

EXPLORATION AND MINING in British Columbia 2009





**Ministry of Energy, Mines
and Petroleum Resources
Mining and Minerals Division**

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Front Cover:

Rotary fill-in drilling at Teck Coal Limited's Mount Michael property, 3 km north of the Line Creek mine and roughly 9 km southeast of Elkford in the Elk Valley coalfield. The Mount Michael property is included in the Line Creek Operations' Phase II Expansion Project. The coal-bearing Mist Mountain Formation of the Jurassic-Cretaceous Kootenay Group occurs on the east limb of the Alexander Creek syncline and in the hanging-wall of the Ewin Pass thrust fault. The 500 m thick section contains about 10 major coal seams, representing 10% of the section. (Photo credit: Dave Grieve)

Canadian Cataloguing in Publication Data

Main entry under title:

Exploration and Mining in British Columbia –
1998-

Annual.

Continues: Exploration in British Columbia. ISSN
0823-2059

ISSN 1491-4646 = Exploration and Mining in
British Columbia

1. Mines and mineral resources – British Columbia – Periodicals.
2. Prospecting – British Columbia – Periodicals.
3. Geology, Economic – British Columbia – Periodicals.
4. British Columbia. Mines Branch

TN270.B74

622'.1'09711

C99-805843-3

VICTORIA
BRITISH COLUMBIA
CANADA

January 2010

FOREWORD

INTRODUCTION

Exploration and Mining in British Columbia 2009 is the latest annual documentary record of the province's exploration and mining industry. The record goes back to 1874 when the *Annual Report of the British Columbia Minister of Mines* first went to print and has evolved through various formats over the years.

This publication is closely linked to its companion document, *British Columbia Mines and Mineral Exploration Overview 2009*. Compared to the provincial *Overview 2009*, *Exploration and Mining in British Columbia 2009* provides a region-by-region perspective and a more in-depth look at significant projects. Readers who wish to acquire a first-pass or general picture of the mining and exploration industry in British Columbia may find the *Overview* to be a more useful publication.

The province's exploration sector for coal, metals and industrial minerals is large and by necessity the reviews and summaries contained in this volume tend to be focused on the larger and/or more advanced projects. To learn more about a particular region, readers are encouraged to contact the appropriate regional geologist. Contact information is given below.

Readers are also encouraged to use this publication in concert with the online geological databases accessible through the BC Ministry of Energy, Mines and Petroleum Resources' MapPlace Internet site (<http://www.empr.gov.bc.ca/Mining/Geoscience/MapPlace/Pages/default.aspx>). For example, MINFILE references given in this publication can be geographically located and queried, and additional information such as bedrock geology, geochemistry, mineral tenures and assessment reports can be displayed concurrently.

Information in *Exploration and Mining in British Columbia 2009* has been compiled and written by the province's regional geologists and the director of the Mineral Development Office in Vancouver, based on their personal knowledge supplemented by industry information. A staffing vacancy in Prince George has necessitated that the chapters concerning the North Central and Northeast regions are, for this year only, relatively brief and general.

B.C.'s Regional Geologists and the Mineral Development Office

The regional geologists are located in Vancouver (Bruce Northcote), Smithers (Paul Wojdak), Kamloops (Bruce Madu), Prince George (vacant) and Cranbrook (Dave Grieve). They support the Mineral Development Office in Vancouver (Jay Fredericks, director) in providing front-line stimulation and promotion of mineral exploration and development in the province. As regional experts they also support various functions of the Ministry of Energy, Mines and Petroleum Resources and particularly of their respective offices.

Regional geologists' key roles and responsibilities include:

- fostering sustainable exploration, development and use of the province's mineral and coal resources;
- providing clients with up-to-date technical information and professional advice about known and potential mineral and coal deposits;
- providing geological and mineral resource information to project review or land-use decision-making processes;

- monitoring the status of the mining industry and the development of infrastructure required for mineral resource development;
- working on field projects and surveys, compilations, promotional brochures and deposit models; and
- contributing information to maintain and update geosciences databases (e.g. MINFILE).



Regional Geologists Contact Information:			
1. Northwest – Smithers	Paul Wojdak	250-847-7391	paul.wojdak@gov.bc.ca
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Methodology

Compilation of *Exploration and Mining in British Columbia* presents certain challenges. Deadlines demand manuscript submission before all information from programs carried out later in the year is available, and before some programs are even complete. It is also difficult to garner information on all

programs that have occurred. In particular, critical grassroots exploration that leads to many new discoveries may be difficult to track because it typically occurs below Mines Act permit thresholds.

A significant amount of information is gleaned from corporate press releases, websites and reports. Regional geologists also maintain contact with their industry peers throughout the year, and ideally are able to visit them at project sites to view outcrops and drill core and to discuss results and progress. Late in the year informal surveys are conducted to gather as much of the statistical information as possible, but in some instances the authors use their professional judgement to provide reasonable estimates.

