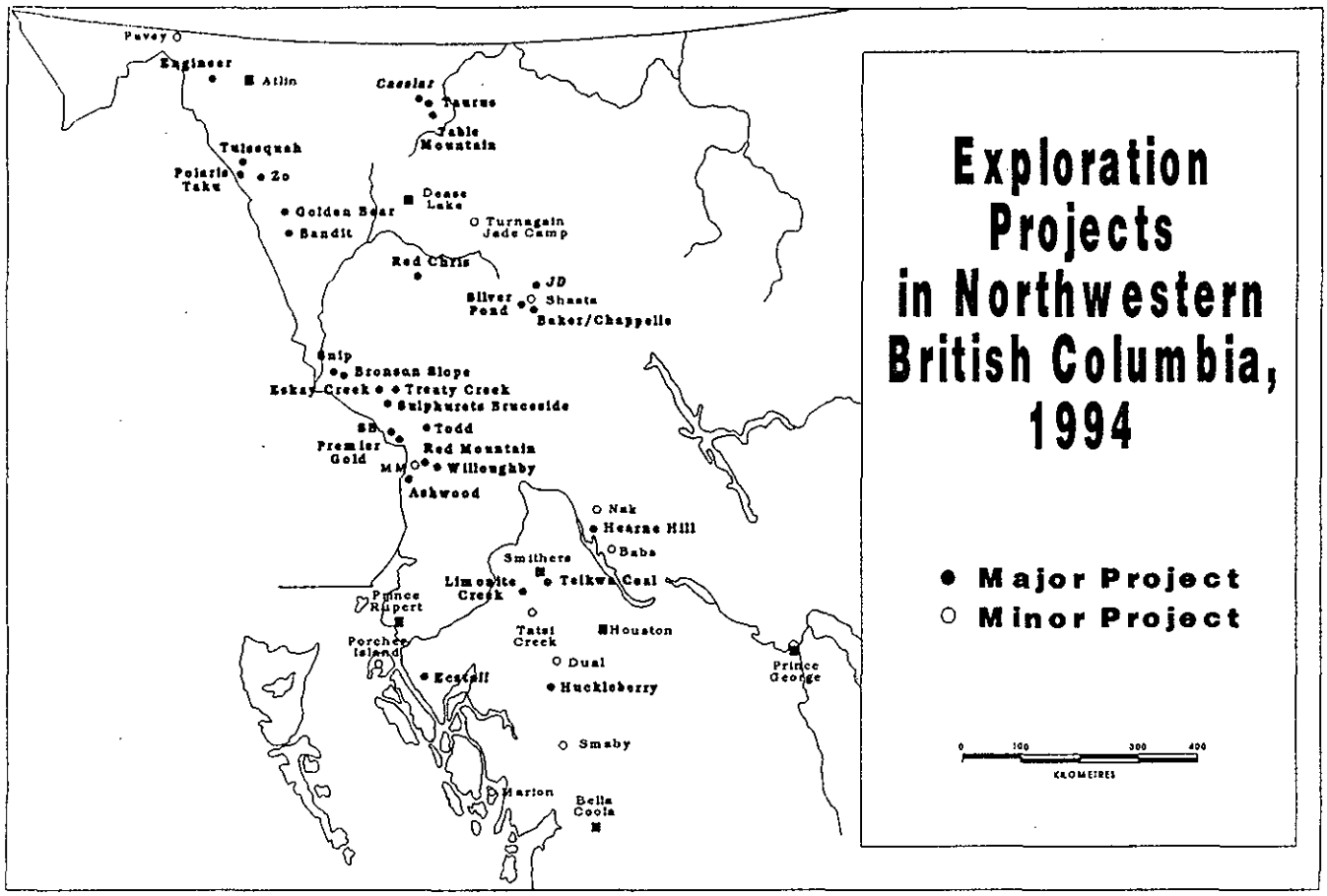

Figure 12.

sell the Red Mountain property has cast uncertainty over British Columbia's largest exploration project. Although Red Mountain gold resource announcements in 1994 did not keep pace with many observers' expectations, this intrusive-related, base metal-associated gold deposit is an important new target in the Stewart and Iskut camps. Continued exploration of intrusive-related gold-bearing systems in the area in 1995 is assured but the level of activity is uncertain. Growing recognition of a parallel in geology and mineral deposits (such as Eskay Creek, Red Mountain and copper-gold porphyries) between active island arcs in the southwestern Pacific and Upper Triassic to Lower Jurassic arcs in northwestern British Columbia may point to other deposit targets.

The discovery of the Kodiak A and Ursa zones at the Golden Bear mine and successful permitting of a cyanide heap-leach mining plan has revolutionized ore deposit target parameters for North American Metals Corporation. Pending operational success of the heap leach, this project may lead to more widespread exploration for carbonate-hosted gold deposits by others.

Although hampered by late project financing, a strong revival in exploration activity in the Toodoggone camp by several junior companies emerged as a significant trend that is expected to continue in 1995. The presence of road access and milling facilites from previous mining operations are important factors which contribute to the economic development of mineral resources, factors which must be balanced against pressures to reclaim and remove infrastructure.

Cominco Ltd.'s discovery of the Kudz Ze Kayah volcanogenic massive sulphide deposit in Yukon-Tannana Terrane may spawn increased exploration of Paleozoic stratigraphy in British Columbia for similar deposits. The high potential of Paleozoic strata in northwestern British Columbia is already well documented, *e.g.* Tulsequah Chief and Foremore properties, but prospective areas in the Slide Mountain (Sylvestor allochthon) and Dorsey terranes have received less attention for this type of target.

Finally, and perhaps most importantly, a resurgence in prospecting appears to be underway, induced in part by the provincial Prospector Assistance program. The number of prospectors able to sell or option properties to junior or senior mining companies is still low but seems to be increasing. A high-grade silver find southwest of Smithers, and showings in the Bear Pass - Cambria Icefield area are examples of promising discoveries that will spark more prospecting in northwestern British Columbia next year.

LAND-USE ISSUES

In 1992 the Government of British Columbia introduced the Protected Areas Strategy (PAS). Under PAS, 12% of the

province will be set aside to protect natural and cultural-heritage values and offer recreational opportunities. No industrial extraction or development will be permitted in these areas. The role of the Ministry of Energy, Mines and Petroleum Resources in land-use planning processes is to ensure that mineral potential values are properly identified, enabling a rational selection of land to be removed from the land base available to mineral exploration and development. Recent protected area designations in the Prince Rupert Forest Region include the Kitlope River and Khutzeymateen River watersheds and the Tatshenshini area which increase the protected area to 3 442 349 hectares, or 13.7% of the region. In addition, 511 745 hectares (2.0%) is partially protected as Recreation and Forest Wilderness Areas. Note that Prince Rupert Forest Region, used in regional land planning, differs somewhat from Northwest Region as defined by MEMPR.

Bear Pass, near Stewart, is a PAS study area with a large number of Crown-granted mineral claims and high mineral exploration interest derived from numerous mineral occurrences and proximity to the Red Mountain gold project. MEMPR, together with the Ministry of Environment, Lands and Parks, the Municipality of Stewart, the Nisga's government and concerned mining companies, discussed the merits of preservation and mineral development. The result was a recommendation to government by the Prince Rupert Interagency Management Committee (comprising the Ministries of Forests, Environment, Lands and Parks and EMPR) that the large study area be greatly reduced and that only the toe of Bear Glacier and Strohn Lake be protected. This recommendation has been accepted by Cabinet.

In northwestern British Columbia, as part of a provincial mapping program, MEMPR is preparing a mineral potential assessment of the Skeena-Nass area. The first phase, based on historical data, has been completed by D.G. MacIntyre *et al.*, *see* MEMPR Geological Fieldwork 1994. Results of the analysis will be interesting to explorationists and informative to land planners. For site-specific issues, Regional Geologists are commonly involved with mineral potential assessments. For example, the impact on mineral exploration of planned deactivation of Forest Access roads was provided for areas on Graham Island and east of Babine Lake, in the Babine porphyry copper belt. The Protected Areas Strategy requires MEMPR to rate mineral potential of Recreation and Forest Wilderness Areas as "low" or "significant". With much appreciated assistance from staff of the Geological Survey Branch, the following mineral potential reports were prepared for the Prince Rupert region:

- Fiordland Recreation Area (by Kim Bellefontaine)
- Hakai Recreation Area (by Kim Bellefontaine)
- Stikine River Recreation Area (by James Logan)
- Atlin Recreation Area (by Mitch Mihalynuk)
- Swan Lake Forest Wilderness Area (by Paul Wojdak)
- Gitnadoix River Recreation Area (by Paul Wojdak)
- Mount Edziza Recreation Area (by Paul Wojdak)
- Tweedsmuir Recreation Areas: Lindquist, Rainbow, Tesla, Preston and Red Bird (by Paul Wojdak and Larry Diakow).

All were rated to have significant mineral potential except Fiordland, Rainbow and Swan Lake which were rated as low. Only a small area within Hakai and Gitnadoix River were rated as significant. (Note that mineral potential assessment studies of Babine Mountains Recreation Area, by R.G. Gaba and Nisga's Lava Bed Recreation Area, by A. Legun, were completed prior to 1994 and have been released to the public). This information will be used by any land planning processes in these areas, or by government to determine final land designations.

MINERAL EXPLORATION

ATLIN CAMP

Activity in the Atlin placer gold district was up about 30% in 1994, with about 38 producing operations of greatly varying size and a further 20 testing programs. Gold occurs primarily in pre-glacial stream gravel, easily distinguished from younger gravel by a distinctive yellow-orange colour, but was reconcentrated in high-energy younger stream channels so that pay gravel occurs at as many as four stratigraphic levels. Encouraged by the success of Ko-Ken Mining's seismic survey on Otter Creek, where there was little historic underground mining, several more seismic surveys were conducted on other creeks in 1994 to detect buried preglacial stream channels. The profitability of several types of mining operations assures continuation of placer mining in the Atlin camp for many years. Large stripping/pitting operations on Spruce and Otter Creeks utilize heavy equipment including 35-tonne trucks to handle large volumes of material. Excavators paired with a floating wash plant are successfully re-mining low-value gravel on Pine Creek and O'Donnel River, and small "family operations" with minimal earth moving equipment are profitably working more difficult ground, such as Ruby and Boulder creeks. Yellow Jacket, an important lode prospect was re-staked by local prospectors in 1994.

Hemlo Gold Mines Inc. continued exploration of auriferous epidote-hornblende-chlorite-pyrrhotite skarn and Au-As-Sb-Cu-Co veins on the Pavey property, 75 kilometres northwest of Atlin. The property straddles the Llewellyn fault which separates pre-Permian metamorphic rocks of Nisling Terrane to the west from Mesozoic volcanic and sedimentary rocks of Stikine Terrane. Skarn is developed in Stuhini Group mafic volcanic rocks. At the Engineer mine, 30 kilometres west of the Atlin camp, Ampex Mining, a private company, installed a 45 tonne per day mill and proposes to treat a 10 000-tonne bulk sample of auriferous quartz-calcite vein in 1995. Engineer is an epithermal deposit in a splay of the Llewellyn fault.

TULSEQUAH CAMP

Redfern Resources Ltd. continued to evaluate Tulsequah Chief and Big Bull, former producing volcanogenic massive

sulphide deposits. Underground drilling was directed to northeast extensions of the H and G lenses at Tulsequah Chief which host the bulk of the present reserve (8 489 885 tonnes grading 1.41% Cu, 1.23% Pb, 6.65% Zn, 2.56 g/t Au and 103.4 g/t Ag). A program highlight was a particularly thick and high-grade intersection of the H lens. Surface drilling extended the stratigraphy and alteration which hosts the Tulsequah Chief deposit some 300 metres westerly (K.M. Curtis, personal communication). Drilling at Big Bull, 8 kilometres south of Tulsequah Chief, confirmed the large size of the Big Bull alteration zone, at least 1000 metres long by 600 metres down-dip, and returned some ore grade intercepts over mineable widths. However, mineralization appears to be disrupted by faulting and a coherent massive sulphide body has yet to be found. Exhalative manganese oxide and jasper, up to 40 metres thick, was encountered (T. Chandler, R. Carmichael, personal communication). Redfern Resources submitted a Pre-application for Mine Development Certificate to initiate government's mine approval process. Through this process British Columbian, Canadian federal, Alaskan and Taku Tlingit interests will address potential impacts of mine development on other resources such as fish, wildlife and tourism.

After a one year hiatus, exploration resumed on Polaris-Taku, a former gold producer located on the opposite bank of Tulsequah River from Tulsequah Chief. Litigation between Canarc Resource Corporation and Rembrandt Gold Mines Ltd. concerning project management was resolved. Past production, 231 000 ounces of gold, and current reserves, 2 186 000 tonnes grading 14.7 g/t Au, are within the "mine wedge", structurally controlled listwanite containing three quartz-arsenopyrite vein systems, the AB, C and Y-veins. Canarc's operating subsidiary continued systematic drilling on the C and Y veins in 1994, with three excellent intercepts from the C-vein, but discovery of the North zone provided more exciting news by opening new ore potential. One of the better intercepts in the North zone is 16.9 metres grading 6.2 g/t Au. The new discovery, which resulted from trenching and drilling of a soil geochemical anomaly, is wider but lower grade than past-producing gold zones. Canarc suggests the North zone is the faulted extension of the mine wedge, and resembles the upper levels of the productive zone in that the carbonate halo to listwanite alteration is broad and stibnite is abundant (James Moors, personal communication). If vertical zoning in the North zone is similar to the mine wedge, arsenopyrite and gold should increase with depth.

On Zohini Creek, 15 kilometres west of Tulsequah, Firesteel Resources Inc. drill tested a shear-hosted polymetallic vein with significant values in antimony, gold, silver, lead and zinc.

GOLDEN BEAR CAMP

A great many events occurred at Golden Bear during 1994. The Kodiak A gold deposit, located 3 kilometres north of the plant site at an elevation of 1900 metres, was defined by a winter drilling program early in 1994 and a cyanide heap-leach mine plan was conceived, engineered and permitted by August 8. North American Metals Corporation hoped to mine 325 000 tonnes from Kodiak A and place the ore on the heap leach pad by November 1. This fast-track approach was necessary to maintain gold production as underground mining of the Bear Main zone was wound up in mid-September and the mill-roaster complex put on a care and maintenance schedule. Unluckily, a severe rain storm made it impossible to install the leach pad liner, caused other damage to mine infrastructure and forced postponement of Kodiak A mining to 1995. The Grizzly exploration decline is scheduled for completion at the end of 1994 and underground drilling of the Grizzly zone from the decline is already underway. Grizzly is a refractory mineralized zone, similar to the Bear zone, in fault gouge between Permian limestone and Stuhini Group mafic volcanic rocks. Another discovery, the Cub zone, was encountered while driving the decline, but follow-up work has not been encouraging.

Heap-leach gold mining will revolutionize economics at Golden Bear. Mining cut-off grade in the Kodiak pit is expected to be 1 g/t Au, versus 12 g/t Au in refractory underground ore (D. Tenney, K. Atkin, personal communication). Even waste rock from the Bear pit, with an estimated grade of 1.5 g/t Au, has been renamed the low-grade stockpile. Kodiak ore is in silicified Permian limestone, variably hematitic but containing no pyrite, so that ore and waste are indistinguishable. Gold occurs over a 40-metre width in the footwall of a very subtle splay of the Fleece fault, faintly detected by a close-spaced EM survey.

As in 1993, an important gold discovery that is amenable to cyanide leach recovery was made in 1994. The Ursa zone, 800 metres north of Kodiak A, is in dolomitized and only locally silicified limestone some 200 metres west of the Ophir break (L. Pigage, personal communication). Previously, exploration at Golden Bear focused on major faults but the Kodiak and Ursa discoveries have expanded the search area. There are only 12 drill holes in the Ursa zone but with a best intercept of 12.2 g/t Au over a true width of 27.2 metres, there is substantial promise it will be an ore zone.

North American Metals commenced systemmatic re-evaluation of its claim holdings in the Golden Bear camp for cyanide leachable gold mineralization. On the Bandit property, drilling targeted a silicified fault contact between Stuhini volcanic rocks and Paleozoic limy tuffs and clastic sedimentary rocks in the Post and Ram Reef zones. Drill targets were selected using VLF EM and IP to assess extensive strong gold soil anomalies (A. Hamilton, personal communication).

CASSIAR CAMP

Gold mining was re-activated at the Table Mountain mine by Cusac Industries Ltd. The West Bain vein was accessed by a decline driven in late 1993, 29 900 tonnes of ore were mined during the winter and milling followed during spring and summer. A post-ore dike in the plane of the Bain vein caused greater dilution than anticipated but the operation was still a success, with a recovery grade of 14.1 g/t Au. Historic production from listwanite-hosted quartz veins at Table Mountain is 8302 kilograms gold from 519

300 tonnes of ore, representing a millhead grade of 14.4 g/t Au, nearly identical to mine grade in 1994. The 1 to 2 metre wide Bain vein contains 5 to 15% pyrite, sphalerite, chalcopyrite, tetrahedrite, arsenopyrite and visible gold. Gold is enriched on the footwall side in ribbon bands of fine-grained sulphide, the hangingwall comprises brecciated quartz with a sulphide matrix but is not ore grade (M. Sadd, personal communication). Auriferous quartz veins in the Cassiar camp are hosted by stacked thrust slices in the Paleozoic Sylvestor Group, and ore grades are limited to a 100-metre vertical extent (M. Ball, personal communication). At time of writing Cusac Industries is proceeding with development of the Big vein and Michelle high grade zone.

Gold-bearing quartz veins on the Taurus property of Hera Resources Inc. and International Taurus Resources Inc. are similar to Table Mountain, except that sulphide and gold content are less. Exploration in 1994 focused west of the Taurus mine workings which produced 217 700 tonnes grading 5.14 g/t Au during 1981-88, and included a 350-metre extension of the Sable decline to explore the 93-1 and 93-2 veins. Late in the exploration season attention shifted to a zone up to tens of metres thick of heavily disseminated pyrite in silicified mafic volcanic rocks that may have bulk-tonnage potential. W.A. Howell of Hera Resources suggests this zone may correlate with the "pyrite zone" in the lower levels of the Taurus mine described by M.H. Gunning in *Exploration in British Columbia 1987*, pages B101-104.

Canadian Chrysotile Management Corp., a wholly owned subsidiary of Black Hill Minerals Limited, began installation of a pilot mill at the former Cassiar Asbestos mine, using proprietary wet-milling technology. If successful, a larger production plant will be built. The proposed source of millfeed is a 16 million tonne stockpile of tailings from the previous dry milling operation that grades 4.2% short-fibre asbestos. The company opened the world's first wet-milling plant at Baie Verte, Newfoundland in 1991. Chrysotile asbestos has substantially lower health risks than the amphibole group asbestos minerals and world demand for Cassiar's premier chrysotile fibre remains strong.

Trenching and diamond drilling to determine gem quality of jade, prior to excavation and diamond sawing, continued in the Turnagain River area 80 kilometres west of Dease Lake. Nephrite jade is associated with serpentinized ultramafic rocks of the Cache Creek Terrane, 120 kilometres south of the Cassiar camp. The largest operators are The Continental Jade Ltd., Glenpark Enterprises Ltd. and Greenrock Exploration Ltd.

GATAGA CAMP

The Devonian Gunsteel formation hosts important sedimentary exhalative zinc-lead-barite mineralization that was explored by Teck Exploration Ltd. on the Driftpile property. Two stacked sulphide horizons occur at the base of a locally derived turbidite sequence deposited within 1 kilometre of the Mount Waldemar fault, interpreted by R.C. Carne to have originated as a growth fault and been converted to a thrust by northeasterly compression. Distinctive dolomite concretions are restricted to shale overlying the mineralized zones (R. Farmer, personal communication) and might be useful in regional prospecting. Twenty kilometres northwest of Driftpile, Ecstall Mining Corporation staked the Rough prospect, a structurally controlled base metal showing and nearby barite horizon. Potential for sedimentary exhalative mineralization extends 200 kilometres northwesterly toward the Yukon border.

STIKINE PORPHYRY CAMP

Exploration of the Red-Chris porphyry copper-gold prospect, 80 kilometre south of Dease Lake, was revived by American Bullion Minerals Ltd. after a twenty year dormancy. Exploration in the 1970s outlined a resource of 41 million tonnes grading 0.56% Cu and 0.34 g/t Au in the Main and East zones. A 5-kilometre-long early Jurassic monzonite, the Red stock, intrudes probable Stuhini Group mafic volcanic rocks at the fault bounded margin of the Bowser sedimentary basin. Copper and gold occur within a sheeted quartz-pyrite-chalcopyrite vein stockwork that parallels the northeasterly elongation of the Red stock in the high-grade East zone, but grades to a random stockwork westerly through the Main zone to the Gully zone. Pervasive alteration is characterized by sericite, ankerite and hematite, the latter two are unusual in a porphyry environment. Classic porphyry zoning is not evident (W. Mann, J. Pardoe, personal communication). Drilling in 1994 was mainly within the limits of prior drilling, except that holes were drilled to 300 metres below surface versus 60-180 metres in previous holes. The objective of American Bullion's program is to substantially increase reserves and define a higher grade core, realistic goals because the extent of mineralization is poorly known. A flat alpine plateau with a till blanket masks bedrock except in the incised Gully zone where earlier drilling is sparse and shallow.

No exploration of other porphyry targets was undertaken in the Stikine camp.

TOODOGGONE CAMP

AGC Americas Gold Corporation discovered new gold-silver mineralization by drilling of the Finn zone on the JD (McClair) property. Two parallel zones returned significant grades over core intervals up to 7 metres, separated by a 3 to 8-metre low-grade siliceous interval. AGC suggests the zone is related to a low-angle fault. A major trenching and drilling program is being planned for 1995.

On the Silver Pond and Law properties, about 3 kilometres west of Cheni mine, Ocean Crystal Resources Ltd. conducted geological mapping, IP surveying, trenching and diamond drilling for a precious metal vein using the Buchanan epithermal model. One kilometre west of the Baker mine, Baker Lake Gold Mines Inc. located three new veins with significant widths by prospecting and trenching in the West Chapelle area. Ocean Crystal and Baker Lake propose further work on their respective properties next year. Sable Resources Ltd. drilling on the Shasta property returned disappointing results on the main target, the JM zone, but the final three holes on the Creek zone returned encouraging gold-silver assays. Also in the Toodoggone camp, Cheni

Gold Mines Inc. conducted soil and magnetic surveys over the Al and Moose claims and Western Horizons Resources Ltd. conducted a study of satellite imagery on the Golden Stranger property. The writer has not visited the Toodoggone camp and has drawn entirely on information provided by company geologists.

ISKUT CAMP

The exceptionally rich Eskay Creek gold-silver deposit, discovered in 1988, received mine approval and was developed to production in 1994 by Prime Resources Group Inc. (Photo 1). Government review included approval to construct a pressure oxidation and cyanidation plant to treat the complex ore, to be built 600 kilometres from the mine site near Houston, British Columbia, but smelters in eastern Canada and Japan made proposals for purchase of raw ore that Prime found attractive and the plant was not built. During construction, Prime Resources continued its systemmatic exploration of the Eskay area with drill testing of deep geological and geophysical targets. The objective is gold-rich exhalative sulphide mineralization near the base of the Salmon River rift volcanic and sedimentary sequence, deposited after cessation of arc-type, "felsic volcanism". The Eskay 21B deposit occurs in the Contact mudstone but other ore zones, such as 21C, occur at stratigraphic levels above this marker unit. While excavating Salmon River mudstone 150 metres above the 21B horizon for road construction, a 0.4-metre-thick sulphide bed was discovered (D. Kuran, personal communication). Gold values are not high but the discovery demonstrates the area's ore potential. Prime Resources Group Inc. explored two properties acquired by option from Teuton Resources Corp. The Eureka and Orpiment zones within strong advanced argillic altered Hazelton Group volcanic rocks on the Treaty Creek property were drilled in search of an epithermal gold deposit and preliminary work was conducted on the Bonsai claims for Eskay Creek style mineralization.

At the highly successful Snip gold mine, recovery of the crown pillar was initiated in addition to normal operations. Cominco Ltd. maintained efforts to discover new gold reserves to extend the mine life. An encouraging intersection was cored in a major drilling program that targeted east and west extensions of the Twin shear zone, which hosts known reserves at Snip, and the Sky Creek shear zone (T. Hodson, personal communication). Exploration drilling for vein structures parallel to the Twin vein was also carried out on the adjoining Bronson property. International Skyline Gold Corporation drilled the Red Bluff porphyry copper-gold system, just 4 kilometres from Snip mine.

On the Sulphurets Bruceside property, drilling was undertaken by Newhawk Gold Mines Ltd. on the Shore, West, R-8, PM-3, Coogan's Bluff, Grace, Tommyknocker and Big Sleep zones. Much of 1994 drilling was 300 to 500-metre-holes to test below prior shallow holes in search of a large

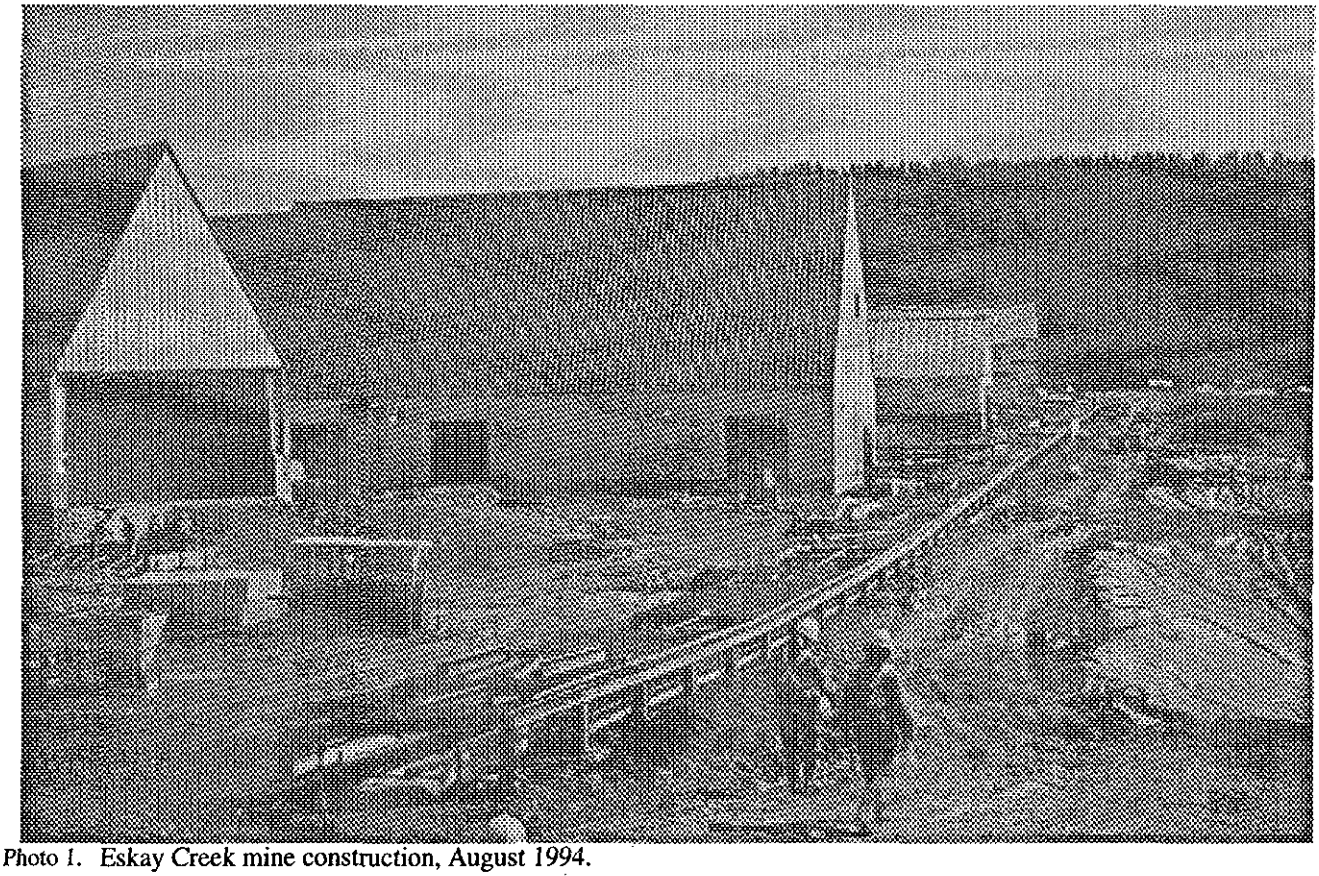

Photo 1. Eskay Creek mine construction, August 1994.

deposit. In the West zone, two follow-up holes failed to extend an intercept of 99.4 metres grading 2.57 g/t Au and 43.2 g/t Ag. Existing geological reserves in the West zone are 750 000 tonnes grading 15.4 g/t Au and 678 g/t Ag. Geological mapping by Steven Roach and others traced Jack formation wacke and argillite from the Shore zone through the quartz-sericite-pyrite alteration zone to outline an important syncline. Consultant Peter Lewis worked to resolve alternative structural models for the property, relating the mineralized zones to folding, faulting and dilational events in a multi-stage structural history.

Several smaller programs were conducted in the Iskut-Sulphurets camp by other operators. Pamicon Developments Ltd. prospected two distinct auriferous massive sulphide boulder trains on the Pam property, 35 kilometres northwest of Eskay Creek mine. Geological and geochemical surveys were conducted on the Forrest property, 20 kilometres northwest of Eskay Creek by Abacus Minerals Corporation for a Au-Ag-Cu shear vein target, and on the RDN property, 35 kilometres north of Eskay Creek, by Pathfinder Res. Ltd. for a gold-rich exhalative massive sulphide target. Planned exploration of new showings on the Corey property, located between the Eskay Creek and Sulphurets Bruceside properties was not undertaken due to difficulties in securing project financing.

STEWART CAMP

The most intensive exploration activity in British Columbia was in the Stewart camp, centred on the Red Mountain gold project. Lac Minerals Ltd. carried out most of its planned, very substantial 1994 exploration program at Red Mountain prior to control of the company being acquired by American Barrick Resources Corporation. The Marc zone decline was extended 540 metres to permit detailed underground drilling of the AV and JW zones. The 141 zone, its name derived from a drill hole which assayed 3.8 g/t Au over 34 metres, and a variety of other geological, geophysical and geochemical targets were tested by trenching and surface drilling. Gold zones at Red Mountain are related to the Goldslide stock, a multi-phase, early Jurassic hornblende diorite intruding a well bedded sequence of siliciclastic to argillaceous sedimentary rocks, determined from paleontological and mapping evidence to be Late Triassic in age (C. Greig, personal communication). Previously these rocks were assigned to the Hazelton Group but are now suggested by Greig to correlate with Unuk River Formation. Disseminated pyrite is widely distributed about the stock but gold, tellurides and associated pyrrhotite and sphalerite occur with a coarse pyrite vein-stockwork and breccia in-filling. Breccia zones most commonly occur at contacts between very irregularly shaped, high-level phases of the intrusion and the sedimentary country rocks (D. Rhys, M. Prefontaine, personal communication). Gold zones have an As-Sb-Zn signature (H. Smit, personal communication). American Barrick hopes to sell the Red Mountain project but at time of writing no buyer has been identified.

Camnor Resources Ltd. sampled and drilled the North, Wilby, Willow and Upper Icefall gold zones on the Willoughby nunatak, 5 kilometres east of Red Mountain. Drill intersections include impressive gold intercepts but ability to extend the zones is compromised by severe topography and ice which limit drill sites. Inspection of the drill core reveals interesting similarities to Red Mountain gold mineralization. The critical hostrock is hornblende-feldspar-porphyritic diorite, similar to high-level phases of the Goldslide stock, that has intruded thin-bedded sediments and andesite tuff. Some zones are associated with ductile shearing in the intrusion, others are associated with hydrothermal breccias. Gold is associated with pyrite, pyrrhotite, and variable galena and chalcopyrite. Mineralized zones have an As-Zn-Pb signature. Alteration includes sericite, black chlorite(?) and pervasive carbonate, which is not present at Red Mountain. Continued exploration is anticipated in 1995.

G.J. Corbett and T.M. Leach, in their *Guide to Pacific Rim Au/Cu Exploration* (a workshop presented at Melbourne University, July 5, 1993) defined a class of deposits that can be referred to as intrusive-related, carbonate - base metal gold systems. Example deposits are Kelian in Indonesia, Porgera and Mount Kare in Papua New Guinea. This writer suggests Red Mountain and Willoughby belong to this class. The definitive characteristics are:

- gold is closely associated with iron and other base metal sulphides and carbonate deposition within vein through to breccia settings,
- associated metal abundances are typically Zn>Pb>Cu
- gold zones commonly occur within, or at the margins of intrusive rocks,
- gold - base metal - carbonate deposition may be preceded either by porphyry-related quartz stockwork or epithermal quartz-adularia-sericite veining, depending on the depth of the system.

These characteristics relate well to the Red Mountain and Willoughby prospects, with some qualifying comments. Carbonate is a prominent pervasive alteration at Willoughby, but is restricted to late veins at Red Mountain. Strong pervasive K-feldspar - sericite alteration occurs below the gold zones at Red Mountain, and quartz-molybdenite stockwork veining occurs at greater depth in the Goldslide stock, but their age relationship to gold deposition is not known. Apparent similarity of Red Mountain to Porgera (types A, B and E) mineralization was described in *Exploration in British Columbia 1993*, pages 33-35.

Many other exploration programs in the Bear Pass - Cambria Icefield area were prompted, to some degree, by discoveries at Red Mountain and Willoughby. Near Bitter Creek, northwest of Red Mountain, Nicholson and Associates evaluated two groups of shear vein occurrences on the MM property for Prime Equities International Corp. Trenching and drilling are planned for the Stewart Central showings, pyrrhotite-chalcopyrite-arsenopyrite mineralization with gold values controlled by northwest-striking structures and/or by a contact between volcanic and sedimentary rocks (G. and J. Nicholson, personal communication). Teuton Resources Corporation prospected its extensive claim holdings near Red Mountain, discovering

a variety of new occurrences. North of Red Mountain, Cameco Corp. conducted detailed geological mapping and sampling in the vicinity of an auriferous sphalerite breccia zone on the Cornice Mountain (Stewart) property, but was disappointed with results and returned the claims to Trev Corporation. Westmin Resources Limited followed up an airborne EM-magnetic survey conducted over stratabound pyrrhotite-chalcopyrite showings at a mafic volcanic/argillite contact on the New York property in Bear Pass. The target is a gold-rich exhalative massive sulphide deposit. A similar target was sought by Aquaterre Mineral Development Ltd. on the Ashwood property, where Hazelton Group mafic to intermediate volcanic rocks are overlain by pyritic argillite.

North of Bear Pass, Canstar Ventures Corporation identified a Au-As-Pb-Zn geochemical signature from lithogeochemical surveying of alteration zones on the Wolf (Golden Crown) property. Also north of Bear Pass, Oracle Minerals Ltd. property at Todd Creek surrounds a small gold deposit owned by Hemlo Gold Mines Inc. and estimated to contain 207 000 tonnes grading 5.48 g/t Au. Oracle's mapping and sampling of altered Hazelton Group volcanic rocks and high-level intrusions outlined drill targets on several zones nearby. At Oweegee dome, a basement window in Bowser Lake Group sedimentary basin, Cominco Ltd. renewed exploration of high-level intrusions into Hazelton rocks on the Delta claims in light of the new Red Mountain deposit model. Near the Tide Lake airstrip, Hemlo Gold Mines Inc. located anomalous amounts of gold associated with arsenic, zinc and lead by a geochemical and geological survey of alteration zones related to the early Jurassic Summit Lake stock.

Westmin Resources Limited continued efforts to utilize its Premier mill and CIL gold recovery facility by attracting additional millfeed. Modifications to mill design were made in order to treat Snip mine's gold-bearing sulphide concentrate. Formerly, Snip concentrate was exported but shipments to Premier Gold commenced in March 1994 and the change has proved to be advantageous for both operations. Five kilometres north of Premier Gold, Westmin and Tenajon Resource Corporation continued their underground sampling and drilling program to evaluate the Kansas/West Kansas gold zones on the SB (Silver Butte) property for potential to supply ore to the Premier mill. Gold occurs in a quartz-calcite base metal vein-stockwork, well suited to bulk mining.

At Premier Gold mine, bulk mining of low-grade caved rock from old underground workings on 555-level and a new 515-level continued to be the main source of ore. A smaller tonnage of higher grade ore is supplied by recovery of pillars from lower levels of the old workings, primarily 4-level. Westmin continued deep drilling for a northerly extension of the ore zone, structurally controlled precious and base metal vein breccia and stockwork. Grades in the Early Jurassic target zone are low but native gold and corresponding high grade was found in arsenopyrite-bearing veinlets, an unusual association at Premier, and an age determination yielded a Tertiary date (P. Lhotka, personal communication).

NORTH COAST AREA

Atna Resources Ltd. acquired the Ecstall prospect 70 kilometres southeast of Prince Rupert from Falconbridge Ltd. Texas Gulf Sulphur Company identified 6.9 million tonnes grading 0.6% Cu, 2.5% Zn, 0.5 g/t Au and 20 g/t Ag in massive pyrite lenses at Ecstall during the 1950s. Rocks correlated with Alexander Terrane are preserved as a pendant within the Coast Plutonic Complex and metamorphosed to amphibolite grade, which obscures primary features and stratigraphic facing. Ecstall River bisects the area of interest; the Ecstall deposit is located north of the river on Red Gulch Creek but Atna's initial focus was south of the river in the Thirteen Creek area where a belt of vertically dipping sericitic quartzofeldspathic gneiss 150 metres wide and 2.5 kilometres long contains widespread disseminated chalcopyrite, minor pyrite and traces of bornite. The longest chip sample assayed 0.20% Cu over 119 metres; the highest grade sample returned 0.65% Cu over 7.5 metres (U. Schmidt, personal communication). Mineralization is not vein like or fracture controlled as expected in the footwall of a volcanogenic massive sulphide deposit and Atna is considering a deformed porphyry copper system, such as Gibraltar, as an alternative deposit model. Targets in the Thirteen and Red Gulch Creek areas will be drilled in 1995.

Three other volcanogenic massive sulphide properties were explored in the north coastal area of British Columbia. TVI Copper Inc. conducted reconnaissance geological mapping and prospecting on the Anyox copper property. Noranda Exploration Company, Limited mapped and prospected extensions to the Prospector and Discovery showings on the Smaby property, 70 kilometres southeast of Kemano. Chalcopyrite, sphalerite and magnetite occur over several kilometres near the contact between sericite-pyrite altered rhyolite and mafic volcanic rocks, tentatively correlated with the Hazelton Group. Two new copper occurrences were found, one in situ and one in float. Eastfield Resources Ltd. prospected a large alteration zone for the source of a strong multi-element soil anomaly on the Cutfinger property, 30 kilometres northeast of Bella Coola, and located copper-zinc mineralization in outcrop and in float.

Westmin Resources Limited conducted feasibility and environmental studies, and held meetings with the general public and aboriginal groups regarding test mining of the Porcher Island mesothermal gold vein deposit, 40 kilometres southwest of Prince Rupert. Ore would be barged to Stewart for trans-shipment to Premier Gold mine for milling. Westmin estimates Porcher Island ore reserve potential to be 135 000 tonnes grading 8 to 10 g/t Au. If a 10 000-tonne bulk sample confirms this grade, production is proposed at a rate of 200 tonnes per day. Forty kilometres north of Bella Bella, the Marion copper-gold skarn property provided exciting results from a new zone discovered by Verdstone Gold Corp.

Tru-Grit Abrasives Limited recover slag from the 1914-1936 copper smelting operation of Granby Consolidated Mining, Smelting & Power Co. Ltd. at Anyox, in one of the few industrial mineral operations in northwestern British Columbia. The slag is washed, screened and shipped by

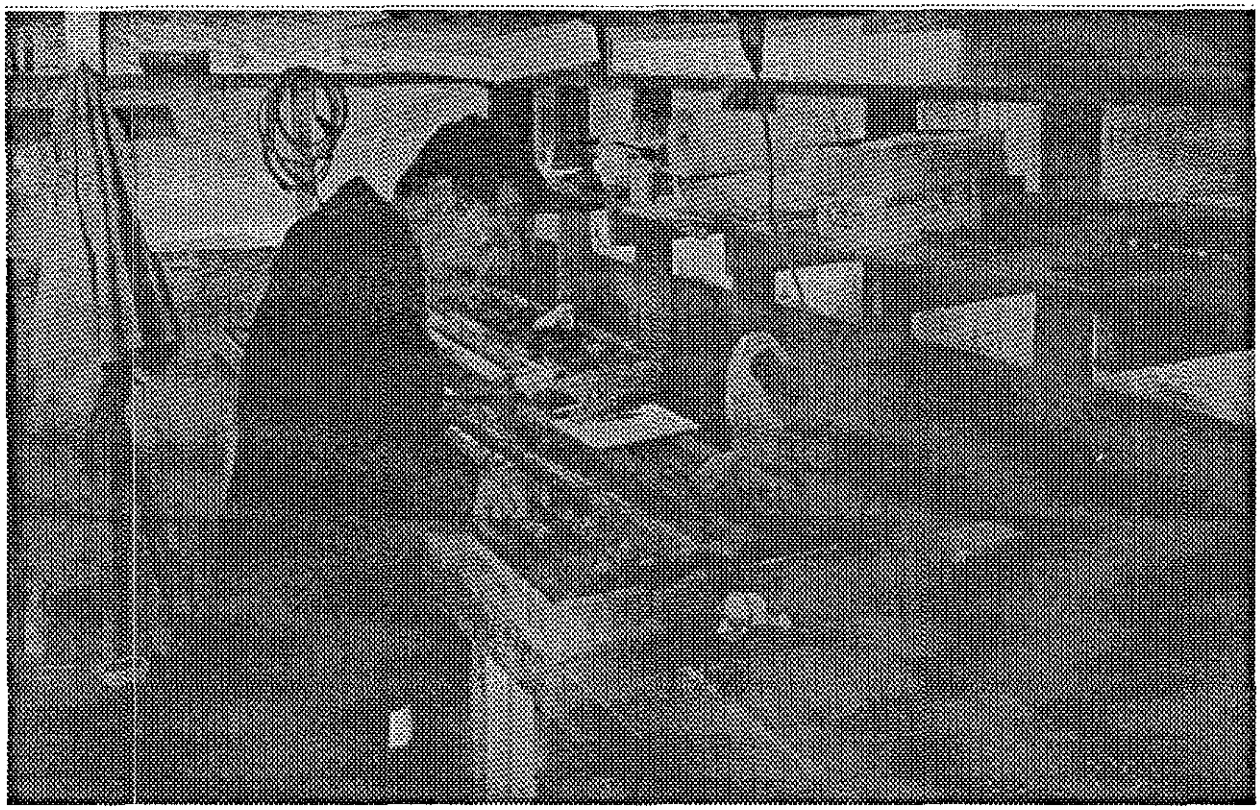

Photo 2. Geologist Jim Hutter logging core at Huckleberry, March 1994.

barge to be used as a light weight filler in concrete, in ashphalt shingles and as sand blasting abrasive.

SMITHERS CAMP

The Limonite Creek Limited Partnership explored a large, advanced argillic alteration zone for a high sulphidation enargite gold deposit near the head of Telkwa River, 40 kilometres southwest of Smithers. Stratabound alteration within intermediate to acidic volcanic rocks of the Hazelton Group comprises sericite, quartz, clay, pyrophyllite, alunite, lazulite and zunyite, identified petrographically (W. Tompson, personal communication). Massive pyrite with traces of copper mineralization occurs within the intensely altered rocks.

In the Telkwa coalfield, Manalta Coal Ltd. sought to evaluate and reduce extensive coal licenses by wide-spaced reconnaissance drilling. In addition, drilling to define coal limits and evaluate waste dump sites was conducted on the Pit 3, 7 and 8 and Tenas Creek coal deposits. Unlike most other British Columbia coal deposits, waste rock at Telkwa has potential to generate acid and Manalta continued detailed ARD studies as required by government's Mine Development Review Committee.

Near Kitwanga, 80 kilometres northwest of Smithers, C.E. Carlson drilled three core holes to test gold-bearing arsenopyrite veins peripheral to the Morningstar porphyry molybdenum system.

A high-grade silver-gold-copper discovery late in 1994, by prospector D. Heino at Tatsi Creek 50 kilometres southwest of Smithers, was acquired by Golden Hemlock Explorations Ltd. Zone dimensions are significant and a major exploration program appears likely in 1995.

TAHTSA AND HOUSTON CAMPS

New Canamin Resources Ltd. submitted a pre-application to government for development of the Huckleberry porphyry copper deposit, based on final definition drilling of the Main and East zones (Photo 2), and engineering and environmental studies that culminated with a positive feasibility study. The eastern end of the East zone was delineated and a small southwest extension of the Main zone was discovered, but a hypothesized deep connection between the two zones was found not to exist. Diluted reserves are estimated to be 91 175 000 tonnes grading 0.517% Cu, 0.064 g/t Au, 2.78 g/t Ag and 0.014% Mo. Copper at Huckleberry occurs preferentially in biotite-chlorite-magnetite hornfelsed Hazelton volcanic rocks adjacent to two small stocks of porphyritic biotite granodiorite of the widespread Late Cretaceous Bulkley suite. It appears that the brittle hornfels fractured readily to provide permeability for ore fluids and superimposed potassic (hydrothermal biotite) and later phyllic alteration. No significant mineralization occurs in the Main zone stock but the East stock is a somewhat better ore host. Chalcopyrite-molybdenite veinlets are invariably steep and pyrite is more abundant in the East than the Main zone. Anhydrite occurs with chalcopyrite and appears to be more common at depth. Flat, post-mineral gypsum veins characterize both zones. Gypsum dissolution in the weathered zone resulted in difficult drilling of hard, uncemented hornfels.

Supergene copper is unimportant at Huckleberry, a significant thickness occurs only at the eastern end of the East zone.

Possibly based on success at Huckleberry, exploration activity increased in the Houston-Tahtsa area, primarily for porphyry copper deposits. Seventeen kilometres north of Huckleberry, International Tournigan Corporation drilled geophysical targets on the Ted property. Cominco Ltd. conducted extensive IP surveys on both the Crow-Raven and Dual-Thira properties, located 10 and 60 kilometres south of Houston, respectively. In an extension of activity in the Interior Plateau, Phelps Dodge Corporation of Canada Ltd. conducted reconnaissance exploration for epithermal gold in the Whitesail area. Equity Silver Mines Ltd. carried out an extensive program of test pitting and drilled four holes on the eastern margin of the Equity Silver property in search of the source of mineralized float found on the adjacent Allin Creek property, which Equity Silver explored in 1993.

BABINE CAMP

Booker Gold Explorations Limited persisted with exploration of chalcopyrite-bearing breccia on the Hearne Hill porphyry copper property. The Discovery (Chapman) breccia was estimated in 1991 to contain 180 000 tonnes grading 1.7% Cu, and a second breccia was discovered in 1994. Texas Gulf Sulfur Company outlined 16 million tonnes grading 0.32% Cu and 0.1 g/t Au in 1967 in an adjacent zone of porphyry copper mineralization. Drilling late in 1994 encountered higher copper grades in the porphyry zone at depth and to the north of previous drilling.

Noranda Exploration Company, Limited completed its exploration of the Babs property, 15 kilometres southeast of the former Bell Copper mine along the trend of the Morrison fault. Emplacement of distinctive Babine porphyritic intrusions is related to formation of the Morrison and other grabens. Biotite feldspar porphyry glacial float, with ore-grade copper and gold values, occurs over a 300 by 150 metre area on the Babs property but two drill holes based on magnetic, IP and soil surveys failed to locate the source and the claims were returned to prospector R. Keefe. Hera Resources Inc. optioned the Nak property, another Babine porphyry copper-gold target, and conducted a 43-kilometre IP survery. Drilling this large porphyry system is anticipated early in 1995. Prospectors K. Soby and L. Hewitt explored for the source of mineralized porphyry float on the nearby Hautete property.

EXPLORATION AND DEVELOPMENT HIGHLIGHTS CENTRAL REGION - 1994

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HIGHLIGHTS

- An end to the downturn of 1989-1993
- Expenditures and projects both up from 1993
- Encouraging results from Muskwa-Gataga and Fraser Plateau
- QR mine under construction
- Mount Polley to start construction in 1995
- Land-use issues continue to dominate district activity
- Cariboo-Chilcotin Land Use Plan in place

INTRODUCTION

The cautious optimism seen at the end of 1993 was translated into an increase in both projects and expenditures in most parts of the district during 1994. Mineral Notices of Work, at 123, were up 22% from 1993 and as Figure 13 shows, much of this increase was in the Omineca. There was also a shift in activity in the Cariboo from the traditional areas, southern Quesnel Trough and Barkerville Terrane, to the Fraser and Nechako plateaus.

Placer Notices of Work, at 449, were little changed from 1993, however, in part because of concern about land-use proposals that would have put many of the Cariboo's most productive areas inside protected areas (parks).

Mineral exploration expenditures, at $6.27 million, were up 37% from 1993, ending a downward trend that began in 1989 (Figure 14). Major projects (expenditures of $100 000 or more) increased similarly. These figures do not include preproduction costs at operating mines or feasibility-related costs. Budgets, however, continued to be tight and financing very difficult, especially for junior companies.

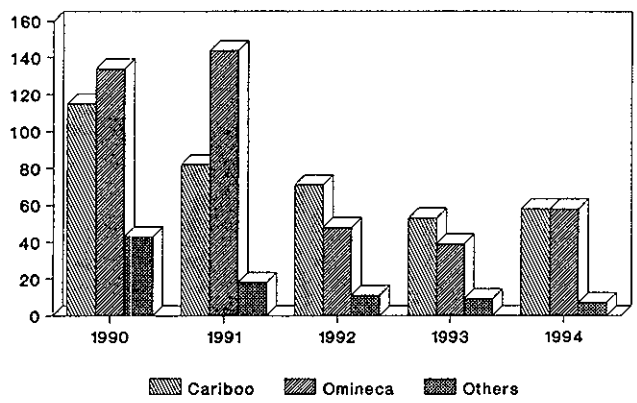

Figure 13. Notices of Work - Central District 1990-1994.

A much broader range of commodities was sought in 1993 than in the previous two years. Interest in porphyry copper-gold properties in the northern Quesnel Trough picked up, the level of activity in the Muskwa-Gataga belt (sedex base metals, silver) and the Fraser Plateau (epithermal and porphyry-related precious metals) was up sharply and there was increased interest in industrial minerals and stone. The locations of the more significant exploration projects, together with properties in the Mine Development Review process and operating mines, are shown on Figure 15.

There was good news from the district's mines and quarries. Gibraltar mine reopened and was at full production before year's end. Construction, mining and the stockpiling of ore began at the QR gold deposit late in the year. Production decisions were made for the Mount Polley copper-gold deposit and the Wishaw Lake quartzite deposit and plans were announced for a major increase in production at the Nazko cinder deposit.

Land-use issues continued to dominate the activities of district staff. Late in the year, the Cariboo-Chilcotin Land-Use Plan was announced, ending uncertainty over protected areas (parks) in that region, but decisions on protected areas in the Omineca and Peace regions will not be made until late this year or early in 1996.