Exploration expenditures are broken down by category: grassroots exploration, early-stage exploration, advanced exploration, mine evaluation and mine lease exploration. Grassroots exploration commonly does not require permitting and the activities and expenditures assigned to this category are less likely to be reported. Early-stage exploration involves focused activities often based on a deposit model. It may include geophysics, geochemistry, trenching and drilling. Advanced-stage exploration is concerned with resource definition emphasizing drilling and bulk sampling, but may include baseline environmental studies, economic pre-feasibility work and exploration of secondary targets. Mine evaluation begins with the firm commitment to develop a resource, and usually coincides with a pending application to government to open a mine; it tends to concentrate on the environmental, social, engineering and financial assessments of a project. Mine lease exploration represents work on a mining property beyond known reserves; it may have characteristics of early-stage or advanced exploration.

Since the exploration expenditures include some estimates, final dollar figures for each region are rounded to the nearest whole million.

MINING

British Columbia is a significant producer of coal, copper, molybdenum, gold, silver, zinc, industrial minerals and construction aggregate, with a total forecast value of \$5.7 Billion for 2009.

The global economic recession that began in 2008 impacted British Columbia's mining industry. No major metal or coal mines closed in 2009, but production levels were down across the board and revenues were hurt by the generally lower commodity prices. No new mines were opened and construction at some sites was stalled.

Producing metal mines in 2009 included Endako (molybdenum), Gibraltar (copper-molybdenum), Highland Valley Copper (copper-molybdenum), Huckleberry (copper-molybdenum), Kemess South (gold-copper), MAX (molybdenum), Mount Polley (copper-gold-silver) and Myra Falls (zinc-copper-gold-silver). There are three coal mines in northeast British Columbia (Brule, Trend and Wolverine), five in the southeast (Coal Mountain, Elkview, Fording River, Greenhills and Line Creek) and one on Vancouver Island (Quinsam). There are a range of industrial minerals produced from well over 30 sites in British Columbia, including limestone (including Benson Lake, Gillies Bay, Harper Ranch, Pavilion and Van Anda), gypsum (Elkhorn, 4J and Falkland), magnesite (Mount Brussilof) and decorative rock (including Kettle Valley Stone).

MINE DEVELOPMENT

The proposed Mount Milligan copper-gold mine received approval from both provincial and federal Environmental Assessment agencies in 2009. Three projects entered the British Columbia Environmental Assessment Process: the Line Creek Phase II Expansion project in the Elk valley (coal), the Raven Coal project on Vancouver Island, and the Chu project near Vanderhoof (molybdenum). There are numerous

other planned and proposed mines at various stages in British Columbia at present. They are described in this volume, and include Galore Creek (copper-gold), Red Chris (copper-gold), KSM (gold-copper), Kitsault (molybdenum), New Afton (copper-gold), Copper Mountain (copper gold) and Goodrich Central South (coal). Expansions are underway at some of the major producing mines, including Endako, Gibraltar and Highland Valley Copper.

MINERAL EXPLORATION

The year began with relatively low prices for most mineral commodities (gold being the notable exception). Consequently the ability of mineral exploration companies to raise funds was impacted and the estimated total expenditure for work carried out in 2009, \$154 million, was only a fraction of that in either of the previous two years. However, metal prices generally increased as the year went on. For example, copper gained back most of its losses by the end of the year, and gold reached record levels. As a result, there were definite signs of improvement in the health of the exploration sector toward the end of 2009. This resulted in a number of late-season programs, and ambitious plans being made for exploration in 2010. Another positive indicator was the number of new option agreements on exploration properties that were entered into late in the year.

With a variety of geological settings, British Columbia is host to a wide range of mineral deposit types. The porphyry environment, including copper, copper-molybdenum and especially copper-gold mineralization, continued to be the most attractive in 2009. Significant porphyry projects included Snowfield, Mount Dunn, Cassiar Moly, Pine, Pinchi, Kwanika, Ajax, Prosperity, Newton Mountain, Lac La Hache, Yalakom, Catface and Roger's Creek. The emphasis with respect to vein-style mineralization was on precious metals, especially gold and/or silver. Vein targets in 2009 included Golden Eagle, Atlin Gold, Treaty Creek, Premier Gold, Homestake Ridge, Terrace, Deer Horn, Blackwater-Davidson, Capoose-Silver Trend, Spanish Mountain, Lustdust, Bralorne, Windpass, Elk, Mineral Creek, Ladner Gold, Slocan Silver, Kenville Gold Mine, Greenwood Gold and Yankee-Dundee. Massive sulphide projects in 2009 included Rock & Roll, Bodine, Ruddock Creek, Harper Creek and Moore. Sediment-hosted gold mineralization was investigated at the Spanish Creek property. Active projects with skarn mineralization included Iron Mist (magnetite), Panorama Ridge (gold), Pearson (magnetite) and Jersey-Emerald (tungsten). Intrusion-related precious metal-enriched mineralization was targeted at the Nox Fort and Crowsnest projects. Rare metals associated with carbonatites were assessed at the Blue River, Wicheeda and Rock Canyon properties.