MUSKWA-GATAGA RANGES

This area saw the highest level of activity since 1982. Both major and junior companies were at work on sedex

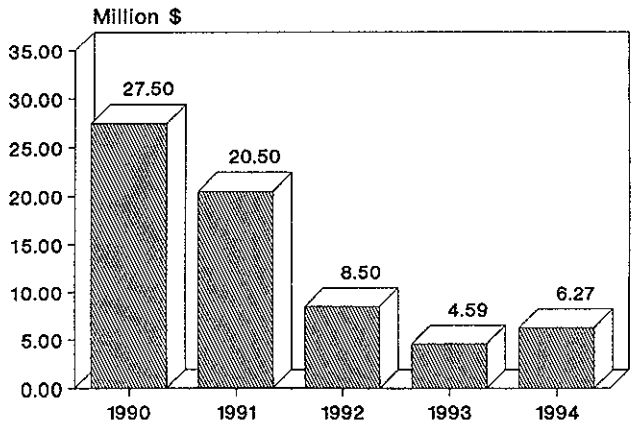

Figure 14. Exploration expenditures - Centraal District 1990-1994.

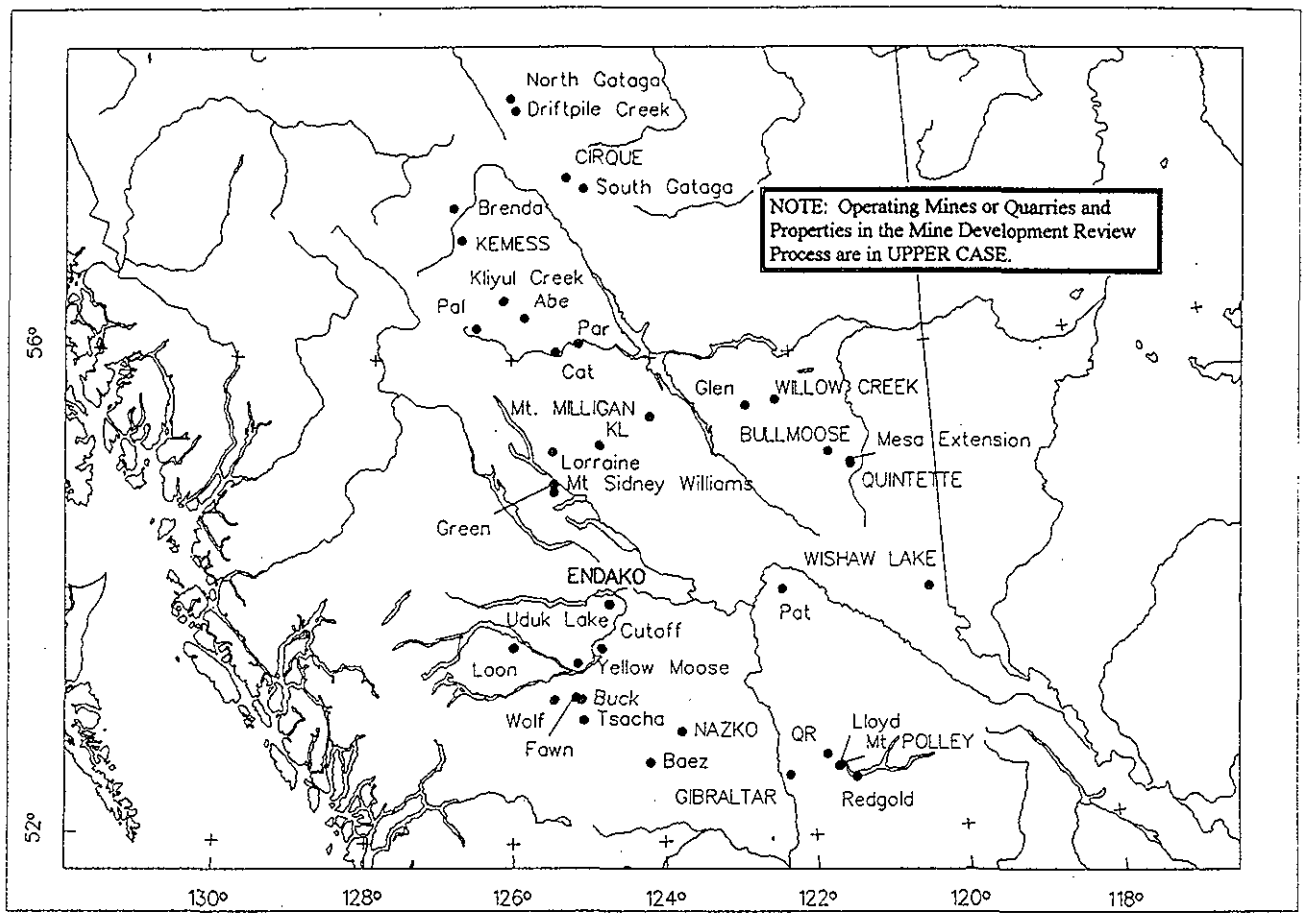

Figure 15. Locations of significant exploration projects.

properties through the belt, led by Teck Corporation, Metall Mining Corporation and Ecstall Mining Corporation. Teck continued to drill targets and define mineralization at the Driftpile Creek property with mixed to encouraging results. With some promising exceptions, the grades of mineralization in the zones discovered to date have been less than those at other deposits in the belt such as the Cirque and Akie. Mineralization is typically a very fine grained pyrite or pyrite-barite mix grading 2 to 4% lead plus zinc. The geological resource of the various zones is more than 20 million tonnes with good potential for increasing that figure substantially.

At the South Gataga project, which comprises the Akie, Pie and YN properties under option from Ecstall, Metall reported several drill intersections of up to 42 metres and grading from 6 to 10% combined lead and zinc over a strike length of more than 1.2 kilometres on the Akie property.The mineralized zone is open on strike and down dip and clearly has the potential to become a major ore deposit. A major program of deeper drilling is planned for this year.

Elsewhere in the belt, however, activity consisted mostly of small or early stage surface programs.

NORTHERN QUESNEL TROUGH

The number of companies active in this area increased in 1993, but most of the programs were on established calcalkaline porphyry copper-gold properties. Results reported were for the most part typical of the trough - mixed to occasionally encouraging.

Canasil Resources Inc. completed a major surface program on the promising but under-explored Brenda property, north of the Kemess deposit, with some good assays reported from several trenches. Major General Resources Ltd., Noranda Exploration Company, Limited, Swannell Minerals Cororation, Lysander Gold Corporation and Hudson Bay Exploration and Development Company Limited all had drilling programs in the area.

Lysander reported possibly the best results from the Lorraine property. The company managed to drill three holes from a set-up on the steep face of Lorraine Mountain into the Main zone and were rewarded with three very good intersections. These averaged close to 1% Cu, including one of 92 m grading 1.4% Cu and 0.65 g/t Au. Drilling on the Bishop zone also returned some encouraging results, with copper grades from 0.47 to 1.09% over widths from 15 to 31 metres.

FRASER AND NECHAKO PLATEAUS

Exploration in this area, mostly for epithermal gold deposits related to the Ootsa Lake Group volcanic suite, and for porphyry-related base metal and gold deposits, has persisted at a modest level for more than a decade despite a poor database, poor exposures and generally poor results. The level of activity has picked up significantly in the last two years, aided by the Interior Plateau Project - a series of interdisciplinary studies funded by the Canada - British Columbia Mineral Development Agreement. These studies have led directly to the discovery of a promising new showing, the Malaput, on ground staked by Western Keltic Mines Inc., as well as to a greatly improved understanding of the geology of this area. More than $1.5 million was spent in 1994, mostly on surface programs and initial drilling, and industry persistence may at last be paying off, with the reporting of some of the most encouraging results to date.

At the Uduk Lake property, Pioneer Metals Corporation reported some scattered but encouraging assays from trench samples, but was unable to secure funds for a more substantial program. At the nearby Loon property, Hudson Bay reported some success in outlining silicified alteration zones with a resistivity survey and drilled 762 metres in five holes with the typical mixed results that characterize many of the plateau properties. Cogema Resources Inc. similarly had mixed results from large drilling and trenching programs on its Cutoff and Yellow Moose properties.

Western Keltic was active on several properties in the area. At the Fawn property, drilling beneath trenched targets intersected narrow, closely-spaced clay-sericite breccia zones with good assays reported from several holes. The best averaged 2.0 g/t Au and 25.2 g/t Ag over 8.1 metres. At the Buck property, a different style of mineralization consisting of conformable base metal sulphides in felsic clastic volcanics of the Hazelton Group has been found. Surface sampling has returned assays up to 4.69% Zn and 6.48% Pb with occasionally significant copper and gold values.

At the Wolf property, optioned by Metall from Lucero Resource Corporation, Metall drilled nine holes in a number of shallow-dipping silicified lenses that occur in a sequence of felsic volcanics and sills. The lenses are grouped into clusters in three zones and assays to date have generally averaged 2 g/t Au over widths up to 30 metres. Scattered individual assays have run as high as 78 g/t Au. Metall returned the property to Lucero late in the year and Lucero plans to test the possibility that at least two of the zones may be joined at shallow depths. If so, there is good potential for a medium-sized open-pittable deposit.

OTHER AREAS

In the Wells-Barkerville area, junior companies have been active in optioning former producing gold mines or properties with reserves. International Wayside Gold Mines Ltd. has an option on the Cariboo Gold Quartz mine, where some low-grade open pittable reserves have been outlined. Gold City Mining Corporation has also optioned the Cariboo Hudson mine, the Island Mountain mine, the Mosquito Creek mine and property on Cow Mountain. Both companies are looking at the feasibility of resuming production. Gold City hopes to mine and truck ore from its properties to a small custom mill to be built near Wells.

In the Likely area, Big Valley Resources Inc. stepped up exploration on its Nordik property adjacent to the Mount Polley deposit. It has also acquired additional ground between the Nordik claims and the QR mine to the northwest. There are a number of untested or poorly explored target areas peripheral to the Mount Polley stock that may host copper-gold mineralization. Big Valley outlined some target areas and intersected some mixed to low-grade copper and gold mineralization in a modest drilling program on one target area.

In the northeast coal belt, Globaltex Industries Inc. continued its exploration of the Willow Creek coal deposit with trenching and bulk sampling, and acquired a number of the adjacent coal licenses. Quintette Coal Limited conducted a major program of trenching, drilling and underground exploration in the Mesa Extension area near the Quintette mine.

INDUSTRIAL MINERALS AND STONE

Interest in industrial minerals and stone picked up during 1994. Exploratory drilling to define grade or expand reserves took place at two of the district's limestone deposits and there was the usual level of contract production from the area's operating quarries to supply local pulp mills.

Global Metals Ltd. re-examined the jade occurrences at the Green property and announced plans to begin limited production this year. Ava Resources Ltd. removed some blocks of quartzite from the old Wishaw Lake quarry site. Product tests were satisfactory and the company plans to begin quarrying blocks this year. The blocks will be shipped to Italy for processing. Canada Pumice Limited announced plans to greatly expand production from the Nazko cinder deposit west of Quesnel. The deposit has seen small-scale production of cinders for use as a winter anti-slip product. New markets are planned for horticultural and nursery use as a soil conditioner. Quarry Pacific Industries Limited removed some test blocks from the Redgold property at Shik Lake. The Shik Lake pluton is one of several in a linear trend that includes the QR and Mount Polley alkaline stocks and the property has been explored for its copper-gold porphyry possibilities. The porphyry has an attractive colour and texture and is now being considered for its stone potential - an excellent example of looking beyond the obvious at a property.

PRODUCING MINES

The welcome news from the producing mines of the district was the reopening of Gibraltar mine, initially with only the copper recovery circuit. The sharp surge in molybdenum prices late in the year led to the reopening of the

TABLE 7
EXPLORATION PROJECTS - CENTRAL DISTRICT

Property (Operator)	MINFILE Number	Mining Division	NTS	Commodity	Deposit Type	Work Done
North Gataga (Ecstall Mining Corp.)	094L 011	Liard	94L/1,8	Pb, Zn, Ag	Sedex	geochem
Driftpile Creek(Teck	094K 066	Liard	94K/4W	Pb, Zn, Ag	Sedex	26 ddh, 4399 m; road
South Gataga(Metall	094F 007	Omineca	94F/6,7	Pb, Zn, Ag	Sedex	12 ddh, 4273 m; geophys
Brenda(Canasil Resources	094E 147	Omineca	94E/2E,7W	Au, Cu	Porphyry	geochem; renching
Kliyul Creek(Noranda	094D 020	Omineca	94D/8, 9	Cu, Au	Porphyry	10 ddh; geochem; geophys
Abe (Reliance Geol Servs Inc)	094C 054	Omineca	94C/5	Cu, Au	Porphyry	10 ddh, 899 m
Pal(Swanell Minerals		Omineca	94C/ 5E, 6W	Cu, Au	Porphyry	10 ddh; geol; geochem;
Par (Cominco Ltd)	094C 024	Omineca	94C/2,3	Pb, Zn, Ag	Base metal vein	6 ddh,1170 m
Cat (Lysander Gold Corp.	094C 024	Omineca	94C/3W	Cu, Au	Porphyry	4 ddh, 400 m
Glen (Halferdahl & Assocs Ltd.)	093O 046	Liard	93O/10	Limestone	Sedimentary	5 ddh, 460 m
KL	093N032	Omineca	93N/7W	Cu, Au	Porphyry	6 ddh, 915 m; geochem;
(Hudson Bay Ex & Dev. Ltd.)	093N 032	Omineca	93N/7W	Cu, Au	Porphyry	10 ddh, 1216 m;geol
Quiintette (Quintette Coal	093P 019	Liard	93P/3	Coal	Sedimentary	69 ddh, 8297 m; 128 m u/g;
Green (Global Metals Ltd.)	093K 005	Omineca	93K/14W	Jade	Metamorphic	geol
Mt. Sidney Williams (U. Mowat)	093K 043	Omineca	93K/14W	Au	Listwanite	10 ddh, 724 m;geochem
Pat (Halferdahl & Assocs Ltd)	093J 025	Cariboo	93J/1W	Limestone	Sedimentary	4 ddh, 488 m
Wishaw Lake (Ava Resources Inc.)	093H 131	Cariboo	93H/16E	Quartzite	Metamorphic	sample blocks
Uduk Lake(Pioneer Metals		Omineca	93E/9	Au	Epithermal	5 ddh; trenching;geol
Loon (Hudson Bay Ex & Dev		Omineca	93F/12W	Au,Cu	Epithermal	5 ddh, 762m; IP
Cutoff(Cogema Resources	093K 044	Omineca	93F/10	Au	Epithermal	21 ddh, 2231m; 14 tr;
Yellow Moose(Cogema		Omineca	93F/6,11E	Au	Epithermal	6 ddh, 626m; 10 tr; geochem
Fawn (Western Keltic Mines)	093F 053	Omineca	93F/3E	Au	Epithermal	6 ddh, 616m

Property (Operator)	MINFILE Number	Mining Division	NTS	Commodity	Deposit Type	Work Done
Buck (Western Keltic		Omineca	93F/3E	Au	Epithermal	1 ddh, 60m; tr; geol; geochem
Wolf (Metall Mining	093F 045	Omineca	93F/3W,4E	Au	Epithermal	9 ddh, 406m; geochem
Tsacha (Teck Exploration Ltd)	093F 041	Omineca	93F/3E	Au	Epithermal	17 tr; geochem
Nazko (Canada Pumice Corp.)	093B 060	Cariboo	93B/13E	Cinders	Volcanic	site prep
Baez(Phelps Dodge Can	093C 015	Cariboo	93C/9B, 16	Au	Epithermal	10 ddh: geochem; geophys
Lloyd (Big Valley Res Ltd.)		Cariboo	93A/12	Cu, Au	Porphyry	4 ddh
Redgold (Quarry Pacific Ind. Ltd.)	093A 058	Cariboo	93A/6	Stone	Igneous	tr; sample blocks

molybdenum circuit and prompted both Gibraltar and Endako mine staff to review their long term mine plans.

MINE DEVELOPMENT REVIEW

There was some positive news for some of the six properties that have Mine Development Certificates or are in the Mine Development Review process. Construction and mining began at the QR gold deposit owned by Kinross Gold Corporation. The official opening is mid-September, with first pour of gold July 13, 1995. Employment will then be 70 people.

Following the decision by Gibraltar Mines Limited not to proceed with a joint venture with Imperial Metals Corporation to mine Imperial's Mount Polley copper-gold deposit and process the ore at the Gibraltar mill, Imperial later completed a merger with Bethlehem Resources Corporation. The new company will continue under the Imperial name and plans to start construction at Mount Polley this year, with milling to commence in 1997. The mine is expected to employ 170-180 people.

El Condor Resources Ltd. continued its feasibility studies for the Kemess copper-gold deposit, completing fieldwork on the access and power line rights-of-way. Land-use concerns eased considerably as areas of interest, that would have affected the ability to mine the deposit, were removed from the Protected Area Strategy priority list. At year's end a number of major companies were conducting a detailed review of the project.

LAND USE

It was a hectic and intense year for district and headquarters staff involved with land-use issues, with the Cariboo-Chilcotin Commission on Resources and Environment Round Table active for most of the year and no less than nine Land and Resource Management Plan processes in operation in the Prince George forest region. Interagency and public meetings related to Protected Areas Strategy, the Cariboo-Chilcotin CORE and district processes typically have averaged 25 to 30 per month. By the end of the year, government decisions had been made on a land-use plan for the Cariboo-Chilcotin, and the plan had passed into the implementation phase. Twelve percent of the Cariboo-Chilcotin region has been set aside for full protection through the creation of 17 new protected areas and through commitments to create a number of additional small, protected areas. Although some ground with high mineral potential is now in protected areas, very few active exploration properties were lost to protected areas.

Eighty percent of the plan area is designated as Resource Development Zones. There were strong industry concerns that the so-called "sensitive areas" - the Special Resource Development Zones, which comprise 26% of the plan area, would become "de facto" parks. The language of the plan, however, states clearly that mineral exploration and mining will have access to 100% of all zones outside of protected areas and existing no-staking reserves.

There is a very clear message to industry to be drawn from the Cariboo-Chilcotin CORE experience: those individuals and companies that were in contact with Ministry land-use staff and participated regularly in the public meetings, were able to make other sectors aware of mineral potential issues in the negotiations and have generally had their concerns addressed in the plan. Those who did not participate, have been the most affected. The land-use processes in the Prince George forest region had, at time of writing, entered the phase at which a strong industry presence at the meetings would be most effective.

EXPLORATION AND DEVELOPMENT HIGHLIGHTS SOUTH-CENTRAL REGION - 1994

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HIGHLIGHTS

- Significantly higher copper and molybdenum prices and the lower Canadian dollar should result in improved profitability for all of the metal mines in the region in 1995.
- The **Similco** and **Afton/Ajax** copper-gold mines reopened in August and September, respectively.
- Bulk samples were extracted at several projects in the region. Bulk sampling programs conducted at the **Elk (Siwash North)** and **Bonaparte** projects were commercially profitable ventures, and will allow further exploration and development of the properties. A similar test-mining program is now underway at the **Brett** project.
- The number of exploration projects in the region increased to 203, a 35% increase over 1993. More importantly, the number of major projects (expenditures >$100 000) was up 79% to a total of 36.
- Exploration expenditures increased 64% over 1993 to $16.5 million, however, claim staking activity was down.
- There were nineteen successful applicants for Explore BC funding in the region, including two grants under the Accelerated Mine Exploration Program (**Similco** and **Goldstream**), and seventeen grants under the Mineral Exploration Incentive Program.
- Seventeen prospectors in the region received financial assistance through the Prospectors Assistance Program.
- Agreement in Principle was reached on the Kamloops Land and Resource Management Plan.

SUMMARY

The level of exploration activity took an upswing in 1994, reversing the downward trend of the last five years. The number of exploration and development projects in the region increased 35% from 152 in 1993 to 203 in 1994 (Figures 16 and 17). Of this total, there were 36 "major" projects in 1994 - those with spending greater than $100 000 - up about 79% from 1993 when there were just 19 such projects (Table 8). Placer activity also picked up in 1994, as evidenced by an increase in the number of Placer Notices of Work filed, relative to the previous three years (Figure 18). As in previous years, most of the projects were hand operations located along the Tulameen and Similkameen rivers, the Goldstream River, the upper Kettle River, and the Fraser/Bridge River areas near Lillooet.

Total exploration expenditures increased 64% over 1993, to $16.5 million (Figure 19). This is particularly significant as it is coupled with an increase in the number of moderate to large projects; in the previous year a large proportion of the total spending was accounted for by only two major projects. Nevertheless, spending levels are still well below those experienced in the late 1980s and the proportion of spending directed to grassroots projects appears to be declining. For example, approximately 20% of total spending was directed to replenishing reserves at existing or dormant mine sites such as **Goldstream, Similco, Bralorne, Blackdome** and the **Afton/Ajax** area. A further 44% was directed to defining reserves, test mining and conducting feasibility studies on well known potential producers, such as **Fish Lake, Elk (Siwash North), Lumby, Brett,** and **Bonaparte**. Only 36% of spending was directed to exploration programs in relatively remote areas of the region, or on properties that can be classified as early stage or grassroots. This situation should improve in 1995 as land-use certainty returns after the completion of land-use plans over a large portion of southern British Columbia.

While most of the exploration indicators are up, many companies reported difficulty raising capital, forcing them to start programs late in the season or to complete only abbreviated programs. A continuing decline in the number of claim units staked (Figure 20) further suggests that industry is directing investment to well established properties rather than grassroots targets.

Gold veins, porphyry copper-gold (±molybdenum) deposits and polymetallic stratiform deposits continued to be the most popular exploration targets in the South-central Region in 1994. There is particular interest in small, high-grade epithermal and mesothermal vein gold deposits, such as **Blackdome, Bonaparte, Mount Skinner, Elk (Siwash North), Brett, Rabbitt mine** (Tulameen area) and **Fairview**. Part of the attraction of these deposits is that exploration can be partially financed through the sale of high-grade, direct-shipping ore from bulk sampling projects.

In addition, strong exploration interest continues to be directed towards porphyry and/or skarn copper-gold deposits, particularly in the Princeton, Kamloops, Logan Lake - Ashcroft and Lac la Hache areas, and towards polymetallic massive sulphide or sedex targets such as the **Cottonbelt** deposit and those near the Goldstream mine.

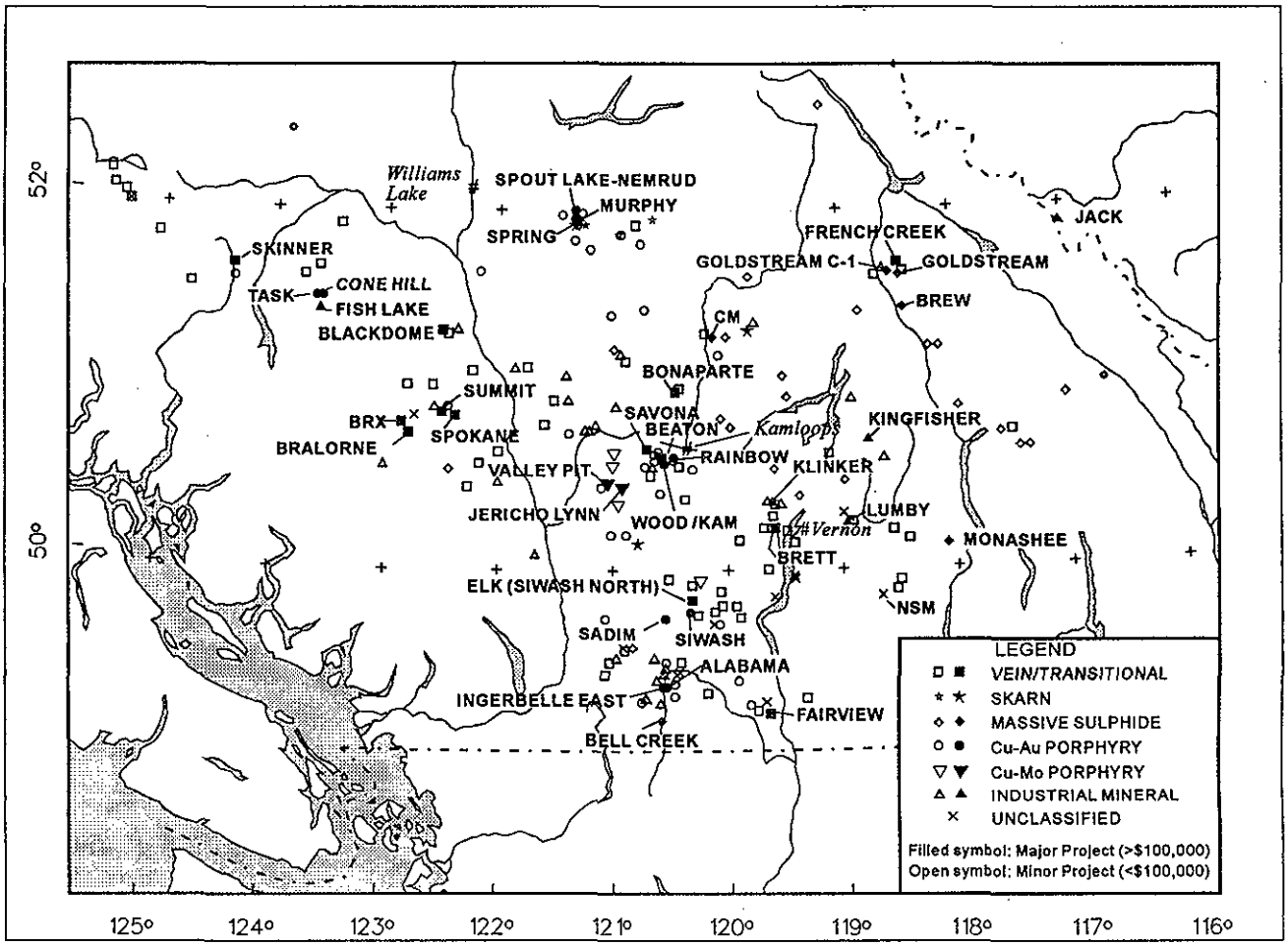

Figure 16. 1994 Exploration projects, South-central Region, B.C. Major projects ($100 000) indicated by name and filled symbols.

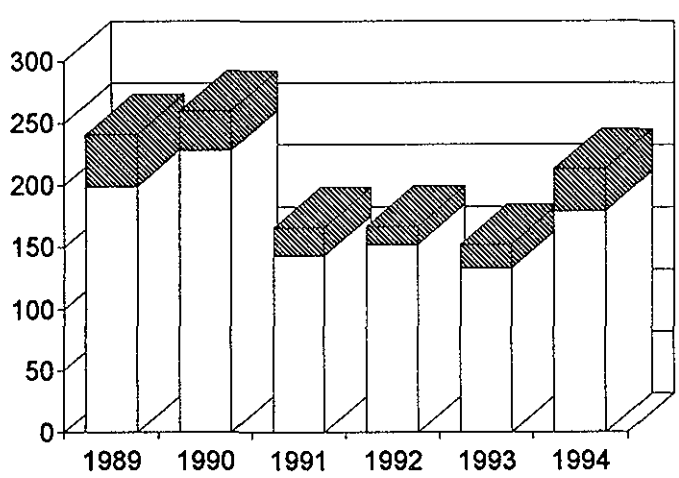

Figure 17. Number of exploration projects in the South-central Region, by year. Major projects ($100 000 expenditure) indicated by stippled pattern. (Figures for years prior to 1991 are estimated from Notices of Work and may overestimate the number of projects by 5 to 15%).

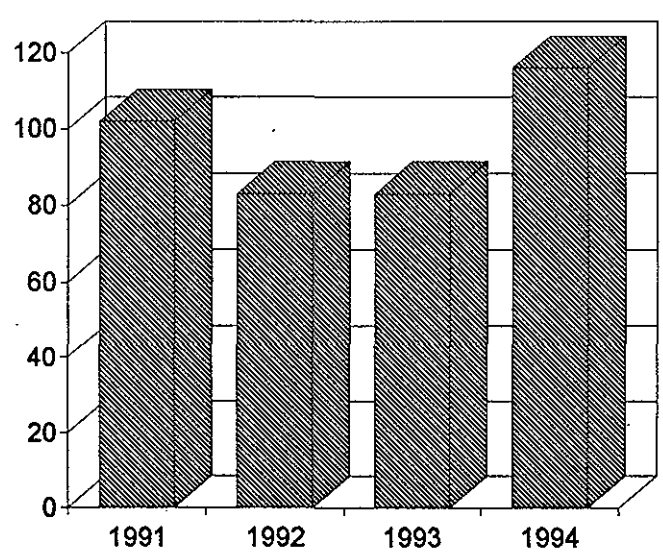

Figure 18. Number of Placer operations in the South-central Region, by year (estimated from Notices of Work).

TABLE 8
MAJOR EXPLORATION PROJECTS
(>$100 000), SOUTH-CENTRAL REGION, 1994

Property (Operator)	MINFILE Number	Mining Division	NTS	Commodity	Deposit Type	WORK DONE
Beaton Group (Lakewood Mining Co. Ltd.)		Kamloops	92I/10E	Cu, Au	Porphyry	5 ddh, 1113 m; 2 pcdh, 240 m
Bell Creek (Westmin Resources Ltd.)	092HSE067	Similkameen	92H/2E	Zn, Cu	Massive sulphide	5 ddh, 1400 m; geochem; borehole geophs
Blackdome Mine (Claimstaker Resources Ltd.)	092O 053	Clinton	92O/8W	Au, Ag	Vein	20 ddh, 2048 m; trench
Bonaparte (Claimstaker Resources Ltd.)	092P 050	Kamloops	92I/16W 92P/1W	Au	Vein	18 ddh, 973 m; 3722 t bulk sample
Bralorne Mine (Avino Mines & Resources Ltd.)	092JNE001	Lillooet	92J/15W	Au, Ag	Vein	14 ddh, 2100 m; 20 trench; u/g rehab; geol
Brett (Liquid Gold Resources Inc.)	082LSW110	Vernon	92L/4E	Au, Ag	Vein	170 m u/g development; site preparation
Brew (OTM International Developments Inc.)		Revelstoke	82M/9W	Cu, Zn, Pb	Massive sulphide	3 ddh, 610 m; geol; geochem
BRX (Strand Resources Inc.)	092JNE020	Lillooet	92J/15W	Au	Vein	10 ddh, 1000 m; 10 trench; geochem
Cone Hill (Valerie Gold Resources Inc.)		Clinton	92O/12E	Cu, Au	Porphyry	9 ddh, 1429 m
Elk (Siwash North) (Fairfield Minerals Ltd.)	092HNE096	Similkameen	92H/16W	Au, Ag	Vein	u/g development; 83 u/g ddh, 2415 m; bulk sample
Fairview (Oliver Gold Corp.)	082ESW008	Osoyoos	82E/4E	Au	Vein	34 ddh, 2591 m
Fish Lake (Taseko Mines Ltd.)	092O 041	Clinton	92O/5E	Cu, Au, Ag, Mo	Porphyry	35 ddh, 7568.1 m; baseline environmental studies
French Creek (Thousand Hills Mining Co.)		Revelstoke	82M/16E 82M/9	Au	Vein	Geochem; geol
Goldstream (C-1) (Bethlehem Resources Corp.)		Revelstoke	82M/10E	Cu, Zn, Pb	Massive sulphide	4 ddh, 750 m; geophys (mag, VLF); geochem
Goldstream Mine (Bethlehem Resources Corp.)	082M 141	Revelstoke	82M/9W 82M/10E	Cu, Zn, Ag	Massive sulphide	11 ddh
Jack (Cons. Venturex Holdings Ltd.)	082N 088	Golden	82N/14E	Diamonds	Diatreme	38 t bulk sample
Jericho-Lynn (Highland Valley Copper)	092ISE011	Kamloops	92I/7W	Cu, Mo	Porphyry	IP, 150 km
Kingfisher (Franz Capital Corp.)	082LNE023	Vernon	82L/10	Marble	Metamorphic	4000 t bulk sample; 3 trench; 2 test pit; geol

Property (Operator)	MINFILE Number	Mining Division	NTS	Commodity	Deposit Type	WORK DONE
Klinker (Okanagan Opal Inc.)	082LSW125	Vernon	82L/5E	Precious opal	Epithermal cavity filling	5 trench; 415 t bulk sample
Lumby (The Quinto Mining Corp.)	082LSE006	Vernon	82L/6E	Graphite/ sericite	Shear zone	10,000 t bulk sample; u/g development, R&D
Monashee (Cameco Corp.)	082LSE022	Vernon	82L/1W 82L/2E	Au, Ag, Pb, Zn	Vein/ replacement	6 ddh, 600 m; IP; geol
Mt Skinner (Cheni Gold Mines Inc.)	092N039	Clinton	92N/9W	Au	Vein	56 m u/g development; 9 u/g ddh, 679 m
Murphy (GWR Resources Ltd.)	092P 002	Clinton	92P/14W	Cu, Au	Porphyry	11 ddh, approx 2300 m
Rainbow (New Zone) (Teck Exploration Ltd./Getchell Resources Inc.)	092INE028	Kamloops	92I/9W	Cu, Au	Porphyry	31 ddh; 5959 m; geophys
Sadim (Christopher Dyakowski)	092HNE095	Similkameen	92H/10E	Au, Cu	Stockwork	Trench; geochem; geophys (mag, VLF)
Savona (CRC Explorations Ltd.)		Kamloops	92I/10	Au, Ag, Zn, Cu	Vein	Geophys (mag, VLF); geochem
Similco - Alabama (Princeton Mining Corp.)	092HSE013	Similkameen	092H/7E	Cu, Au	Porphyry	32 ddh, 5248 m; 6 rcdh, 1158 m
Similco - Ingerbelle (Princeton Mining Corp.)	092HSE004	Similkameen	092H/7E	Cu, Au	Porphyry	34 ddh, 6077 m
Siwash (International Tower Hill Mines Ltd.)	092HNE001, 032, 063, 165	Similkameen	92H/16W	Au, Ag, Cu, Zn, Pb	Vein	2000 m pcdh; geol; geochem; geophys (IP, mag, VLF)
Spokane Gold (Spokane Resources Ltd.)	092JNE034	Lillooet	92J/16W	Au, Cu	Vein	26 ddh, 2551 m; geol; geochem
Spout Lake-Nemrud (Regional Resources Ltd.)	092P 120, 108	Clinton	92P/14 93A/3	Cu, Au	Porphyry, skarn	5 ddh, approx 550 m; IP, 55.9 km
Spring (GWR Resources Ltd.)		Clinton	92P/14	Cu, Au	Porphyry/ skarn	4 ddh, approx 250 m; geophys
Summit (Gold Summit Mines Ltd.)	092JNE035	Lillooet	92J/15E	Au, Ag, Zn, Pb, Cu	Vein	6 ddh, 1000 m; 10 trench; geochem
Task 9, 10 (Pioneer Metals Corp.)		Clinton	92O/5 92O/12	Cu, Ag, Au	Porphyry	5 ddh, 730 m; mag
Valley pit (Highland Valley Copper)	092ISW012	Kamloops	92I/6E	Cu, Mo	Porphyry	8 ddh, 2380 m
Wood Group (Lakewood Mining Co. Ltd.)		Kamloops	92I/10E	Cu, Au	Porphyry	2 ddh, 766 m; 8 pcdh, 865 m

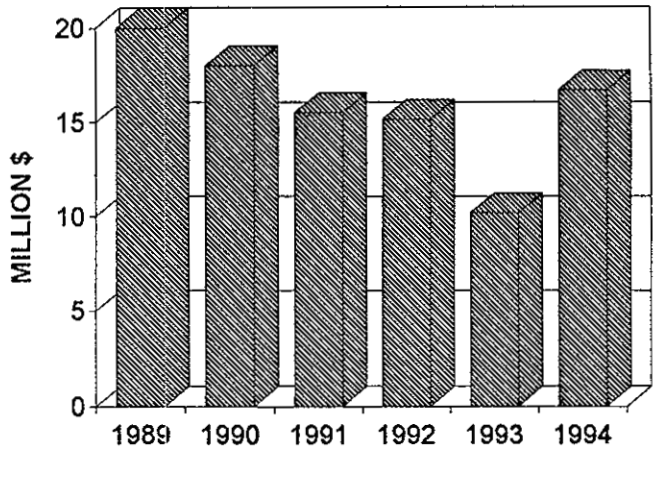

Figure 19. Estimated exploration expenditures (in millions of dollars) in the South-central Region, by year.

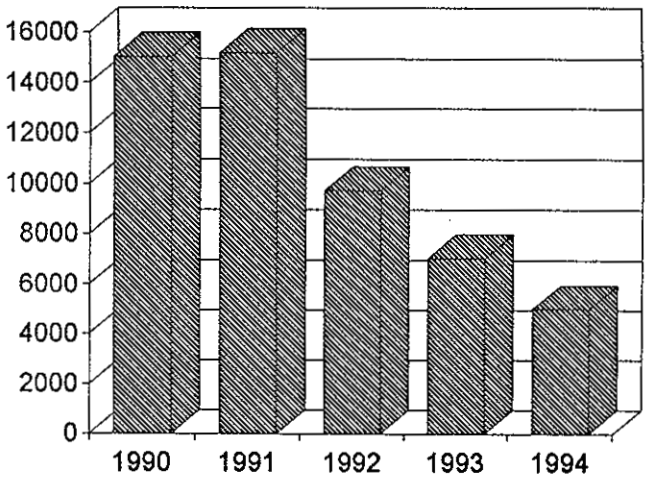

Figure 20. Claim units staked in the South-central Region, by year.

OPERATING MINES

METAL MINES

As of the end of 1994, there were five operating metal mines in the South-central Region: **Highland Valley, Goldstream, Nickel Plate, Similco** and **Afton/Ajax**, two more than at the end of 1993 (Table 9 and Figure 21). The Mascot gold tailings, heap leach operation of Candorado Operating Co. Ltd. was also in production in 1994. All the mines, but in particular the copper and molybdenum producers, are benefiting from higher metal prices and the lower Canadian dollar.

At the Highland Valley Copper mine 32 065 825 tonnes of copper-molybdenum-gold-silver ore were milled in first nine months of 1994, for an average throughput of over 117 000 tonnes per day. Employment averaged 1092 persons during this period.

At **Nickel Plate**, a total of 979 504 tonnes of gold-silver ore were milled in first nine months of 1994. Average throughput was 3575 tonnes per day and employment averaged 177 persons. The mine is scheduled to close in late 1996 due to depletion of reserves.

The **Similco** mine, owned by Princeton Mining Corporation, re-opened on August 18, 1994 after a nine-month hiatus due to low copper prices and a company reorganization. The company is currently milling ore from a low-grade stockpile at a rate of approximately 24 500 tonnes per day. At the end of 1994 approximately 8 million tonnes of ore remained in the stockpile, sufficient for about ten months production. Princeton reported that the Similco division shipped about 4 003 000 kilograms of copper and 164.66 kilograms of gold in concentrate during the last quarter of 1994.

Two targets on the Similco property were the subject of aggressive exploration programs during the year. Partially funded by an Explore BC grant, this work included more than 6000 metres of drilling on each of the **Alabama** and **Ingerbelle East** zones. Results for both programs were encouraging and additional infill drilling at Alabama was scheduled to continue well into 1995 in an attempt to define an ore reserve. Late in the year the company announced a new ore reserve figure and mine plan for the **Ingerbelle East** deposit. It proposes to expand the Ingerbelle pit in two phases. Phase 1 is planned for spring, 1995 and will involve mining about 13 million tonnes grading 0.32% Cu and 0.24 g/t Au at a waste to ore ratio of about 0.8. Production from Ingerbelle will gradually increase to replace production from the low-grade stockpile. Phase 2 will involve mining of 38.4 million tonnes of ore grading 0.329% Cu and 0.24 g/t Au at a waste to ore ratio of 1.7. The Ingerbelle pit expansion will provide about five to six years of mill feed.

The **Afton/Ajax** mine, a copper-gold producer owned by Teck Corporation re-opened in September after a three-year shut-down due primarily to low copper prices. In late October, 1994, 135 employees were back at work and production from the Ajax East pit was averaging about 8700 tonnes a day, grading about 0.46% Cu. Reserves at Ajax East are considered to be sufficient to keep the Afton mill operating until about January 1996. A recently announced re-opening of the Ajax West pit has increased employment to about 170 positions and will allow mining until late 1998, depending on metal prices.

At the **Goldstream** mine, owned equally by Bethlehem Resources Corporation and Goldnev Resources Inc., the mill was shut down for one month in spring, 1994 to allow for underground development. Additional shut-downs are not anticipated, and total revenue is up, due to higher copper prices. During the first six months of the year the mine produced 258 557 tonnes of copper-zinc ore, employing an average of 138 people.

TABLE 9
OPERATING MINES, PROJECTS IN THE MINE DEVELOPMENT ASSESSMENT PROCESS AND SIGNIFICANT BULK SAMPLING PROJECTS, SOUTH-CENTRAL REGION, 1994

MINE/PROJECT	OPERATOR	COMMODITY	DEPOSIT TYPE	COMMENTS
Mines - Metals				
Afton-Ajax	Afton Operating Corp. (Teck Corp.)	Cu, Au	Porphyry	Re-opened September, 1994; milling 8700 t/day from Ajax East pit; propose re-opening Ajax West pit in 1995.
Goldstream	Bethlehem Resources Corp. (50%), Goldnev Resources Inc. (50%)	Cu, Zn, Ag	Massive sulphide	Milled 258 557 t in first 9 months of 1994; mill shut down for one month in spring, 1994.
Highland Valley	Highland Valley Copper	Cu, Mo, Au, Ag	Porphyry	Milled 32 065 825 t in first 9 months of 1994, averaging about 117 000 t/day.
Mascot Gold Tailings	Candorado Operating Co. Ltd.	Au	Tailings	
Nickel Plate	Homestake Canada Inc.	Au, Ag	Skarn	Milled 979 504 t in first 9 months of 1994, averaging 3575 t/day.
Similco	Similco Mines Ltd. (Princeton Mining Corp.)	Cu, Au	Porphyry	Re-opened August, 1994; production from low-grade stockpile at approximately 24 500 t/day; propose re-opening and expansion of Ingerbelle pit in 1995.
Mine Development Assessment Process - Metals				
Bralorne	Avino Mines and Resources Ltd.	Au	Vein	Submitted Application for a Mine Development Certificate, July, 1994
Fish Lake	Taseko Mines Ltd.	Cu, Au, Ag, Mo	Porphyry	Pre-application phase of Mine Development Assessment Process.
Bulk Samples - Metals				
Bonaparte	Claimstaker Resources Ltd.	Au	Vein	Shipped 3720 t grading about 26 g/t Au to Trail smelter.
Siwash North	Fairfield Minerals Ltd.	Au, Ag	Vein	Shipped ore containing 715 kg Au to ASARCO smelter in Montana. Ore was mainly from open pit mining and stockpiles.
Mines and Quarries - Industrial Minerals				
Craigmont Tailings	M. Seven Industries Ltd.	Magnetite	Tailings	In continuous production in 1994
Harper Ranch	Lafarge Canada Inc.	Limestone	Industrial mineral	Produced 245 978 t in first 11 months of 1994
Moberly	Mountain Minerals Co. Ltd.	Silica	Industrial mineral	Produces about 80 000 t annually

MINE/PROJECT	OPERATOR	COMMODITY	DEPOSIT TYPE	COMMENTS
Nicholson	Bert Miller Contracting Ltd.	Silica	Industrial mineral	Produces about 50 000 t annually
Parson	Mountain Minerals Co. Ltd.	Barite	Industrial mineral	Produces about 60 000 t annually
Pavilion Lake	Continental Lime Ltd.	Lime	Industrial mineral	
Red Lake	Western Industrial Clay Products Ltd.	Fullers Earth	Industrial mineral	Intermittent producer
Mine Development Assessment Process - Industrial Minerals				
Crystal Peak	Polestar Resources Ltd.	Garnet		Approval pending
Bulk Samples - Industrial Minerals				
Kingfisher	Franz Capital Corp. Ltd.	Marble, Granite	Industrial mineral	4000 t bulk sample
Lumby	The Quinto Mining Corp.	Graphite-Sericite	Industrial mineral	10 000 t bulk sample, process and product development/testing
Ranchlands	Mountain Minerals Co. Ltd.	Zeolite	Industrial mineral	1000 t bulk sample, process and product development/testing

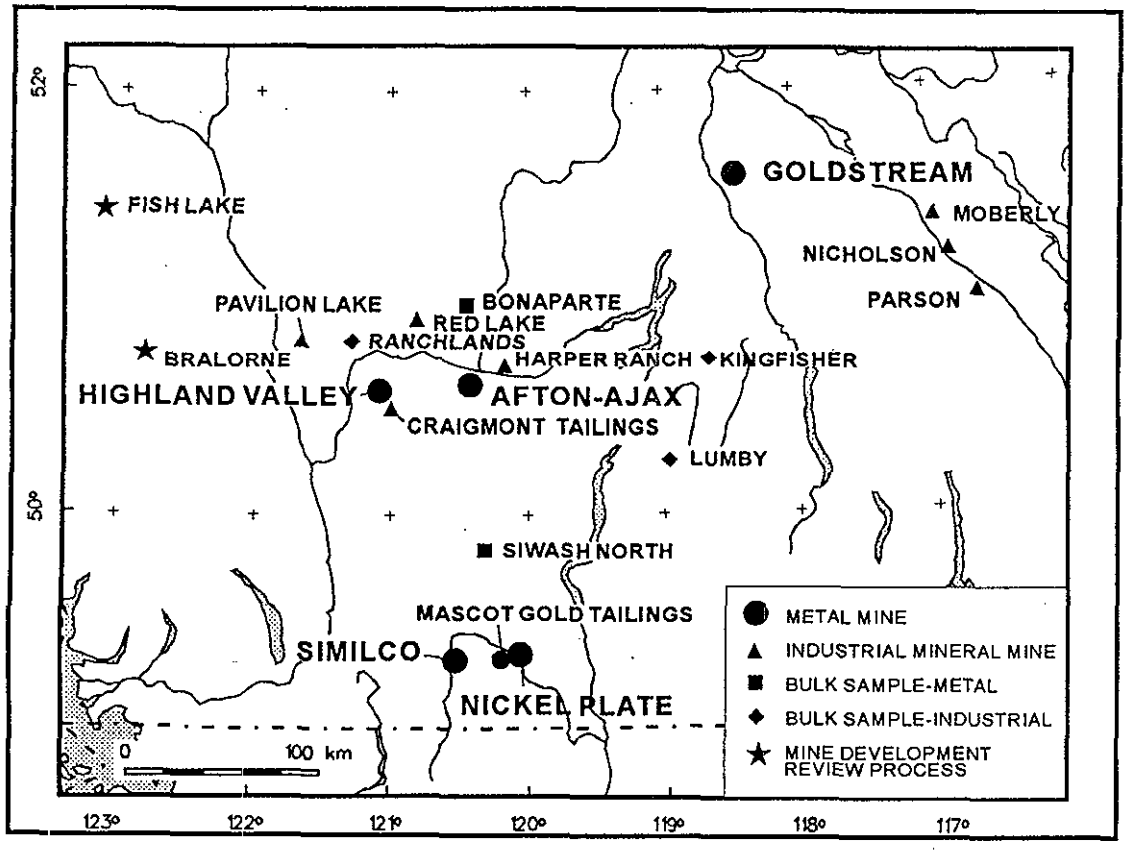

Figure 21. Locations of operating mines, projects in the Mine Development Assessment Process and significant bulk sampling programs, South-central Region, 1994.

During the year, the joint venture conducted a deep drilling program to define the down-plunge extension of the orebody. The known mineralized zone is approximately 150 to 300 metres in strike length, averages 4 metres in thickness, and plunges at least 1500 metres to the northeast at a shallow angle. An initial program of six holes, partially funded by an Explore BC grant, was very successful and the program was expanded to a total of eleven holes. The best intersection was 3.94 metres grading 6.594% Cu and 1.67% Zn. New reserves were reported in November, 1994 and total 700 000 tonnes grading 4.20% Cu and 2.30% Zn, sufficient for about two years of production.

INDUSTRIAL MINERAL MINES

There are numerous small to medium-sized industrial minerals operations in the South-central Region, many of which operate intermittently or on an as-needed basis (Table 9 and Figure 21). Products include limestone, silica, barite, fullers earth, magnetite, gypsum/anhydrite, flagstone and dimension stone. The larger operations are **Harper Ranch, Pavilion** and **Craigmont tailings**, which were all in continuous operation in 1994.

Lafarge Canada Inc. operated three quarries in the Kamloops area to supply feed for its cement operation. These include the **Harper Ranch** limestone quarry, with production of 245 978 tonnes for the first eleven months of 1994; the **Falkland** gypsum/anhydrite quarry, which produced 9049 tonnes, and the **Buse Lake** siliceous tuff quarry, which produced 6596 tonnes over the same period. Estimated reserve-life for Harper Ranch is 15 to 17 years at the current production rate, and 30 years for Buse Lake. Approximately 15 persons are employed in the mining and crushing operations. Lime is produced from high-purity marble at the **Pavilion Lake** operations of Continental Lime Ltd. near Lillooet.

In the Golden area, silica is produced at the **Moberly** quarry of Mountain Minerals Co. Ltd. and at the **Nicholson** quarry of Bert Miller Contracting Ltd. Approximately 60 000 tonnes of barite were mined by Mountain Minerals at the **Parson** mine. Magnetite is produced by M-7 Industries Ltd. at **Craigmont** by re-processing old tailings from past copper mining. This magnetite is used in beneficiation of coal elsewhere in western Canada. Finally, Western Industrial Clay Products Ltd. produced diatomaceous earth (fullers earth) from a quarry at **Red Lake** north of Kamloops. The company supplies a large portion of the kitty litter market in western Canada.

ADVANCED EXPLORATION AND DEVELOPMENT PROJECTS

METALS

Several projects in the South-central Region are presently in the Mine Development Assessment Process or are in advanced exploration/development or bulk-sampling phases (Table 8, Table 9 and Figure 21).

Avino Mines and Resources Ltd. submitted an Application for a Mine Development Certificate in the early summer of 1994, with the intention of re-opening the historic **Bralorne** gold mine. It intends to bring the Bralorne mine back into production at 200 tonnes per day, eventually increasing to 450 tonnes per day. Initially, the main source of ore will be areas at the margins of the upper levels of the mine. Proven and probable reserves are reported by the company to be 292 000 tonnes grading 12 g/t Au above the 1000-metre level, and a further 673 000 tonnes grading 8.2 g/t Au below 1000 metres. During 1994, partner Bralorne Pioneer Gold Mines Ltd. completed underground rehabilitation, trenching and a 2100-metre, 13-hole drilling program on the Peter vein and the newly discovered Big Solly zone. Another phase of drilling is planned for 1995 and will test the area between the Bralorne mine and the **Pioneer** mine to the north, an area which is considered to be largely unexplored.

At **Fish Lake**, Taseko Mine Ltd. completed a $1.7 million pre-feasibility work program. The company is in the pre-application phase of the Mine Development Assessment Process. In July, it announced potential reserves of 675 million tonnes grading 0.236% Cu and 0.434 g/t Au at an overall waste to ore ratio of 1.57:1. A conventional crushing/flotation operation is proposed with a milling rate of 60 000 tonnes per day. Capital costs are estimated at $460 million. Late in the year the company reported the results of twelve large-diameter, angle drill holes designed to retest a portion of the deposit. This resulted in an increase in gold and copper grades by 11% and 4%, respectively, for the 120 million tonne portion of the deposit tested in the program. The company plans additional angle drilling to test whether the grade increase extends to the rest of the deposit.

At the **Siwash North (Elk)** gold property west of Summerland, Fairfield Minerals Ltd. conducted an aggressive development program in 1994 consisting of test mining, underground development and underground drilling. For the year, the company reported sales of about 715 kilograms of gold contained in bulk samples totalling some 8800 tonnes. The bulk samples were from open pit mining, underground test-mining and stockpiles on hand from 1993 mining and were shipped to the ASARCO smelter in Helena, Montana. Since mid-1992, bulk samples from this narrow, high-grade gold vein have produced over 1500 kilograms of gold at an average grade of nearly 96 g/t Au. The operation is permitted to ship up to 10 000 tonnes of ore per year for off-site processing. In early 1995 the company submitted a prospectus to the government to expand the operation to a 200-tonne per day mine and on site flotation mill.

After a late start, Liquid Gold Resources Inc. and joint venture partner Huntington Resources Inc. report that underground development at the **Brett** gold property near Vernon has begun. At the end of December an adit had been advanced about 170-metres of the estimated 245-metre distance to the high-grade Bonanza zone. The companies plan to extract a 10 000-tonne bulk sample in 1995.

INDUSTRIAL MINERALS

The Quinto Mining Corporation continued to explore and develop its **Lumby** graphite-sericite deposit in 1994. Work included underground development, extraction of a 10 000-tonne bulk sample, construction of a test lab, product development and market research. The bulk material is processed to produce a graphite-coated sericite material, informally called "schillerite". The company believes that the flexibility and unusually fine grain size of this material make it valuable as a filler in composites and other specialty plastics applications, such as automotive body panels. Quinto reports that at least 60 samples of "schillerite" have been submitted to manufacturers for product testing.

On the **Kingfisher** property east of Vernon, Explore BC grant recipient Franz Capital Corp. Ltd. explored the dimension stone potential of attractive white marble and white granite. The marble is very coarse and hosted in a band at least 1500 metres long in the Shuswap Metamorphic Complex. In addition to conducting exploration along the length of this band, a 4000-tonne bulk sample of the marble was collected. Large blocks will be cut for dimension stone testing and smaller pieces crushed for landscaping uses. In addition, a small sample of the white granite was removed late in the season for testing.

At the **Ranchlands (Z1 and Z3)** zeolite properties near Cache Creek, Mountain Minerals Co. Ltd. applied for mining leases with the intention of putting the deposits into limited production in 1995. During 1994, it collected a 1000-tonne bulk sample and did trenching in preparation for further bulk sampling in 1995. The company also completed beneficiation tests at its Moberly facility on material collected in 1993, and, in conjunction with Agriculture Canada, conducted product testing for use of zeolite in the agricultural industry.

EXPLORATION

Major exploration projects in 1994 are listed in Table 8 and locations are shown on Figure 16. Highlights of some of the programs are outlined below.

PRECIOUS METAL VEIN DEPOSITS

Claimstaker Resources Ltd. optioned the **Blackdome mine** property in the spring and completed a program consisting of limited trenching and 20 diamond-drill holes totalling 2051 metres. This narrow, high-grade, epithermal vein gold property has been dormant for several years, but has a 200 tonne per day mill and mining permits. A possible resource of 79 000 tonnes grading 14 g/t Au is reported for the mine. Drilling in 1994 focused on extensions to the No. 1, No. 11 and No. 18 veins and results appear to indicate good potential for increasing reserves. The best results included 1.20 metres grading 77.5 g/t Au and 37.4 g/t Ag and 1.25 metres grading 32.2 g/t Au and 90.9 g/t Ag. In addition, several untested soil anomalies are reported to be present on parallel structures outside the mine area. Further drilling is planned for 1995.

Claimstaker also conducted a bulk sampling program on the **Bonaparte** property north of Kamloops. About 3720 tonnes of vein quartz grading 26 g/t Au were shipped to Cominco's Trail smelter. Eighteen diamond-drill holes, totalling 973 metres were completed in an effort to define the zone at depth and along strike from the pit. Veins are generally less than a metre in width, trend northerly and dip moderately eastward. The mineralization appears to be mesothermal in character.

At the **Mount Skinner** gold vein property north of Tatla Lake, Cheni Gold Mines Inc. optioned the property from owner Ottarasko Mines Ltd., and began work on a decline to remove an underground bulk sample. Ottarasko had recovered approximately 11.4 kilograms of gold from a 300-tonne bulk sample in 1993. The steeply dipping, sheared, metadiorite-hosted quartz vein averages approximately 0.7 metre in width. Results were not encouraging and Cheni returned the property to the owner in late summer.

A number of companies were active in the Bridge Lake - Lillooet area. Programs of diamond drilling and trenching were conducted on gold-silver vein occurrences on the **BRX** property of Strand Resources Inc and the **Summit** property of Gold Summit Mines Ltd. Spokane Resources Ltd. reported good results from a 26-hole diamond-drilling program on the **Spokane** property in the Shulaps Range. It was a quiet year at the **Wayside** property of International Wayside Gold Mines Ltd., although the company announced late in the year that a drilling program would start shortly. International Wayside also optioned the **Minto** and **Olympic** claims from Avino Mines and Resources Ltd, and plans drilling for 1995.

At the **Fairview/Stemwinder** gold-silver vein prospect in the southern Okanagan, Oliver Gold Corporation drilled approximately 2600 metres in 34 diamond-drill holes with encouraging results. Exploration is focusing on two high-grade shoots identified by drilling in February. Also in the Okanagan, International Tower Hill Mines Ltd. explored its **Siwash** property near the **Siwash North (Elk)** property of Fairfield Minerals Ltd.. Two new discoveries were reported by the company, consisting of siliceous zones containing gold, silver, lead, zinc, copper and fluorite. Fairfield reported discovery of a narrow high-grade gold vein on its nearby **Pen** property.

On the **Ned** property southwest of Kamloops, Rhino Resources Inc. reported encouraging gold values from several drill holes. The mineralization is interpreted by the company to be epithermal in character.

PORPHYRY DEPOSITS

Teck Exploration Ltd., and joint venture partner Getchell Resources Inc., conducted a large exploration program for alkalic porphyry copper-gold targets on the **Rainbow** property within the Iron Mask batholith southwest of Kamloops. Teck drilled 31 diamond-drill holes totaling 5959 metres, mainly in the area southeast of Sugarloaf Hill and the Rainbow #2 zone. The drilling discovered the **New zone** (or "17 Zone"), located southeast of the Rainbow #2 zone and buried beneath 20 to 40 metres of overburden. Five good intersec-

TABLE 10
1994 EXPLORE BC GRANT RECIPIENTS,
SOUTH-CENTRAL REGION

PROJECT	APPLICANT	COMMODITIES	DEPOSIT TYPE
MINERAL EXPLORATION INCENTIVE PROGRAM (MEIP)			
Ace/Joker	Teck Exploration Ltd.	Cu, Au	Porphyry
Alwin	Claimstaker Resources Ltd.	Au, Cu	Vein
CVS-Mystery Lake	Aucumo Resources Ltd.	Cu	Porphyry
Fairview	Oliver Gold Corp.	Au	Vein
Getty South/Central	Robak Industries Ltd.	Cu	Porphyry
Goldstream Regional	Bethlehem Resources Corp.	Cu, Zn	Volcanogenic Massive Sulphide
Jesse Creek	Conlon Copper Corp.	Cu	Skarn
Kingfisher	Kingfisher Marble Ltd.	Marble	Industrial Mineral
Klinker	Okanagan Opal Inc.	Opal	Gemstones
Krain/Getty North	Getty Copper Corp.	Cu	Porphyry
Lucky J Graphite	Carbon Reef Resources	Graphite	Industrial Mineral
Rainbow	Teck Exploration Ltd.	Cu, Au	Porphyry
Rey Lake	Hera Resources Inc.	Cu, Au	Porphyry
Sun Claims	Canmark International Resources Inc.	Zeolite	Industrial Mineral
Taseko	Westpine Metals Ltd.	Au	Vein
Task	Pioneer Metals Corp.	Cu, Au	Porphyry
Whipsaw	World Wide Minerals	Au	Vein
ACCELERATED MINE EXPLORATION PROGRAM (AMEP)			
Goldstream	Bethlehem Resources Corp.	Cu, Zn	Volcanogenic Massive Sulphide
Similco Alabama Hill Ingerbelle East	Princeton Mining Corporation	Cu, Au	Porphyry

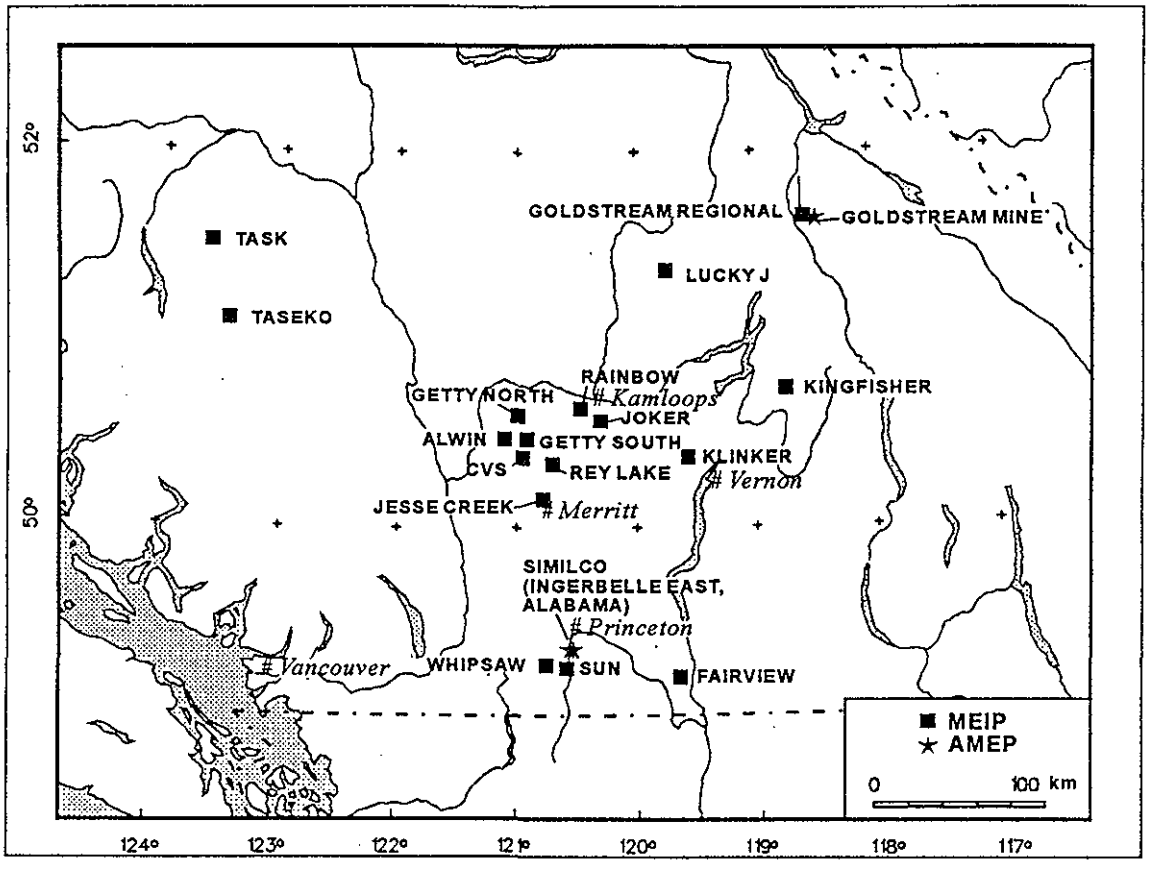

Figure 22. Successful applicants for Explore B.C. funding, South-central Region, 1994.

tions cut the zone with the best returning 0.93% Cu over 91 metres. The zone occurs in an area of strong faulting and a complex inter-relationship of Iron Mask and Nicola rocks. It appears to have a steep dip and a northwesterly trend. Teck also explored the nearby **Joker/Ace** property. Lakewood Mining Co. Ltd. also drilled in the Iron Mask area during the year, focusing on the **Beaton** and the **Wood** groups.

In the Guichon Creek batholith, Highland Valley Copper completed an extensive induced polarization survey on the **Jericho** and **Lynn** targets, and did definition drilling within the **Valley pit.** Claimstaker Resources Ltd. optioned the nearby **Alwin** property and began preparations for taking an underground bulk sample in early 1995.

Activity was again strong in the Lac la Hache area this year, as several companies explored for alkalic porphyry and skarn copper-gold deposits in the southern Quesnel Trough. Regional Resources Ltd. and GWR Resources Ltd. carried out induced polarization surveys and diamond drilling on targets on the **Spout Lake, Nemrud, Spring, and Murphy** properties. Very little information has been released on these projects so far. Several other junior companies and individuals also worked in the area.

In the Taseko Lake area, results were mixed from nine diamond-drill holes on the **Cone Hill** porphyry target, being explored by Sultan Minerals Inc. and Valerie Gold Resources Inc. Pioneer Metals Corporation also drilled on the adjacent **Task 9 and 10** property, intersecting low grade copper-gold-silver mineralization which it believes may be the fault-offset extension of the **Fish Lake** deposit.

STRATIFORM SULPHIDE DEPOSITS

In 1994, most work on stratiform base metal deposits was confined to the northern Selkirk Mountains near the Goldstream mine. To the west of Goldstream, mine owners Bethlehem Resources Corporation and Goldnev Resources Inc. conducted a drilling program on the **C-1 zone**, a band of lead-zinc mineralization. OTM International Developments Inc. drilled three diamond-drill holes at the **Brew** volcanogenic massive sulphide target under option from Bethlehem and Goldnev. The drilling intersected massive sulphide mineralization in two holes over widths of up to 3.8 metres. In contrast to the Goldstream deposit, which occupies a similar stratigraphic and metallogenic setting, samples of massive sulphide boulders on surface had previously returned very high gold values.

On the **Cottonbelt** stratiform lead-zinc property, Canquest Resources Corporation performed an aerial geophysical survey during the summer, with strongly encouraging results. Several anomalies were identified along the 8-kilometre strike length of mineralized rocks. Bethlehem and Canquest took an option on the property late in the year with intention of drilling the geophysical anomalies in 1995. The target is fold hinge zones where the persistent stratiform horizon may be structurally thickened.

INDUSTRIAL MINERALS

1994 continued to be a busy year for industrial minerals exploration, with keen interest in zeolites and other absorbent materials, as well as dimension stone. Twenty-five projects (12% of the regional total) were identified as industrial minerals projects, accounting for $2.6 million (16%) in expenditures.

Canmark International Resources Inc. reported exploration success at the **Sun** zeolite property near Sunday Creek, south of Princeton. A ten-hole diamond drilling program, coupled with a program of similar scope in 1993, suggests that the deposit is approximately 10 to 15 metres thick, and contains 3 500 000 tonnes measured, 4 400 000 tonnes indicated and 38 600 000 tonnes possible reserves of zeolitized volcaniclastic rocks. The cation exchange ratio (CEC) for the material ranges from 95 to 135, with an average of 116. A 10 000-tonne bulk sampling program is planned for 1995.

Several groups of claims were investigated for their zeolite, bentonite and diatomite potential along the Deadman River. Prospectors Assistance grant recipient Chuck Marlow investigated his **Bentonite/Diatomite** property covering a Miocene channel deposit north of Vidette Lake.

Explore BC grant recipient Okanagan Opal Inc. has been exploring the **Klinker** property, a precious opal showing near Vernon. Work included prospecting, bulk sampling and cutting and marketing of finished jewelry. The opal occurs as vesicle and fracture fillings in volcanic mudflows (lahars?) in the Kamloops Group, and ranges from "fire" opal to clear, yellow and white varieties. It is the only known precious opal occurrence in British Columbia, and has attracted interest from collectors throughout North America.

A small bulk sample was collected from the **Jack** diatreme in the Rocky Mountains by Discovery Consultants on behalf of Consolidated Venturex Holdings Ltd. In addition, Prospectors Assistance recipients Barb and Bill Welsh staked areas containing diatremes with possible diamond potential near the north end of the Dogtooth Range in the Purcell Mountains.

PROSPECTORS ASSISTANCE AND EXPLORE B.C. PROGRAMS

The Prospectors Assistance and Explore BC grant programs were revived by the provincial government in 1994, and helped to stimulate exploration activity province-wide. Within the South-central Region, seventeen prospectors received Prospectors Assistance grants. They targeted a variety of commodities using conventional prospecting methods and, in some cases, newer methods such as enzyme-leach geochemistry. Option agreements have been signed or are presently being negotiated for several of the projects.

The Explore BC program is divided into Mineral Exploration Incentive Program (MEIP) grants and Accelerated Mine Exploration Program (AMEP) grants. Seventeen companies were awarded MEIP grants for properties in the

South-central Region, and two (**Goldstream** and **Similco**) were awarded AMEP grants (Table 10 and Figure 22). Many of the more successful programs are described above.

MINERAL POTENTIAL INITIATIVE

The B.C. Geological Survey Branch has now completed Phase 1 and Phase 2 mineral potential maps for the Okanagan-Shuswap and Kamloops areas. Phase 2 probabilistic estimates were generated during a 4-day workshop in Kamloops, with approximately 20 industry and government experts participating. The result is the most complete dataset yet assembled for any of the regions being analyzed. 1:250 000-scale geologic compilations of these areas are expected to be available in mid-1995.

RESEARCH ACTIVITIES

Several academic, federal and provincial government projects were carried out in the region in 1994. These have, or will soon, provide useful new data for explorationists. Some of these projects are:

- Paul Schiarizza (B.C. Geological Survey) mapped the 92N/09 1:50 000-scale map sheet northwest of Tatlayoko Lake, extending his previous mapping to the northwest.
- Jim Logan (B.C. Geological Survey) continued 1:50 000-scale mapping on the 82M/09 map sheet in the vicinity of the Goldstream mine, north of Revelstoke. A deposit study focused on the underground workings at the mine.
- Bob Thompson (Geological Survey of Canada) is in his second year of mapping the Vernon (82L) 1:250 000-scale map sheet, assisted by Ken Daughtry of Discovery Consultants. Preliminary indications are that the location and significance of the Okanagan Valley fault may have to be rethought.
- Jim Lang and Colin Godwin (Mineral Deposits Research Unit at UBC) relogged drill core from the Big Onion porphyry copper-gold deposit near Afton, to gain a further understanding of the sequence of mineralizing events in the Iron Mask batholith.
- Geochemists from the Geological Survey of Canada and the B.C. Geological Survey Branch teamed up with Teck Exploration Ltd. to study the application of the enzyme-leach geochemical method and biochemistry to the Iron Mask area.
- The Geological Survey of Canada and Teck Exploration Ltd. jointly sponsored an airborne magnetic/gamma ray survey over the Iron Mask batholith. The information has a one-year confidential period and will be released to the public in April, 1995 as GSC Open File 2817.
- Under the Canada-B.C. Mineral Development Agreement, the Geological Survey of Canada conducted a airborne magnetic survey over a portion of the Interior Plateau. A 1:250 000-scale colour plot was released in December, 1994 as GSC Open File 2785.

LAND-USE ISSUES - KAMLOOPS LRMP

The Kamloops Land and Resource Management Plan (LRMP) table reached an "agreement in principle" in December 1994, to recommend a strategic land-use plan for approximately 2.2 million hectares of the Kamloops and Clearwater Forest Districts. The plan includes recommendations for 17 new protected areas totalling approximately 4% of the area. The Kamloops LRMP table, made up of public and government representatives, met on a monthly basis for over two years prior to the agreement. A ratification meeting was held in early February with Cabinet has given approval-in-principle of the plan. The mining sector was represented by the Kamloops Exploration Group, the Cordilleran Prospectors and Developers Association and the Gold Dredgers Association of B.C. It is hoped that the resolution of land-use issues in the Kamloops region will have a positive effect on exploration activity, by decreasing uncertainty related to new protected areas. Plan highlights for mining include:

- The LRMP table endorsed the concept of "Enhanced Resource Development Zones" for mining, and other resource-based industries. Four areas, including the Guichon Creek batholith, Iron Mask batholith, and two areas in the Eagle Bay Complex are proposed for this designation. Management guidelines will be written to build investor confidence for mineral development in these areas.
- Only about 90 claim units will be affected by the creation of new parks. Of these, 15 will be included in a park only if the claims lapse or are voluntarily relinquished, and 59 only if the tenure holder is compensated at fair market value by conservation groups, with no cost to the taxpayer.
- Mining sector representatives were largely successful in their endeavour to keep high mineral potential lands out of new protected areas (Figure 23). Analysis using Phase 2 mineral potential data and local expertise suggests that proposed protected areas alienate only about 0.8% of such land in the LRMP area.
- A systematic review of all no-staking reserves in the region will be undertaken by the Ministry of Energy, Mines and Petroleum Resources. Those reserves deemed to be no longer necessary will be removed. This may partially mitigate the loss of mineral lands due to park designation.
- Management guidelines in special management zones are being written to emphasize that mining is an acceptable activity in these areas.

Government announced a land-use plan for the Cariboo-Chilcotin region in October of 1994. Further information on this plan, which covers a portion of the **South-central Region,** can be found in the report for the Central Region by E.L. Faulkner.

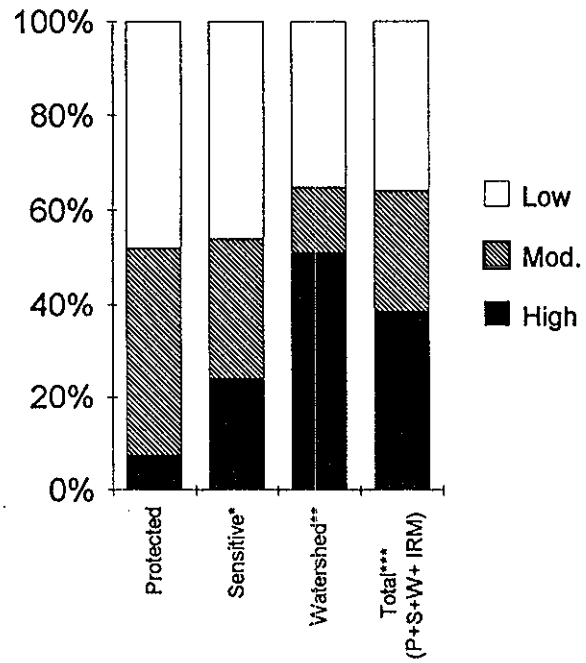

Figure 23. Percentage of high, medium and low mineral potential lands in proposed management zones, Kamloops Land and Resource Management Plan.

OUTLOOK FOR 1995

The year ahead should see continued improvement in exploration and development activities in the region. Sharply higher copper and molybdenum prices and the lower Canadian dollar mean the existing metal mines will be much more profitable. We expect to see continued development activity as the mines re-open pits and maximize throughput. This will be particularly evident at **Similco** and **Afton-Ajax** mines.

Exploration activity will probably continue to be focused on a handful of targets, mainly on well established properties in stable land-use areas. Spending will likely continue to be directed to porphyry Cu-Au and Cu-Mo-Au deposits, high-grade Au-Ag veins and industrial minerals. Interest in stratiform base metal deposits should see a marked improvement in 1995, particularly as land-use uncertainty is reduced in the Kootenay Arc and Adams Plateau mineral belts due to the completion of the Kootenay CORE process and the Kamloops LRMP.

ACKNOWLEDGMENTS

The authors wish to acknowledge the contributions of data and ideas from many prospectors and explorationists in the region.

EXPLORATION TRENDS AND HIGHLIGHTS KOOTENAY REGION - 1994

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TRENDS

The level of exploration activity in the Kootenay Region in 1994, if measured by the number of Notices of Work (permit applications) submitted, showed an increase of 22% over 1993 (Figure 24, Table 11). A total of 220 mineral, placer and coal notices were filed but only 17 projects could be classed as "major " projects involving a significant amount of drilling, underground exploration or a budget in excess of $100 000 (Figure 25, Table 12). Other indicators of exploration activity, such as money spent and mineral claim units recorded, were significantly down in 1994. The estimated total exploration expenditure in the region (including on-property work at producing coal mines) was $5.6 million, a decline of 27% from the 1993 figure and about one half of the $12 million expenditure in 1991 when the current downward trend in project funding began. The apparent contradiction between the increase in permit applications and the sharp decline in spending illustrated very clearly that there is still a firm willingness by explorationists to propose and plan projects in the region but many projects were postponed completely or significantly scaled back due to the inability, particularly by prospectors and junior companies, to raise the necessary funding.

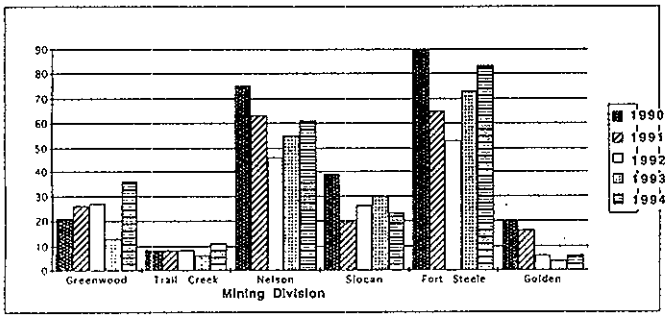


Figure 24. Notices of work - by mining division (mineral, placer, and coal notices).

TABLE 11
COMPARATIVE INDICATORS OF LEVEL OF EXPLORATION ACTIVITY

Notices of Work:	1990 - 253
	1991 - 197
	1992 - 166
	1993 - 181
	1994 - 220 (+22%)
Estimated On-the-ground Expenditure (All Projects):	1991 - $12 million
	1992 - $ 7.1 million
	1993 - $ 8.3 million
	1994 - $ 5.6 million (-33%)
Mineral Claim Units Recorded:	1990 - 11,022
	1991 - 8,218
	1992 - 5,294
	1993 - 6,475
	1994 - 5,637 (-13%)

Of particular concern in the context of long-term sustainability of non-coal mining activity in the region is the fact that a decreasing amount of effort is currently being put into grassroots prospecting or exploration. Most of the expenditures in 1994 were on established prospects and advanced projects. Prospecting was definitely given a boost by the seventeen Prospector Assistance Program grants issued by the Ministry to prospectors for work in the Kootenay Region, and several of those grant-assisted programs resulted in new or improved prospects. Nevertheless, the number of mineral claim units recorded in the region declined by 13%, largely because the flurry of speculative staking for diamonds which occurred in 1993 was not sustained into 1994.

In spite of the decline in project funding there were some definite successes recorded within the region during the year, as outlined in the following sections of this report, and the expectation for 1995 is for increased activity and funding for exploration in all parts of the region. Many of the uncertainties surrounding land use and regulatory issues which unquestionably caused much of the caution and reluctance to invest funds displayed by exploration companies in 1993 and 1994, are expected to be cleared away early in 1995. That should result in a more positive and secure environment in which to commit capital and undertake new exploration in the coming years.

EXPLORATION HIGHLIGHTS

INDUSTRIAL MINERALS

For what is probably the first time in the Kootenay Region, the project which saw the highest total on-the-ground expenditure was an industrial minerals prospect. The Ice diamond prospect of Consolidated Ramrod Gold Corporation now covers an area of 160 square kilometres along the west side of the Elk Valley, north and south of the town of Elkford. Systematic tracing of indicator minerals in heavy

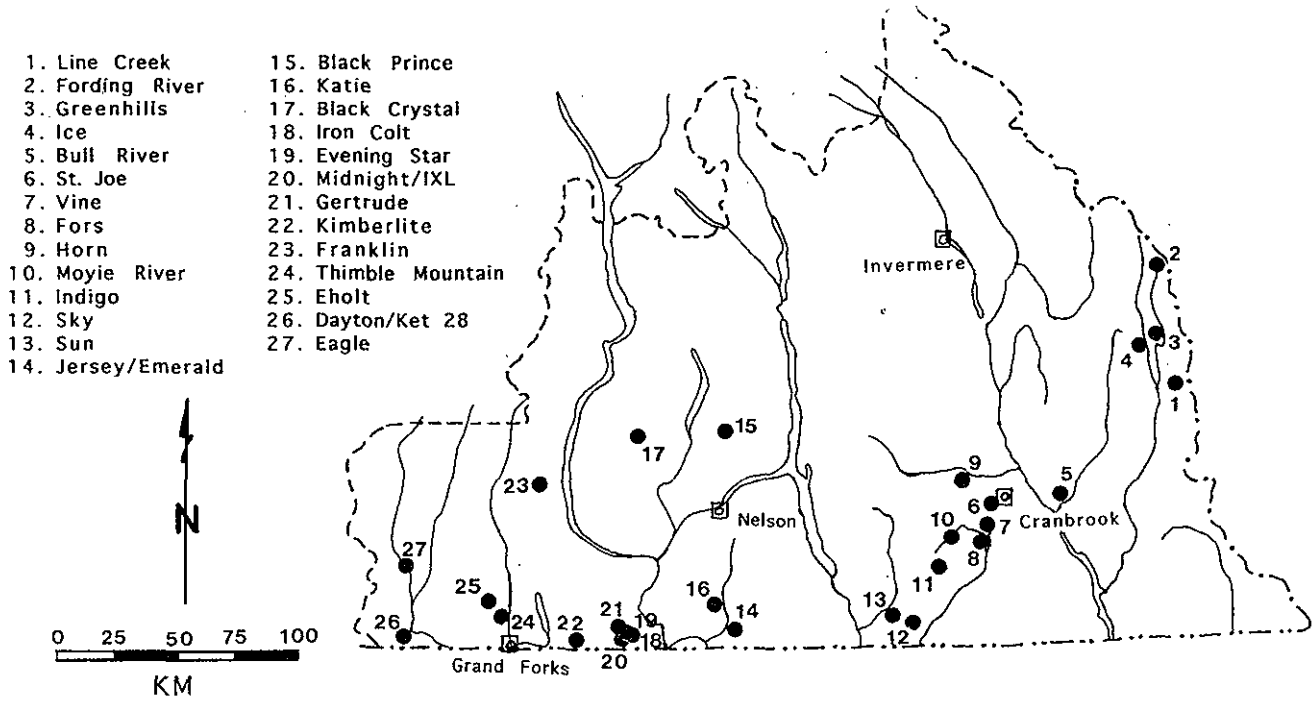


Figure 25. Major exploration projects, Kootenay Region - 1994.

mineral concentrates from stream sediments, combined with the identification of strong magnetic anomalies by airborne geophysics, has resulted in the discovery of three new kimberlite intrusions giving a total of six so far identified on the property. Included among the original three are the Cross pipe on Crossing Creek, and a swarm of dikes south of Boivin Creek, all of which have been known for over twenty years and until recently were British Columbia's only confirmed true kimberlites. Previous exploration of these kimberlites had failed to discover any diamonds. However, from its 1995 sampling of intensely weathered bedrock exposures of the newly identified kimberlite bodies, Consolidated Ramrod has reported the discovery of two macrodiamond fragments one from each of two pipes located about 2.5 kilometres east of the Cross pipe. It is anticipated that the new kimberlite bodies will be drill-tested and possibly bulk sampled in 1995. In addition, there are several large airborne magnetic anomalies on the property which have not yet been investigated.

Sway Resources Inc. reported the identification of 15 diamonds, including 12 macrodiamonds, in residual soil samples collected in 1993 from its **Kimberlite** claims on Santa Rosa Creek west of Rossland. The samples were collected from surface depressions in a harzburgite intrusion. No significant follow-up work was undertaken in 1994 but, late in the year, it was announced that Marum Resources Inc. had signed an agreement with Sway to initiate further exploration starting in early 1995.

Following widespread staking in 1992 and 1993 of a large number of previously known and newly-discovered ultramafic intrusions and diatremes throughout the Hughes Range and southern Rockies, the Toby and Horsethief creeks area of the central Purcells, the Arrow Creek area east of Creston and around Wildhorse River, very little follow-up investigation or sampling occurred in 1994, primarily due to the inability of the companies involved to raise further exploration funding. This appears to be symptomatic of a general decline in the pace of grassroots exploration for diamonds in western Canada.

Two other industrial minerals projects of note in 1994 were the **Eagle** dimension stone prospect of Quadra Stone Company Ltd. south of Beaverdell, where 1000 tonnes of granite were quarried for product testing, and the **Black Crystal** graphite prospect of Black Crystal Resources Ltd. on Hoder Creek in the Valhalla Range west of Slocan Lake. On the latter property the 1994 work consisted of 250 metres of reverse-circulation drilling in six holes to test the continuity of disseminated coarse flake graphite associated with marble zones in high-grade paragneisses of the Valhalla Metamorphic Complex. Further drilling and bulk sampling are proposed for 1995.

Interest remains strong among a number of prospectors and junior companies in the potential for development of a variety of industrial minerals in the region, including dimension stone, gemstones, wollastonite, barite, gypsum, magnesite, garnet, silica and phosphorite.

METALS

A top priority target in the Kootenays continues to be Sullivan-type sedex zinc-lead-silver mineralization in the Middle Proterozoic Aldridge Formation. The world-class Sullivan orebody will be mined out early in the next decade

TABLE 12
EXPLORATION PROJECTS - KOOTENAY REGION - 1994

Property (Operator)	MINFILE Number	Mining Division	NTS	Commodity	Deposit Type	Work Done
KOOTENAY REGION						
Black Prince (Pacific Golden Spike Resources Ltd.)	082FNW140	Slocan	82F/14W	Ag, Pb, Zn, Au, Cu	Vein	u/g & surface diamond drilling bulk sampling
Bull River (R.H. Stanfield & Assoc.)	082GNW002	Fort Steele	82G/6W, 11W	Au, Cu	Vein	Rotary & diamond
Dayton Camp/Ket (Phoenix Gold Res., Gold City Res., Sway Res.)	082ESW022	Greenwood	82E/3E	Au	Epithermal vein, skarn	16 rdh, 1079m; 15 ddh, 1247 m; geochem; geophys
Eagle (Quadra Stone Co. Ltd.)		Greenwood	82E/6E	Dimension stone	Intrusive (granite)	1000 t bulk sample
Evening Star (Pacific Vangold Mines Ltd.)	082FSW102	Trail Creek	82F/4W	Au	Vein	5 surface ddh; u/g drifting & raising
Fording River (Fording Coal Ltd.)	082JSE009, 010, 012	Fort Steele	82J/2W	Coal	Sedimentary	21 rdh, approx. 4600 m
Fors/Vine (Consolidated Ramrod Gold Corp.)	082GSW035, 50	Fort Steele	82G/5W	Zn, Pb, Ag, Au	Sedex	5 ddh, 2883 m; geochem
Franklin (Sway Resources Inc.)	082ENE002, 003, 009 51	Greenwood	82E/9W	Au, Ag, Pb, Zn, Cu	Epithermal vein, replacement	11 ddh, 1060 m; 10 rdh, 300 m; geophys; geochem
Greenhills (Fording Coal Ltd.)	082JSE007	Fort Steele	82J/2W	Coal	Sedimentary	23 rdh; 6 test pits
Ice (Consolidated Ramrod Gold Corp.)		Fort Steele	82J/2W	Diamonds	Intrusive (kimberlite)	Heavy mineral geochem & petrology; geophys
Indigo (A. Whaley)		Nelson	82F/1E	Zn, Pb, Ag	Sedex	1 ddh, 1018 m; geochem
Iron Colt (Pacific Vangold Mines, Internat. Silver Ridge Res.)	082FSW100	Trail Creek	82F/4W	Au, Ag	Vein	Bulk sampling; u/g drifting & raising
Jersey/Emerald (Sultan Minerals Inc.)	082FSW009, 010	Nelson	82F/3E	Au, W, Pb, Zn, Ag	Skarn, replacement	9 ddh, approx. 1100 m; geophys
Line Creek (Line Creek Resources Ltd.)	082GNE020, 021, 022	Fort Steele	82G/15E, W	Coal	Sedimentary	Approx. 70 rdh, 14000 m
Midnight/IXL (Consolidated Ramrod Gold Corp.)	082FSW116	Trail Creek	82F/4W	Au	Vein	u/g & surface diamond drilling geophys
St. Joe (Consolidated Ramrod Gold Corp.)	082GSW004	Fort Steele	82G/5W	Pb, Zn, Ag	Vein, sedex	5 ddh, 3000 m

and no successor has yet been found in spite of many years of diligent searching by Cominco Ltd. and other companies throughout the Purcells. The most promising occurrence at present is the combined **Fors** and **Vine** property of Consolidated Ramrod Gold Corporation in the Moyie Lake area south of Cranbrook. A major drilling program in 1993, following discovery of the Fors vent structure in late 1992, defined extensive sulphide-rich tourmalinized breccia, numerous thin but conformable sulphide bands and virtually all of the alteration types and distinctive lithologies typical of the Sullivan setting, over a strike length of 8 kilometres parallel to the Moyie fault and over a thick stratigraphic interval above and below the Sullivan horizon. Exploration on the Fors/Vine prospect was scaled back in 1995 to include only 2883 metres of diamond drilled in five holes, mainly because the company's resources and funding were diverted onto other properties, including the Ice diamond prospect described earlier. Other properties with a Sullivan-type objective which were explored by Consolidated Ramrod in 1995 included the **St. Joe**, just south of Cranbrook, where 3000 metres were drilled in five holes, and the **Horn** prospect southwest of Marysville. Similar mineralization was the target of Pacific Mariner Explorations Ltd. and Arbor Resources Ltd. in modest drilling programs on the **Sun** property at Kitchener and the **Sky** property near Goatfell, respectively. Prospector Allen Whaley, using a Prospector Assistance grant, drilled 1018 metres in one long hole to test the Sullivan horizon beneath a large mercury-in-soil anomaly on the **Indigo** property at the head of Kid Creek. He had not succeeded in reaching the target depth by the end of the 1994 season but hopes to continue the hole in 1995.

Pacific Vangold Mines Ltd. had a very successful year in 1995, with exploration programs in the Rossland gold camp, partly financed with an Explore BC grant. On the **Evening Star** claim, underground exploration drifting, raising and sampling proved up higher overall grades and increased mineable ore reserves at the former-producing main zone. Prior to the present program, remaining reserves in the main zone had been reported to be about 91 000 tonnes averaging 10.6 g/t Au. In addition to the underground program, surface diamond-drilling outlined a new zone south and west of the previously stoped area containing at least 16 300 tonnes at about 17 g/t Au. Mining of a 10 000 tonne bulk sample has been proposed for 1995. Meanwhile, at the nearby **Iron Colt** claim, the company, in a joint venture with International Silver Ridge Resources Inc., made a first shipment of about 560 tonnes (averaging approximately 34 g/t Au) out of its approved 10 000-tonne bulk sample. The ore is being trucked to Echo Bay's Kettle River mill in Washington for custom milling. Earlier in the year, a crosscut to test the full width of the Le Roi vein system on the Iron Colt claim returned an average grade of 23 g/t Au from muck samples over a width of 9.1 metres. On its **Gertrude** claim south of Red Mountain, Pacific Vangold drilled two surface core- holes to further test the War Eagle zone. Only one hole intersected the zone but it returned 14.7 g/t Au over 6 metres.

Also at Rossland, Consolidated Ramrod Gold Corporation carried out a program of underground and surface drilling on the optioned **Midnight and IXL** claims where high-grade gold mineralization is associated with serpentinite in a regional-scale thrust fault. The company terminated the agreement at the conclusion of the program. Late in the year it was reported that the vendor, Matovich Mining Ltd., had dealt the property to Midnight Mining Co., a subsidiary of LRX Capital Corporation. Test mining and bulk sampling are proposed for 1995.

One of the more intriguing projects currently underway in the region is at the **Jersey/Emerald** property south of Salmo where Sultan Minerals Inc., is re-examining two former producing base metal mines as gold prospects. Following up on high gold values reported by Gerry Ray of the BC Geological Survey on samples collected at the former Emerald tungsten producer, prospectors Lloyd Addie and Bob Bourdon purchased the Emerald and adjoining Jersey lead-zinc mine properties in 1993. They confirmed the existence of free gold in the Emerald mine tailings and high gold values associated with massive pyrrhotite zones in the lead-zinc and tungsten orebodies. They also located three new gold-bearing quartz veins by prospecting elsewhere on the property. Sultan Minerals optioned the property in late 1993 and, in the fall of 1994, completed an initial drilling program of 9 surface holes totaling approximately 1100 metres. Among the better intersections reported were 33.9 g/t Au across 0.9 metre within a geophysical anomaly south of the tungsten mine and 16.1 g/t Au across 0.4 metre in the "Bismuth" zone adjacent to the Jersey lead-zinc mine. Drilling will continue in 1995.

On Hellroaring Creek southwest of Salmo, the joint venture of Yellowjack Resources Ltd. and Hemlo Gold Mines Inc. has resumed exploration at the **Katie** porphyry copper-gold property. A proposed $200 000 drilling program on the Main zone, one of three separate zones defined by drilling prior to 1992, began in mid-December, financed and operated by Yellowjack. Only the first hole had been completed by year-end. The Katie prospect is the most easterly of the alkaline porphyry copper-gold occurrences in British Columbia and, so far, the only potentially significant Cu-Au deposit identified in the Jurassic Rossland Group volcanics, although several other prospects were briefly explored in the 1980s in the area between Nelson and the U.S. border. This latest program is based on a revised structural interpretation of the deposit which suggests that a 90° change in drilling direction will significantly improve the indicated grade of main zone mineralization.

A brief flurry of staking activity in mid-summer in the Rock Creek area resulted from a report by Sway Resources Inc. of a drill intersection averaging 51.4 g/t Au over 3.36 metres on the **Ket 28** claim south of Bridesville. This impressive intersection was the best of several in erratic gold mineralization associated with pyritic, silicified fault breccia. The drilling on Ket 28 was only one part of a multiphased program of diamond drilling, rotary drilling and geophysics/geochemistry surveys in several areas within a belt of contiguous properties extending from the U.S border to north of the old Dayton mining camp and located between Bridesville on the west and Rock Creek on the east. This belt which contains several new and old discoveries of gold mineralization associated with both skarn and epithermal

vein and breccia systems has been referred to as the **Rock Creek gold trend**. The south end of the belt is only a few kilometres from the major Crown Jewel gold deposit in Washington. The current exploration activity within the belt is a joint venture of Phoenix Gold Resources Ltd., Gold City Resources Ltd. and Sway Resources Inc. Several encouraging results were reported from the 1994 program, providing numerous opportunities for further work in 1995.

Sway Resources Inc. was also very active in the old **Franklin** mining camp on Burrell Creek north of Grand Forks. Although Sway's focus is on gold-silver targets, the camp contains a variety of precious metal and base metal past-producers and prospects, most of which are replacement or epithermal vein deposits. The most encouraging results in 1994 came from a brief drill test on the North Banner zone of gold-bearing quartz veins, where the best intersection was 27.4 g/t Au over 2.4 metres. A total of over 1000 metres in 11 diamond drill holes and ten rotary holes totaling 300 metres were completed, together with localized geophysical and geochemical surveys.

In the Greenwood camp, Orvana Minerals Corporation drilled four short holes to test the Seattle showing on its **Thimble Mountain** property north of Grand Forks. Earlier surface sampling of this showing had returned a best assay of 7.3 g/t Au and 0.71 % Cu over 4.8 metres. A similar program on the nearby **Eholt** property was abandoned after only one hole was completed, due to unseasonably mild weather prior to Christmas. The plan is to complete the program in the spring. The target on both properties is skarn-hosted copper-gold mineralization.

Other projects of note include the **Black Prince** property at the head of Springer Creek, east of Slocan, where Pacific Golden Spike Resources Ltd. carried out underground and surface diamond drilling on a group of small past-producing silver-lead-zinc vein deposits. The company was also investigating the possibility of bulk sampling the waste dumps from the previous operations and re-processing the material through a small pilot mill. At the **Bull River** mine east of Cranbrook, R.H. Stanfield and Associates conducted further deep drilling in an attempt to increase measured resources of gold-copper mineralization at depth beneath the former Bull River open pit mine.

PRODUCING MINES

COAL

The four largest of the five operating mines in the Southeast coalfield maintained steady or increasing production through 1994. Fording Coal Ltd. reports total production in 1994 of about 6.5 million tonnes at the **Fording River** mine and about 3 million tonnes at **Greenhills** mine. Teck Corporation produced approximately 2.4 million tonnes at its **Elkview** mine. All three mines are planning expanded production in 1995. At the **Line Creek** mine of Line Creek Resources Ltd., 1994 production is believed to have been approximately 3 million tonnes. All four mines produce and market mainly metallurgical coal (Figure 26).

The former **Byron Creek** thermal coal mine at Corbin, which had been producing at a rate of about 1 million tonnes per year, ceased operations in October due to the expiry of

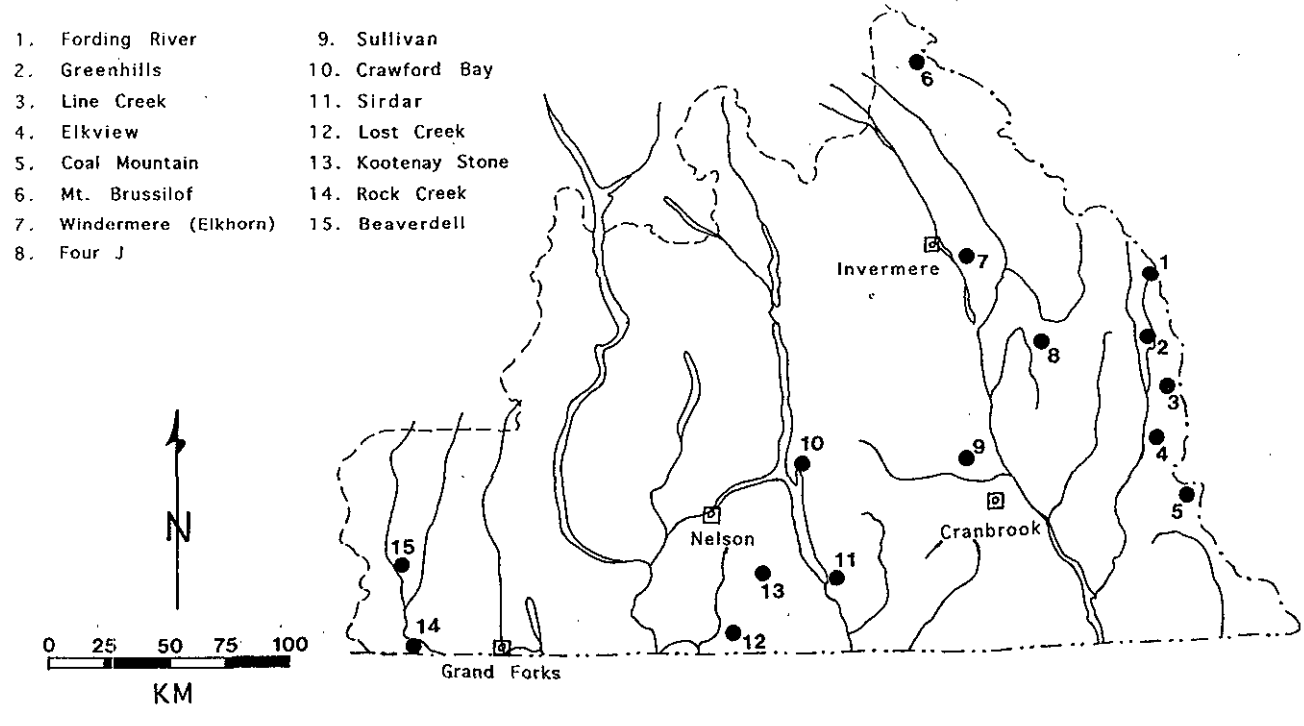


Figure 26. Producing mines and quarries, Kootenay Region - 1994.

its marketing contracts. Shortly after, the mine was purchased by Fording Coal Ltd. and re-opened in December with the new name of **Coal Mountain Operations.**

Only three of the mines, Fording River, Greenhills and Line Creek, undertook on-property exploration work in 1994. In all cases, the work involved mainly rotary drilling programs to firm up reserves in specific parts of the properties and ranged in scale from 4600 metres planned at Fording River to an anticipated total of 14 000 metres at Line Creek.

METALS

The only producing metal mine in the region is the **Sullivan** zinc-lead-silver mine of Cominco Ltd. at Kimberley. The mine remained in full production through 1994 with a daily milling rate of about 7000 tonnes. Reserves will be exhausted and the mine is due to close in about seven or eight years.

INDUSTRIAL MINERALS

Three major industrial minerals operations are located in the Rocky Mountains. Magnesite is mined by Baymag Mines Company Limited at **Mount Brussilof** east of Radium Hot Springs at a rate of approximately 175 000 tonnes annually. Westroc Industries Limited produces gypsum at a production rate of about 450 000 tonnes per year from its **Elkhorn** pits on Windermere Creek. Domtar Gypsum produces about 10 000 tonnes of gypsum per year from its operation in the Lussier River area east of Canal Flats. Current production is from the **Four J** deposit on Lussier River north of the confluence of Coyote Creek.

Other industrial minerals operations in the region include Imasco Minerals Inc.'s underground dolomite mine at **Crawford Bay**, limestone mine on **Lost Creek,** south of Salmo and granite quarry at Sirdar, north of Creston. **Kootenay Stone Centre** produces and markets quartzite flagstone from several small quarries, mainly in the Porcupine Creek area north of Salmo. Dolomite is quarried at **Rock Creek** by Mighty White Dolomite Ltd. and granite dimension stone south of **Beaverdell** by Quarry Pacific Ltd.

PLACER ACTIVITY

Weaver Creek Placer Ltd., a subsidiary of Fiorentino Bros. Contracting Ltd. of Cranbrook, resumed large-scale production of placer gold from the former Queenstake Resources Ltd. leases on **Moyie River,** upstream from the mouth of Weaver Creek. The operation had shut down in October 1992 due to exhaustion of known reserves, but test drilling since then has identified sufficient additional reserves to warrant re-opening in 1994.

A total of 62 Notices of Work for testing or mining on placer properties were submitted in 1994. The heaviest concentrations of activity were in the Wildhorse River watershed and along the Pend D'Oreille River east of Trail, with significant placer activity also occurring in the Perry Creek, Moyie River and Rock Creek areas.

LAND USE (contributed by David Grieve, P. Geo., Regional Mineral Land Planner)

KOOTENAY REGIONAL LAND USE PLANNING PROCESS

The government of B.C. released its regional land use plans for East Kootenay and West Kootenay-Boundary on March 13, 1995. This made the Kootenays the third region in the province, after Vancouver Island and the Cariboo-Chilcotin, to have a regional plan in place. Contents of the plans reflect to a large extent the work of the CORE (Commission on Resources and the Environment) planning process, which took place through 1993 and 1994, with multi-stakeholder negotiations, based on principles of shared decision-making. The mineral industry, both coal and general mining, was represented during those negotiations. The CORE process culminated in the release of the CORE land-use plan reports on October 31, 1994. Following release of the CORE reports, government began a period of further consultation. Again, the mining industry was an active participant in the consultation process.

Crown lands in the Kootenays are now designated in one of four categories: protected areas, special resource management zones, integrated resource management zones and enhanced resource development zones. These four designations correspond with designations in the Vancouver Island and Cariboo-Chilcotin regional land-use plans, although the terminologies differ. **Exploration and mining are acceptable activities in all zones other than protected areas.** Some portions of certain special management zones will be more sensitive to mining-related impacts than others. In these cases, conditions may be established in the development approval processes so that mining-related activities respect sensitive values. The enhanced resource development zones mainly apply to forest resources, with one major exception: a high proportion of the Crown-owned coal-bearing lands in the East Kootenay are in the enhanced resource development zone.

Sixteen new protected areas have been created. Where possible, mineral tenures were excluded from the new protected areas. When existing protected areas are added in, the total amount of protected area in the Kootenays as a whole amounts to 13.9% (with 11.3% in the West Kootenay-Boundary region, and 16.5% of the East Kootenay region).

In addition to the land use designations and economic strategy included in the plans, government announced a series of measures specifically designed to stimulate and provide a degree of certainty to the mineral industry. These include a $600 000 airborne geophysical survey to be focused on the Aldridge Formation. This will aid the ongoing search for other Sullivan-type ore bodies, which are needed by the region to replace the Sullivan Mine when it closes permanently in less than 10 years. Another measure is a commitment to streamline the exploration and mining per-

mitting process, and to reduce the turn-around time on work permit applications to 30 days in certain cases. Broader consultation on Forest Service road deactivation under Forest Renewal programs is another commitment; this consultation procedure will be piloted in the Arrow Forest District, where road deactivation has already impacted claim holders.

Objectives and guidelines for land-use designations and specific land-use zones will be developed starting in 1995 and will involve public consultation. The land use plans and their objectives will constitute higher-level plans as defined in the Forest Practices Code, and will guide all lower level (more local) planning. Consequently it is imperative for the mineral industry to continue its active participation in land-use planning in the Kootenays.

EXPLORATION AND DEVELOPMENT HIGHLIGHTS SOUTHWESTERN REGION - 1994

By R. H. Pinsent, P. Geo.
Regional Geologist, Vancouver

INTRODUCTION

The Southwestern Regional Geology Office, in Vancouver, monitors exploration and other geoscience activity on the Queen Charlotte Islands, Vancouver and the off-shore islands and in the Coast Mountains southeast of Bella Coola (Figure 27). It also handles land-use issues on the Lower Mainland.

HIGHLIGHTS

- Westmin Resources Limited returned to full production at Myra Falls after an extended industrial dispute.
- Westmin Resources Limited reported excellent results from exploration drilling in highly prospective H-W "Mine Series" stratigraphy underlying Thelwood Valley.
- Romulus Resources Limited and Misty Mountain Gold Limited formed a joint venture to evaluate the underground mine potential of the Cinola property, on the Queen Charlotte Islands.
- Athabasca Gold Resources Limited optioned the past-producing Carolin gold mine, east of Hope. It plans an undergound drilling programme.
- Government released a land use plan for Vancouver Island based on recommendations made by the Commission on Resources and Environment. The plan

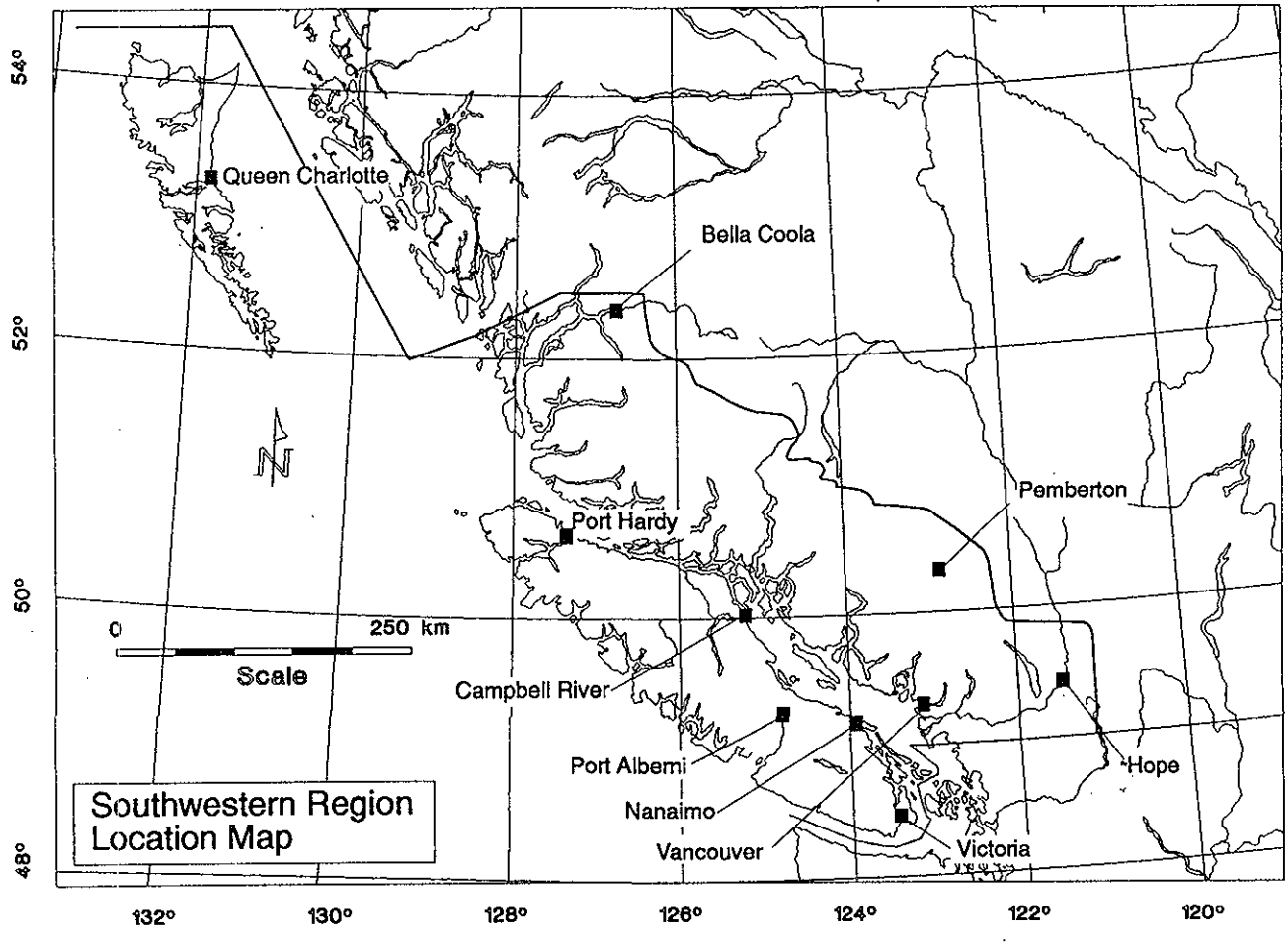


Figure 27.

created 23 new protected areas and a strategy for "intergrated resource managment" lands.

- The British Columbia Ministry of Energy, Mines and Petroleum Resources re-established Explore B.C. and Prospectors Assistance grants to stimulate mineral exploration.

EXPLORATION TRENDS

The level of mining and exploration activity in the region was similar to 1993. It was a difficult year. Two of the mines experienced production problems and few of the exploration companies had adequate funds. The exploration climate, however, seems to be improving. There were several developments in 1994 that bode well for the future. These include: resolution of the labour dispute at Myra Falls; substantial increases in commodity prices; properties changing ownership in advance of renewed exploration; successful middle and early stage and "grass-roots" exploration progams; provincial government initiatives to encourage exploration; and resolution of some land-use issues. Mining and exploration activity should increase in 1995.

The number of Notices of Work applications filed for mineral properties provides some indication of exploration intent or interest, although it is not a particularly accurate measure of exploration activity as most are small projects and many fail to go ahead. There were 91 Notice of Work applications filed in 1994, which compares to 85 in 1993 and 83 in 1992. Unfortunately, the increase in number of filings did not translate into a significant increase in exploration.

The number of major projects (arbitrarily defined as those likely to have incurred costs in excess of $100 000) provides a better gauge of field activity. There were 16 major projects in 1994, the same as in 1993 and down from 18 in 1992.

The total investment in exploration in 1994 is estimated to be $4.0 million; down from $5.0 million in 1993 and $8.5 million in 1992. The low figure reflects the lack of advanced exploration programs in the region. Very few projects incurred costs in excess of $250 000.

Two of the major programs (Table 13, Figure 28) were mine-site exploration projects. Two others were small scale bulk sample extraction projects and the remainder were general exploration programs. Between them, they covered a wide range of exploration opportunities. Two were focussed on coal, two were directed toward industrial mineral and/or dimension stone targets and the rest were metallic mineral projects exploring gold-bearing veins and shear zones, volcanogenic massive sulphide, porphyry copper and skarn targets.

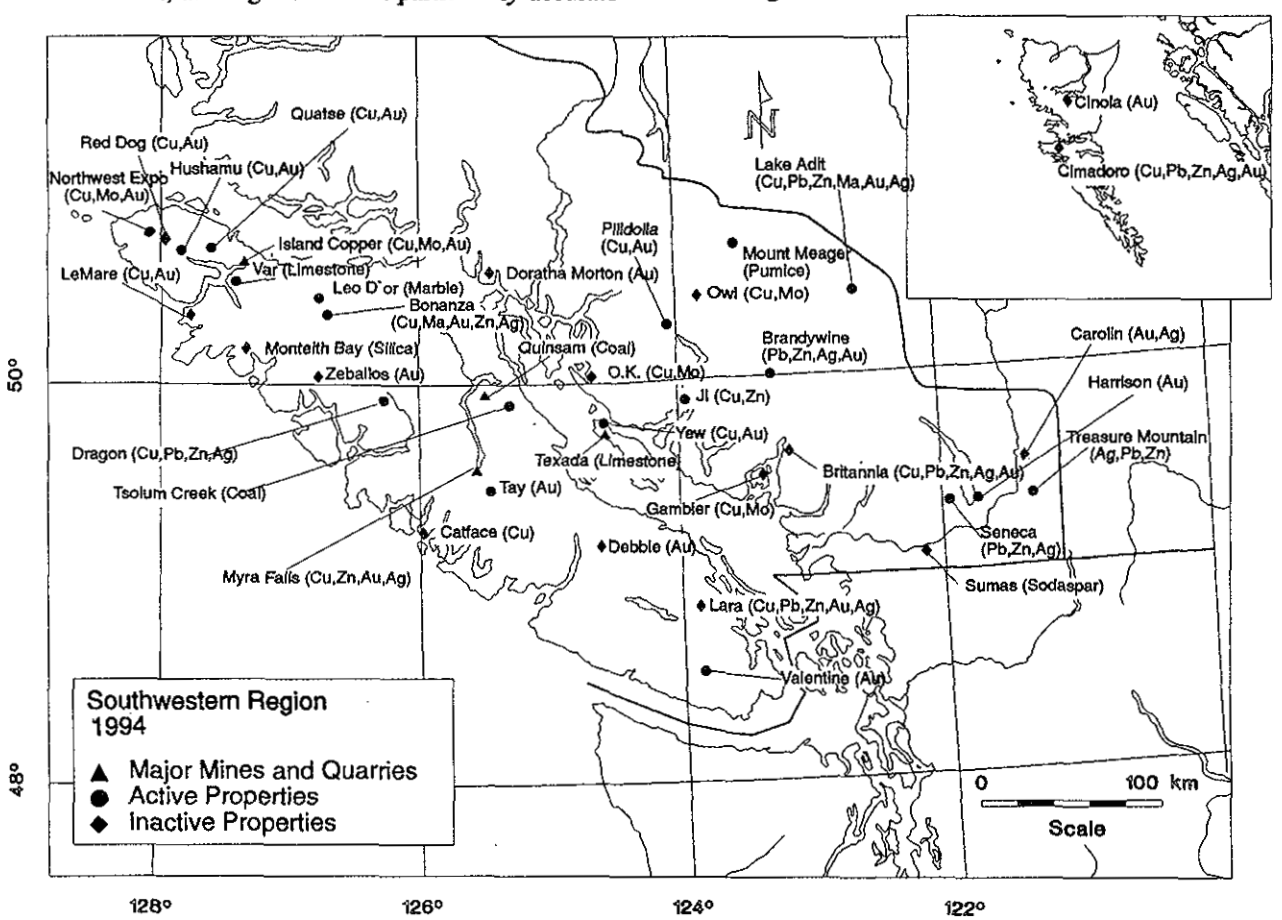


Figure 28. Major exploration projects, Southwestern Region - 1994.

TABLE 13
EXPLORATION PROJECTS - SOUTHWESTERN REGION - 1994

Property (Owner)	MINFILE Number	Mining Division	NTS	Commodity	Deposit Type	Work done
Bonanza/Steele (Braddick Resources Ltd.)	092L 164	Nanaimo	92L/7W	Cu, Ag, Fe, Au, Zn	Skarn	6 ddh, 446.2 m
Brandywine (La Rock Mining Corp.)	092JW001	Vancouver	93J/3E	Cu, Pb, Zn Ag, Au	Massive sulphide shear/vein	10 ddh, 1981 m
Hushamu (Jordex Resources Inc.)	092L 185	Nanaimo	92L/12W	Cu, Au	Porphyry	4 ddh, 972 m
Lake Adit (Guardian Resources Corp.)	092JSE009	Lillooet	92J/7E	Cu, Pb, Zn Fe, Au, Ag	Skarn	5 ddh, 701 m; geophys
Leo D'Or Marble (Leo D'Or Mining Inc.)	092L 339	Nanaimo	92L/7W	Marble		bulk sample
Myra Falls/Trumpeter (Westmin Resources Ltd.)	092F 330 092F 073	Alberni	92F/12E	Cu, Pb, Zn, Ag,Au	Massive sulphide	5 ddh, 2000 m; dhole geophys
Northwest Expo (BHP Minerals (Canada Ltd.)	102I 013	Nanaimo	102I/9E	Cu, Mo, Au	Porphyry	7 ddh, 822 m
Quatse (Kamaka Resources Ltd.)	092L 061	Nanaimo	92L/12E	Cu, Ag	Porphyry	2 ddh, 439 m
Quinsam Coal (Brinco Coal Mining Corp.)	092F 319	Nanaimo	92F/13E 92F/14W	Coal		15 ddh, 8pdh, 2300 m; dhole geophys
Seneca (Metall Mining Corp.)	092HSW013 092HSW139	New West.	92H/5W	Cu, Zn, Pb Ag, Au	Massive sulphide	1 ddh, 694 m; geophys
Tay Gold (Dalmation Resources Ltd.)		Alberni	92F/6W	Au, Ag	Shear/vein	18 ddh, 2320 m
Treasure Mountain (Huldra Silver Inc.)	092HSW016	New West.	92H/6E	Ag, Pb, Zn	Shear/vein	6 pdh, 271 m
Tsolum River Coal (Canadian Occidental Petroleum Ltd.)	092F 318	Nanaimo	92F/14W 92K/3W	Coal		6 ddh, 1945 m; dhole geophys
Valentine Mountain (Beau Pre Explorations Ltd.)	092B 108	Victoria	92B/12W	Au	Shear/vein	bulk sample metallurgical test
Var Limestone (Ecowaste Industries Ltd.)		Nanaimo	92L/12E	Limestone		8 ddh, 1073 m
Yew (International Metals Research Corp.)	092F 516	Nanaimo	92F/10E	Cu, Au	Skarn	bulk sample

In the spring of 1994, the Ministry of Energy, Mines and Petroleum Resources announced two initiatives to accelerate exploration in the province. The Explore B.C. 1994-1997 program, has two parts; the Accelerated Mine Exploration Program (AMEP), designed to assist established mines delineate reserves, and the Mineral Exploration Incentive Program (MEIP) to help companies fund exploration projects. Ten companies were awarded grants to carry out programs in the region. However, they were not all able to implement them within the calendar year.

The Prospectors Assistance Program is designed to assist prospectors and encourage grass-roots exploration in the province. Seven prospectors received grants for work in the region. They used the funds to make new discoveries and provide better understanding and documentation of known mineral prospects. The program encouraged some prospectors to stake new claims and enabled others to carry out the work required to option their properties to exploration companies.

OPERATING MINES AND QUARRIES

The three mines and the major quarries in the region all benefited from improving economic conditions. The metal mines, despite their other problems, were able to take advantage of significantly higher copper prices while the coal and limestone operations were able to increase their production.

Myra Falls Operation: Westmin Resources Limited Myra Falls operation was affected by a labour dispute for much of the year and operated well below its nominal 4000 tonne per day capacity. Management operated the mine on a limited "batch" basis until unionized staff returned to work at the end of August. Preliminary figures for the year indicate that the mine processed 251 560 tonnes of ore and produced 4096.8 tonnes of copper, 136.7 kilograms of gold, 4010.2 kilograms of silver and 5146.9 tonnes of zinc.

At years end, the Myra Falls operation had reported ore reserves of 9 704 000 tonnes grading 1.6 g/t Au, 35.6 g/t Ag, 1.7% Cu, 0.4% Pb and 6.3% Zn in five discrete ore zones (H-W, Battle, Gap, Gopher and Extension).

Westmin scaled down its exploration and development at Myra Falls during the dispute but was able to carry out a limited definition-drilling program over part of the Battle zone. It drilled off the Gopher lens, at the southeast end of the zone. It has now restarted definition drilling and it expects to drill off the remainder of the zone in 1995.

The company has a considerable amount of development work to do before it can start full-scale production from the Battle zone. However, it could start small-scale production in the spring of 1995. It plans to ramp the 18-level exploration drift down into the zinc-rich Gopher lens and blend production with copper-rich ore from the H-W lens.

As part of an on-going project to locate additional reserves, Westmin conducted a surface drilling program in the Thelwood Valley area, southeast of the H-W shaft. The company drilled five holes for an aggregate length of 2000 metres and ran down-hole and surface electromagnetic surveys. The holes tested prospective H-W "Mine Series" stratigraphic and down-hole geophysical targets. Two tested the known Trumpeter zone, on the west side of Thelwood Creek, and three tested prospective stratigraphy east of the creek. The Trumpeter holes expanded the known copper-rich zone and encountered two zinc-rich zones higher in the section. Core from one hole ran 1.7 g/t Au, 31.9 g/t Ag, 1.2% Cu and 3.8% Zn over 33.5 metres. The mineralization above the Trumpeter zone is fragmental in nature and it strongly resembles Block 43 ore, which occurs at the same stratigraphic interval in the H-W mine. The data suggest that there may be a substantial deposit in the "gap" between the Myra - Price fault, which terminates Block 43, and the Trumpeter area of Thelwood Creek.

Island Copper Operation: BHP Minerals (Canada) Limited operates an open-pit porphyry copper mine, near Port Hardy, at the north end of Vancouver Island. In 1994, the operation was able to take advantage of improved copper prices but, with proven ore reserves running low (23.4 Mt grading 0.33% Cu and 0.02% Mo), the company is finding it increasingly difficult to operate the mill at full capacity (52 000 tonne per day). Preliminary figures for the year indicate that the company processed 18 477 072 tonnes of ore and produced 52 519.7 tonnes of copper, 1138.2 kilograms of gold, 14 789.1 kilograms of silver and 1330.9 tonnes of molybenum.

In 1994, the operation was affected by geotechnical problems. The south wall of the pit started to destabilize.

The company drilled holes to alleviate water pressure and buttressed the toe of the slope with waste. It managed to stabilize the wall but may have lost approximately 14.5 million tonnes of ore, equivalent to nine months of production. It is reviewing its development plan to see if any of the affected reserve can be recovered.

BHP Minerals ran a major exploration program at the mine, in 1993. It located a substantial but low-grade, near-surface, resource in the Bay Lake area, peripheral to the pit. The company feels that it is unlikely to be economic and it expects the mine to close in the fall of 1995. It is already implementing its site reclamation plan. It has landscaped and seeded over 150 hectares of waste dump.

The Island Copper plant could, conceivably, be used to custom mill ore from other deposits but economic feasibility has yet to be established.

Quinsam Coal Operation: Brinco Coal Mining Corporation operates a coal mine at Quinsam Lake, near Campbell River. It has proven and probable reserves of 38 million tonnes of high-volatile bituminous coal. In 1992, the company started to restructure the operation as part of a plan to increase production from 0.25 million to 1.0 million tonnes of clean coal per year. In 1994, it closed its last open pit and became fully dependant on its underground operation.

The company currently controls the sulphur content of its product by blending coal from two parts of the deposit. It takes approximately 65% from the 2N reserve block and the remainder from the 2S block. Early in 1994, the company closed its first portal in the 2N area and moved two continuous miners into a second, where they are used for mine development and production. At the same time, it opened a portal into the 2S block, where it uses a single continuous miner to perform both functions. Both blocks are cut by faults with minor off-sets that complicate mine development. These faults, and other problems, have slowed the expansion process. However, the mine is now able to produce approximatly 1800 tonnes of clean coal per day, equivalent to approximately 600 000 tonnes per year. The company currently processes the coal through a single wash plant. It plans to build a second to handle any further increase in production.

Brinco carried out a major exploration program at the mine. It diamond drilled and geophysically logged 23 holes, for an aggregate length of approximately 2300 metres. Twenty holes tested the thickness and quality of known coal seams in a previously under explored area between the 2N and 3N reserve blocks. The results were encouraging. They show that the seams are of good quality and mineable width.

Three holes were drilled deeper in the sedimentary basin, down dip from the known reserve. They too produced encouraging results. The main productive seams appear to continue to depth and maintain reasonable thickness and quality. The drilling program will enable Brinco to up-grade its reserve and establish a development plan for the area between the 2N and 3N reserve blocks.

Texada Island Limestone Quarries: Holnam West Materials Limited and Ash Grove Cement Company increased limestone production at their respective quarries at the north end of Texada Island. They shipped approximately 5.0 million tonnes of chemical, cement and agricultural grade limestone.

MINE DEVELOPMENT SUBMISSIONS

There are currently four properties in Mine Review and Permitting process. Two are likely to start production in 1995.

Mount Meager Pumice: Great Pacific Pumice Inc. has submitted a prospectus for seasonal production of pumice from a past-producing quarry site on the north slope of Mount Meager. It plans to excavate, crush, screen and truck between 35 000 and 50 000 tonnes of pumice per year. The company received its mine development certificate early in 1995.

Monteith Bay "Geyserite": Monteith Bay Resources Limited has submitted a prospectus for seasonal production of "geyserite" silica from a deposit on the shore of Easy Inlet, at the north end of Vancouver Island. It plans to excavate, crush, screen and ship between 70 000 and 100 000 tonnes of silica per year. The company received its mine development certificate early in 1995.

Sumas Sodaspar: Quality Mineral and Supply Inc. has submitted a prospectus for production of ceramic-grade sodaspar from a site near the top of Sumas Mountain. The company has yet to receive terms of reference to proceed with its submission.

Red Dog: Crew Natural Resources Limited submitted a prospectus for production from the Red Dog porphyry copper deposit, north of Holberg Inlet, in 1992. It planned to produce 20 000 tonnes of ore per day for shipment to the Island Copper mine site for custom milling. The company has dropped its option and it has withdrawn its prospectus.

EXPLORATION ACTIVITY

VANCOUVER AND TEXADA ISLANDS

There were numerous exploration projects on Vancouver Island. Most were at the north end, however, there was activity further south, particularly in the Port Alberni region. Several individuals and companies explored for: volcanogenic massive sulphide deposits in Sicker Group, or equivalent, strata; porphyry copper-gold deposits in high-level intrusions in Bonanza volcanic strata; skarn deposits in Quatsino limestone; epithermal and mesothermal shear-hosted gold vein deposits in Sicker, Karmutsen, Bonanza and Leach River Group rocks; coal in Nanaimo Group sediments; and a variety of industrial mineral and dimension-stone targets.

There were a few programs on Texada Island. They were directed toward shear-hosted gold vein deposits in Karmutsen basalt and skarn mineralization in Quatsino limestone.

Tay: Dalmation Resources Limited completed a diamond drilling program on the Tay property, west of Sproat Lake. It drilled 18 holes for an aggregate length of 2320 metres. The holes tested geological, gold-in-soil geochemical, and induced polarization geophysical targets in a complex quartz-carbonate vein system in Karmutsen volcanic rocks. The company is exploring for gold-enriched ore shoots at intersections of crosscutting structures. The results were erratic but sufficiently encouraging for the company to expand its claim holding and contemplate an airborne geophysical survey.

Valentine Mountain: Beau Pre Exploration Limited continued its on-going program to determine the average grade of a series of narrow, high-grade, gold-bearing quartz veins and vein stockworks in metasedimentary rocks on Valentine Mountain. The company cleaned out and sluiced muck from the floor of a trench along the B vein and collected several tonnes of heavy mineral concentrate. It processed small, approximately 22-kilogram, bulk samples to assess the average gold content.

The company also extracted and stock piled 100 tonnes of ore from a trench along the C vein stockwork. In 1995, it plans to extract additional bulk samples. It will run the

material through a small, 5 to 10 tonne per day, crusher and ball mill and sluice the pulp to generate additional concentrate. The program is designed to establish the consistency of the gold grade along the trench.

Dragon: Doromin Resources Limited. Noranda Exploration Limited dropped its option on the Dragon volcanogenic massive sulphide property, near Gold River, on Vancouver Island. Westmin Resources Limited acquired the property. It plans a two stage field program for 1995.

Tsolum Coal: Canadian Occidental Petroleum Limited ran a seismic survey near the Oyster River, south of Parksville, in 1993. It identified several possible coal seams in shallow-dipping Nanaimo Group sedimentary strata. In 1994, the company drilled six holes, for an aggregate length of 1945 metres, to test the stratigraphy and establish the number and quality of the seams. Four were intersected, one in the Dunsmuir Member and three in the Cumberland Member of the Comox Formation. Two may be of economic interest.

Bonanza/Steele: Braddick Resources Limited explored two parallel zones of copper-bearing garnetiferous skarn at the south end of Bonanza Lake. One of the zones is in a pendant within a granodiorite pluton. The other is immediately adjacent to it. The company traced the zones for several kilometres, using a combination of soil geochemistry, geology and ground geophysics, and drilled six diamond-drill holes for an aggregate length of 446.2 metres. The holes were designed to confirm previous indications of gold enrichment in one of the zones, and to evaluate other geological and geophysical targets. They encountered appreciable thicknesses of skarn with disappointingly low gold values.

Quatse: Kamaka Resources Limited explored a porphyry copper target near Quatse Lake, northwest of the Island Copper mine. The company drilled two core holes, for an aggregate length of 439 metres. They were sited to test a linear, copper-in-soil geochemical anomaly, and coincident magnetic and induced polarization anomalies. The holes intersected strongly altered but weakly mineralized volcanic rocks. The rocks display chlorite alteration and magnetite enrichment comparable to that found at Island Copper.

Hushamu: Jordex Resources Inc. completed a diamond drilling program on the Hushamu part of the Expo property, northwest of the Island Copper mine. It drilled four holes for an aggregate length of 972 metres. The holes were designed to add definition to the known deposit. However, they did not significantly alter the resource estimate. The deposit is reported to have a proven and probable reserve of 173 237 000 tonnes grading 0.27% Cu, 0.009% Mo and 0.34 g/t Au. Jordex completed its earn-in requirement for the Expo property. The claims are now owned jointly by Jordex Resources Inc. (45%) and BHP Minerals (Canada) Limited (55%).

Northwest Expo: BHP Minerals (Canada) Limited and Jordex Resources Inc. carried out a diamond drilling program in the extreme northwest corner of the Expo property, north of Holberg Inlet. They drilled seven holes, for an aggregate length of 822 metres, to test for "transitional" and porphyry style mineralization. The holes tested a large, coincident, geophysical (magnetic and induced potential) and geochemical (copper-in-soil) anomaly originally identified in the early days of exploration on the property. The anomaly is at the foot of a cliff of strongly altered Bonanza volcanic rock, capped by silica. The holes intersected significant alteration and weak, but encouraging, signs of mineralization.

Leo D'Or Marble: Leo D'Or Mining Inc. has permits to extract 3000 tonnes of white crystalline limestone for dimension-stone purposes. In 1993, it started to develop a quarry on the east side of Bonanza Lake. The company shipped several blocks over the fall and winter and shut the project down in the spring of 1994.

Var Limestone: Ecowaste Industries Limited is exploring for limestone on Vancouver Island. It drilled eight core holes on the Var property on the south side of Rupert Inlet for an aggregate length of 1073 metres. The holes tested the thickness and chemical purity of a relatively flat lying section of Quatsino limestone.

Yew: International Metals Research Corporation continues to develop the Yew property, on Texada Island. In 1993, it extracted approximately 4000 tonnes of pyritic skarn from a flat lying lens interbedded with Karmutsen Formation basalt. It trucked the ore to the nearby Bolivar mill (225 tonne per day). The company is currently processing it through a fine-grind circuit and recovering gold from a gravity circuit. In 1989, the Yew deposit was reported to have indicated reserves of 31 576 tonnes grading 17.4 g/t Au and 2.0% Cu.

There were numerous small-scale exploration projects and prospecting ventures on Vancouver and Texada islands. Examples of successful projects include: the detailed mapping of an interesting volcanogenic massive sulphide showing on the Jasper property, near Nitinat; the discovery of several new areas of magnetite and sulphide skarn mineralization on Storey Creek, near Nimpkish Lake; and further definition of the high-grade gold vein system on the MacTush property, west of Alberni Inlet.

SOUTHERN COASTAL REGION

There were several exploration programs in the southern Coast Mountains. Most were directed toward volcanogenic massive sulphide deposits in Gambier Group pendants or mesothermal, shear-hosted gold vein systems. There was lesser interest in exploration for porphyry copper or skarn deposits. There were several corporate developments that should lead to increased exploration in 1995.

Carolin Mine: New Global Resources Limited increased its land holding in the MacMaster/Carolin mine area, east of Hope. It carried out a limited rock sampling program and optioned the past-producing property to Athabasca Gold Resources Limited.

Athabasca plans to re-open the mine and carry out a major underground drilling program. It hopes to increase the current indicated "reserve" of 898 000 tonnes grading 4.3 g/t Au. If successful, it intends to recommission the 1350 tonne per day grinding circuit and modify the existing plant to extract gold using carbon-in-pulp technology.

Harrison Gold: Pacific Comox Resources Limited closed the main Jenner stock portal on the Harrison Gold property, near the south end of Harrison Lake. It also shipped 20.7 tonnes of dry auriferous sulphide concentrate (predominantly pyrrhotite with lesser pyrite and minor chalcopyrite) to the Cominco refinery, at Trail, B.C.. The concentrate was from the underground bulk sampling program that Kerr Addison Mines Limited and Bema Gold Corporation carried out in 1987.

Brandywine: La Rock Mining Corporation continued to explore two targets on the the Brandywine property, near Whistler. The company diamond drilled five holes, for an aggregate length of approximately 1500 metres, to test a complex ductile shear zone in Gambier Group volcanic strata near Dave's Pond. The results were erratic. However, several holes encountered 1.0 to 2.0-metre zones of quartz, sericite and carbonate alteration with trace amounts of galena, sphalerite, chalcopyrite and a significant amount of free gold.

The company also diamond drilled five holes, for a total length of approximately 500 metres, to test for zinc-rich volcanogenic massive sulphide in cherty tuff at the Zinc showing. The holes confirmed the presence of prospective stratigraphy but encountered only weak mineralization.

Lake Adit: Guardian Resources Corporation carried out a field program on the Lake Adit magnetite skarn property, on the west side of Lillooet Lake. It ran induced polarization and magnetometer geophysical surveys over a polymetallic massive sulphide showing. The company outlined two strong geophysical anomalies and diamond drilled five holes, for an aggregate length of 701 metres. The holes intersected two shear zones, one of which contains rhodonite. A substantial area of pyrite, chalcopyrite and sphalerite mineralization was also identified.

Doratha Morton: Ripple Rock Resources Limited increased its land holding around the Doratha Morton property, on the mainland to the north of East Thurlow Island. In the fall, it optioned the ground to Home Ventures Incorporated. The latter company plans to explore a variety of geological targets. These include auriferous shear zones and a large, possibly porphyry-related, mineralized intrusive breccia.

Seneca: Metall Mining Corporation explored the Seneca volcanogenic massive sulphide deposit, under the Chehalis River valley, west of Harrison Lake. The deposit currently has a geological reserve of 1.5 million tonnes grading 3.57% Zn, 0.63% Cu, 40.0 g/t Ag and 0.8 g/t Au. The company drilled a single, vertical, diamond-drill hole to a depth of 694 metres. The hole was collared uphill and approximately 1.0 kilometre to the east of the main showing. It encountered weakly mineralized tuffaceous sandstone underlain by approximately 30 metres of strongly altered volcanic and sedimentary rock over the critical stratigraphic interval. The sandstone unit runs 2.15% Zn over 3.3 metres.

Metall Mining also ran a limited electromagnetic geophysical survey southwest of the Chehalis River. The results were inconclusive.

Pilldolla: Aquaterre Mineral Development Limited carried out a limited mapping and prospecting program on the Pilldolla property, near the head of Jervis Inlet. It traced a train of auriferous massive sulphide (pyrite, pyrrhotite and chalcopyrite) boulders to a probable source; a cliff face that defines the trace of a major shear zone.

JI: Aquaterre Mineral Development Limited also explored for volcanogenic massive sulphide deposits near Friel Lake, on the west side of Jervis Inlet. The company ran geological, soil geochemical and geophysical (induced polarization) surveys across a bedded contact between Gambier Group volcanic and sedimentary strata. The program identified four close-spaced, subparallel, targets in prospective stratigraphy.

Treasure Mountain: Huldra Silver Inc. completed a limited percussion drilling program on Treasure Mountain, east of Hope. It drilled six holes, for an aggregate length of 271 metres, to test a soil geochemical anomaly located 800 metres from the undergound workings associated with the C vein. One hole returned an assay of 918.9 g/t Ag over 36.0 metres. In 1990, the company reported proven and probable reserves of 145 000 tonnes grading 877.7 g/t Ag and 9.85% combined lead and zinc.

There were other small-scale exploration and prospecting programs on the mainland. For example, successful prospecting programs lead to the discovery of a southern extension to the O.K. porphyry copper deposit, near Powell River and to a better understanding of a gold-bearing silicified shear zone on the Bird property on Rutherford Creek.

QUEEN CHARLOTTE ISLANDS

There were no major exploration programs in the Queen Charlotte Islands in 1994. However, there was one important development.

Cinola: Romulus Resources Limited and Misty Mountain Gold Limited formed a joint venture to explore and develop the Cinola property, on Graham Island. The property covers a large, epithermal gold deposit in conglomerate adjacent to the Cinola fault. In 1988, City Resources Canada defined an open-pit "reserve" of 31.3 million tonnes grading 2.2 g/t Au, at a 1.1 grams per tonne cut-off and a strip ratio of 1.7:1. The company conducted a feasibility study, however, metallurgical problems and environmental concerns regarding trace element content and potential for acid rock drainage, prevented it from proceeding to production.

Romulus and Misty Mountain will evaluate the feasibility of developing the property using more selective, under-ground mining methods. In 1995, they plan to reopen the adit drill large diameter holes to establish the size and grade of a higher grade quartz-vein system within the deposit. The company will use the drill core for metallurgial test work.

LAND-USE ISSUES

VANCOUVER ISLAND

In February, 1994, the Commission on Resources and Environment (CORE) produced its land use plan for Vancouver Island. It recommended that the provincial government increase the amount of land under protection from 10.3% to 13% by the creation of 23 new "protected areas". It also proposed a range of possible land-use designations for the remaining land base.

In June, government announced the creation of 23 new protected areas, subject to boundary revisions which were announced in April, 1995. The revisions reduced impacts on mineral tenures and areas of high mineral potential. The land use decision returned eight Protected Areas Strategy (PAS) study areas, covering 65 000 hectares, to "integrated resource management" and allocated 12 000 hectares for small protected areas covering special features. These areas, which have still to be selected, will bring the over-all level of protection on Vancouver Island to 13% of the land base.

Government's land-use plan recommends the creation of one integrated resource management zone, called a "Forest Land Reserve". This would be managed under existing legislation and the new Forest Practice Code. The Reserve would be open for forestry and mining. It would be composed of three zones that allow for different intensities of resource use (high intensity, general forestry and low intensity). Low intensity areas will be subject to special management standards to respect specific environmental, recreational and/or cultural heritage values.

LOWER MAINLAND

Lower Mainland is not subject to regional land-use planning, such as the CORE process. Land-use issues are managed by a government Inter-agency Management Committee (IAMC) supported by a Regional Protected Area Team (RPAT). Both are involved in implementing the Protected Areas Strategy.

In 1993, RPAT reviewed the existing protected areas and identified "gaps" in representation of conservation, recreation and cultural heritage values. It also reviewed the merits of "study areas" identified the previous year and recognized the need to study a broader selection of areas.

In 1994, RPAT solicited additional "areas of interest" from the public.

In the fall, IAMC established an advisory committee of representatives of stakeholder organisations, including the mining industry, to assist government in selecting the best areas to fill "gaps" in the current protected areas system. In December, IAMC presented the advisory committee with technical data and a range of possible protected area options for discussion.

In addition to the regional selection process, there are four on-going "special-case" land-use studies in the Lower Mainland region. They are all nearing completion. Three study teams; Stawamus Chief (at Squamish), Pinecone Lake - Burke Mountain (north of Coquitlam) and Tetrahedron (near Sechelt) completed public review processes and submitted final reports with recommendations to IAMC. Their recommendations have been reviewed by Cabinet and new protected areas have been created at all 3 locations. The fourth, Callaghan Lake (near Whistler) completed its public review process. It has yet to complete its final report.

GOVERNMENT ACTIVITY AND RESEARCH

The Ministry of Energy, Mines and Petroleum Resources is actively involved in implementing PAS and other land-use processes in the Southwestern Region.

In 1992, the Ministry commenced a province-wide assessment of regional-scale mineral potential. In 1994, it completed work on Vancouver Island, and produced preliminary data for the Mid-Coast. Both areas have been subdivided, based on geology, into tracts designated as having "high", "medium" or "low" potential.

Also in 1992, the Ministry initiated a multi-faceted, multi-year, study of the geology and mineral potential of the north end of Vancouver Island. In 1994, the project included: a 1:50 000-scale mapping program south and west of Holberg Inlet; surficial geology and drift exploration programs over much of the Holberg Inlet area; age determination studies; and investigations of a natural acid rock drainage and an anomalous mercury-bearing stream. The data adds considerably to the geological information available for the north end of Vancouver Island.

The Geological Survey of Canada also conducted several research studies on Vancouver Island. Some were done in conjunction with the Ministry of Energy, Mines and Petroleum Resources, the Mineral Deposit Research Unit, at The University of British Columbia, and industrial partners.

The Mineral Deposit Research Unit continued its studies of volcanogenic massive sulphide deposits in the region. In 1994, it focussed on the volcanic setting of the H-W ore body at Myra Falls.

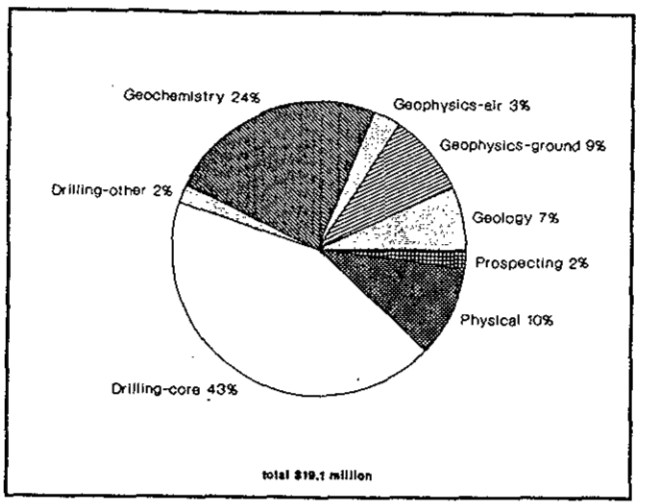
ACKNOWLEDGMENTS

The author acknowledges the contribution of numerous public and private sector geologists and other professionals in the creation of this report.

Page 73: Paragraph 3:
Incorrect (Figure 31)
Correct (Figure 32)

Page 74: Figure 31, caption:
Incorrect '1990-1992'
Correct '1992-1994'

Page 75: Figure 32, caption and diagram:
Incorrect '1992'
Correct '1994'
See new figure below:



Page 75: Paragraph 1: Regional Geologist's office has been moved from Nelson to Cranbrook.

ASSESSMENT REPORTS A SOURCE OF VALUABLE CURRENT AND HISTORIC MINERAL EXPLORATION DATA

By T.E. Kalnins, P. Eng. and A.F. Wilcox, P. Geo.

SUMMARY OF ASSESSMENT WORK, 1994

Results of mineral exploration programs are submitted by the industry to the Ministry in compliance with the Mineral Tenure Act Regulations and provide a valuable record of exploration data in British Columbia.

The number of assessment reports submitted and approved in 1994 totalled 490 with declared costs of $19 057 218, a 12% increase in expenditures over year 1993 (Table 14, Figures 29 and 30).

Drilling accounted for 45% of the expenditures, geochemical sampling 24%, geological mapping 7%, geophysical surveys 12%, physical work 10%, and prospecting 2% (Figure 31).

Assessment work, which is required for the maintenance of mineral claim tenure, comprises only a portion of the overall mineral exploration in the province.

Average exploration project costs by work type are shown in Table 15. These values are based on clearly apportioned cost statements including labour, consulting, food, accommodation, transport, camp equipment rentals and supplies, laboratory analyses, report preparation, and direct administration and management of the project.

USING THE DATABASE

Assessment reports are the primary and most current source of detailed technical data available in the public domain. Reports on exploration may be viewed or paper and microfiche copies purchased after expiry of a confidentiality period (usually one year).

The Geological Survey Branch maintains a library of over 23 000 assessment reports dating from 1947. A computer index called ARIS (Assessment Report Indexing System) provides help to users wishing to locate specific information for planning new exploration programs, resource management - land use studies, or geoscience research.

This is a basic bibliographic index sorted by NTS map sheets. For each report the index provides geographic coordinates, claim names, operator, author, type of work reported and report year. Newly computerized, page-size index maps show the approximate centre of exploration reported.

The Assessment Report Index is available on COMFICHE, PAPER printouts and DISKETTES. On diskettes the data fields are enhanced with additional information on geology, mineralization, mining camp, and work done. Data on the diskettes are organized as a series of flat ASCII files to facilitate access by commercial software programs.

The paper index has been updated into 5 volumes and a supplement. The first volume consists of index maps, and four other (1993) volumes plus a 1994 supplement covering southeastern, southwestern, central, and northern parts of the province.

These products may be purchased directly from:

B.C. and Yukon Chamber of Mines
Publications Centre
844 West Hastings Street
Vancouver, British Columbia
V6C 1C8

Telephone: (604) 688-7571 or 681-5328
Fax: (604) 681-2363

TABLE 14
SUMMARY OF ASSESSMENT WORK, 1994

NTS	No. of Assessment Reports	Value $	Geological (ha)	Geophysical Airborne (km)	Geophysical Ground (km)	Geochem. No. of Samples	Drilling Core (m)	Drilling Non-core (m)	Prospecting (ha)	Trenching (m)	Access Roads (km)	Line/grid (km)	Tunnelling (m)
82/83	143	3 149 621	11 270	1 805	1 122	10 963	14 664	3 319	5 399	465	33	392	305
92/102	156	4 928 191	30 440	381	852	22 619	21 246	2 009	7 032	1 300	10	332	1 556
93	92	4 005 996	18 501	3 414	662	19 498	29 979	419	6 200	518	20	228	300
94	34	2 247 717	18 830	419	252	11 168	7 194	--	--	100	--	343	--
103	10	1 027 639	3 670	250	64	4 860	3 427	--	7 175	820	--	97	--
104/114	55	3 698 054	29 170	469	126	13 627	11 762	--	1 375	300	20	115	60
TOTALS													
1994	490	19 057 218	111 881	6 738	3 078	82 735	88 272	5 747	27 181	3503	83	1 507	2 221
1993	478	17 082 345	137 365	4 521	1 954	72 626	91 270	6 681	23 101	4 903	41	1 359	
1992	616	27 625 329	257 342	5 915	4 273	128 871	126 156	3 748	46 410	12 480	56	2 597	480

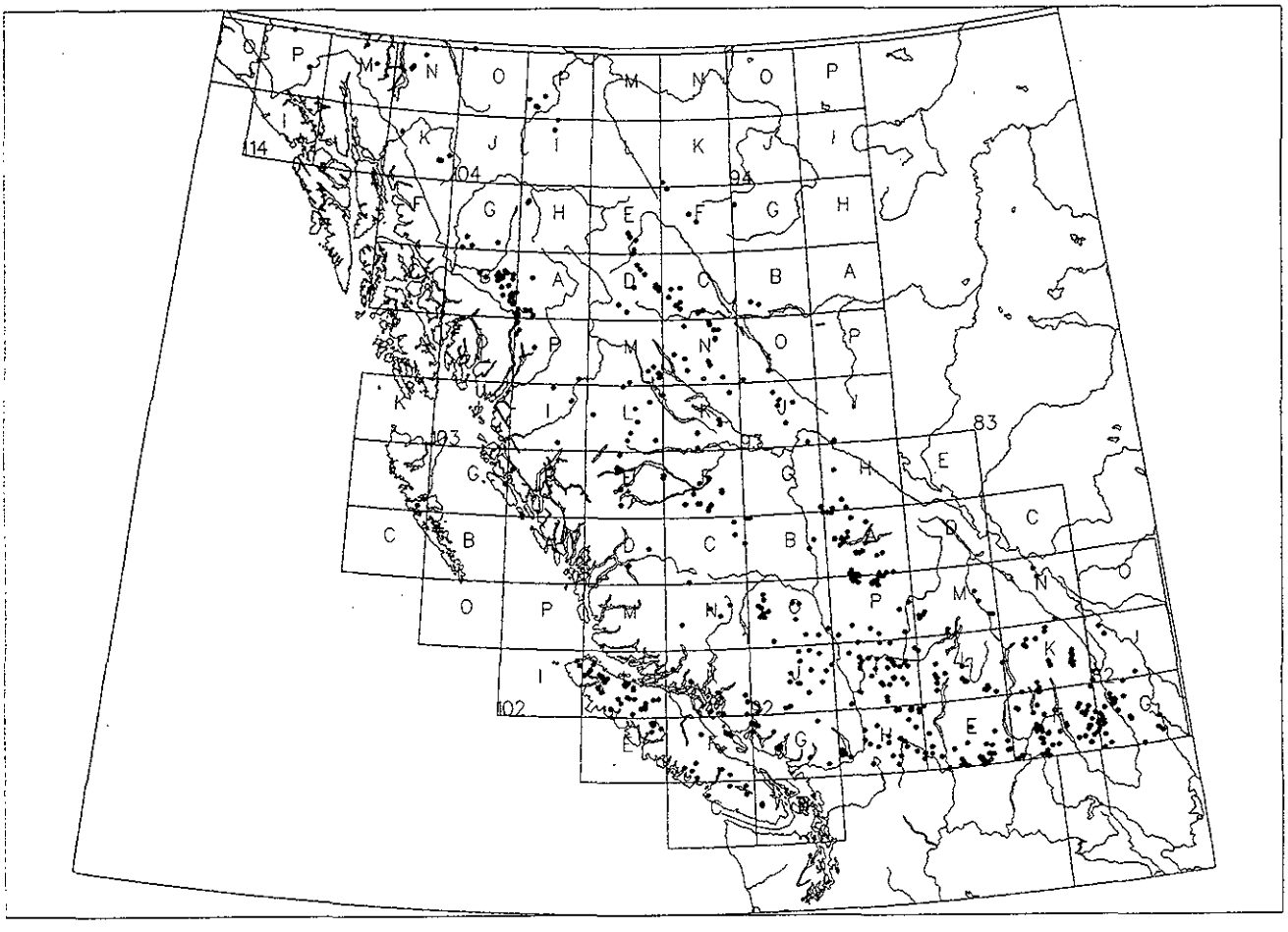


Figure 29. Assessment report distribution in B.C. - 1994.

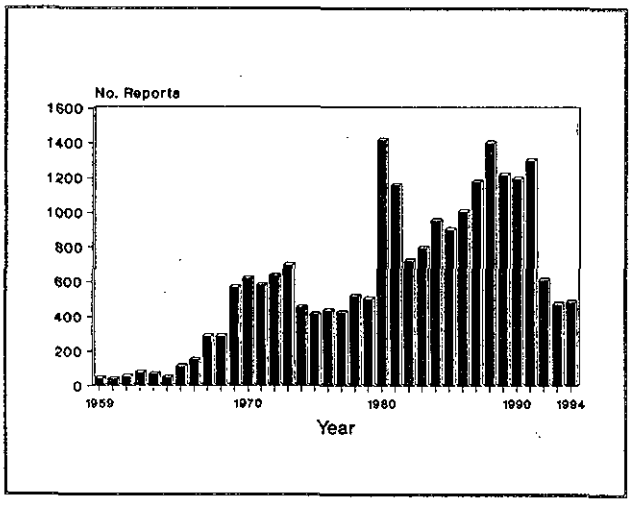


Figure 30. Assessment reports received.

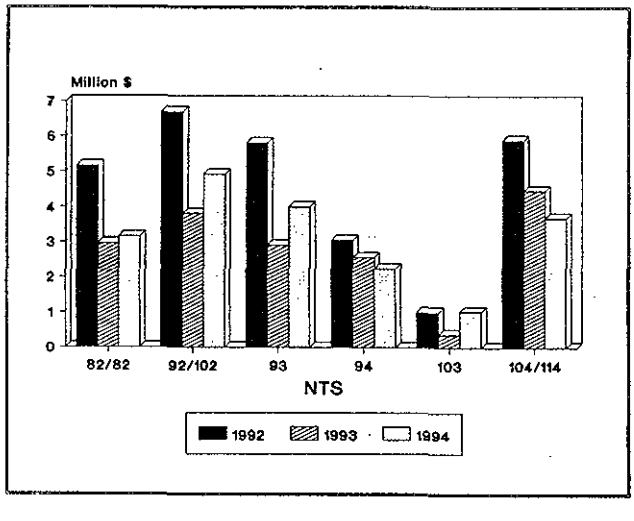


Figure 31. Assessment reports, value of exploration by NTS; 1990-1992.

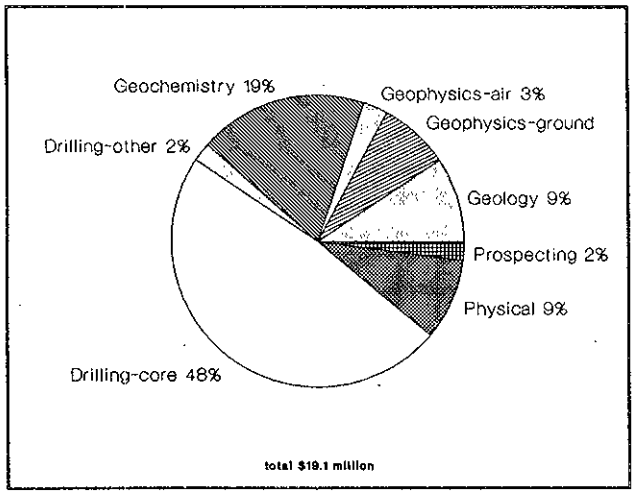


Figure 32. Value of exploration by work type; Assessment reports, 1992.

A complete library of original assessment reports is located at the Geological Survey Branch's headquarters in Victoria. Partial libraries are located at the Regional Geologists' offices in Smithers, Prince George, Kamloops and Nelson. Complete libraries of microfiche assessment reports are available in all Regional Geologists' offices. Partial libraries are maintained in fourteen Gold Commissioners' offices throughout British Columbia. For further information contact:

TABLE 15
AVERAGE EXPLORATION PROJECT COSTS, 1994
($ per unit of work)

TYPE OF WORK	1994	1993	1992
Geological mapping	12/ha	20/ha	18/ha
Mag./E.M. airborne	80/km	135/km	98/km
Magnetic, ground	269/km	272/km	245/km
Electromagnetic, ground	484/km	607/km	474/km
Induced polarization	1 594/km	1 702/km	1 098/km
Self potential	430/km	798/km	784/km
Soils	34/sample	31/sample	36/sample
Stream sediments	113/sample	50/sample	82/sample
Rock chips	49/sample	61/sample	72/sample
Sampling-assaying	38/sample	63/sample	34/sample
Core drilling	93/m	103/m	106/m
Drilling, non-core	53/m	62/m	—
Prospecting	12/ha	13/ha	13/ha
Line cutting, grid	429/km	565/ha	550/km
Trenching	64/m	87/m	48/m

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