Coal exploration in 2009 included the Raven Coal project on Vancouver Island, Belcourt West, Wolverine and Gething in northeast British Columbia, and Mount Michael and Baldy Ridge in the southeast.

ACKNOWLEDGMENTS

The cooperation of the industry in providing information and access to project sites is always welcomed and sincerely appreciated. The authors also wish to thank Dave Lefebure, chief geologist, and Tania Demchuk, manager of geoscience marketing and partnerships, for their editorial improvements and coordination of the volume. Compilation and layout for this volume was completed by George Owsiacki and Garry Payie of Total Earth Science Services.

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NORTHWEST REGION

By Paul Wojdak, P. Geo,
Regional Geologist, Smithers

SUMMARY AND TRENDS

The reduced level of activity in the exploration and mining industry continued in early 2009, as part of the world slowdown resulting from tight financial markets. During 2009, copper, silver and zinc gradually recovered much of the value they lost late the preceding year and gold, which had not declined, climbed to a record high price. The price of molybdenum improved only a modest amount after it fell more than any other metal. Beginning in August risk capital became more available, in particular flow-through funds, and resulted in a late-season surge in exploration drilling. The outlook for 2010 is moderately positive.

The Endako molybdenum mine reactivated a major expansion and modernization program, expending approximately \$39 million in 2009 on the only major mine development project active in the region. Owners of the Huckleberry copper-molybdenum mine announced a two year extension of operations until 2012. Fireside barite, a small seasonal quarry in the far north, continued in operation. Construction stopped at the Tulsequah Chief copper-zinc-silver-gold mine; the owner, Redfern Resources Ltd became bankrupt after spending \$170 million and the project assets are being sold by the Receiver. Adanac Moly Corporation was placed under Bankruptcy Protection and the construction camp for its Ruby Creek molybdenum project was sold and removed from site. Figure 1.1 shows major mines, small mines and proposed mines in Northwest region. Metal production and mine reserves are listed in Table 1.

Galore Creek, Red Chris, KSM (Kerr-Sulphurets-Mitchell) and Kitsault lead a group of mine development projects. The Galore Creek copper-gold proposed mine is on hold pending redesign of the project. Teck Corporation continued to construct the access road and a corporate decision on the project's future is anticipated in 2010. In a landmark move, the governments of British Columbia and Canada agreed to share the cost to build the Northwest Transmission Line, an extension of the 287 kilovolt power grid to Bob Quinn that could service new mines in the region, such as Galore Creek. The Red Chris copper-gold project, which also holds a development certificate for an open pit mine, is located 125 km beyond Bob Quinn. Exploration at Red Chris continued for a deep copper-gold deposit. The KSM gold-copper and Kitsault molybdenum projects conducted engineering, environmental and archeological field studies. The KSM project is one of the five largest undeveloped gold

resources in the world. It will be reviewed under the BC and Canadian environmental assessment processes. The Kitsault molybdenum mine operated previously and may proceed under an Amendment to its current Mine Permit. There were no field activities at the Kutcho copper-zinc or Schaft Creek copper projects. Environmental review of the Davidson molybdenum project is suspended pending supplemental information.

Three small gold projects progressed towards commercial operation. The Yellowjacket project near Atlin received a Small Mines Act permit following pilot milling in 2008; however, only 73 ounces of gold was produced. The Cassiar Gold project began underground development at the Table Mountain mine and surface mining of a bulk sample at the nearby Taurus mine. Work at the two sites was halted in November. Near Smithers, the new owner of the closed Dome Mountain mine refurbished the underground workings and applied for a Small Mines Act permit to mine the remaining gold resource for off-site milling.

Estimated expenditure on major and small mine development projects was \$47 million, down from \$245 million in 2009. Mineral exploration expenditures declined to \$65 million from \$140 million (Figure 1.2). There were 17 exploration projects that exceeded \$500,000 in expenditures, down from 55. Exploration drilling totaled about 144 000 metres at 30 drilling programs (Figure 1.3). Highlight exploration projects to the time of writing in late November were:

- Red Chris, a drill intercept below the proposed open pit grading 4.1% copper and 8.8 g/t gold over an interval of 152 m.
- Exploration of under-explored gold-silver zones at Snowfield-Brucejack and re-consideration of historic work that resulted in new resource estimates; 120.5 Mt at 1.04 g/t Au and 16.9 g/t Ag (measured plus indicated).
- Snowfield and KSM projects, aggregate resources (measured, indicated and inferred) at these adjoining projects totals 4.37 billion tonnes containing 85 million ounces of gold.

Second-order highlights, ranked below those listed above, include Rock and Roll where exploration was revived on a precious metal-rich volcanogenic massive sulphide prospect, and Bronson Slope where significant gold drill intercepts were encountered in a new area.

Mines and Proposed Mines

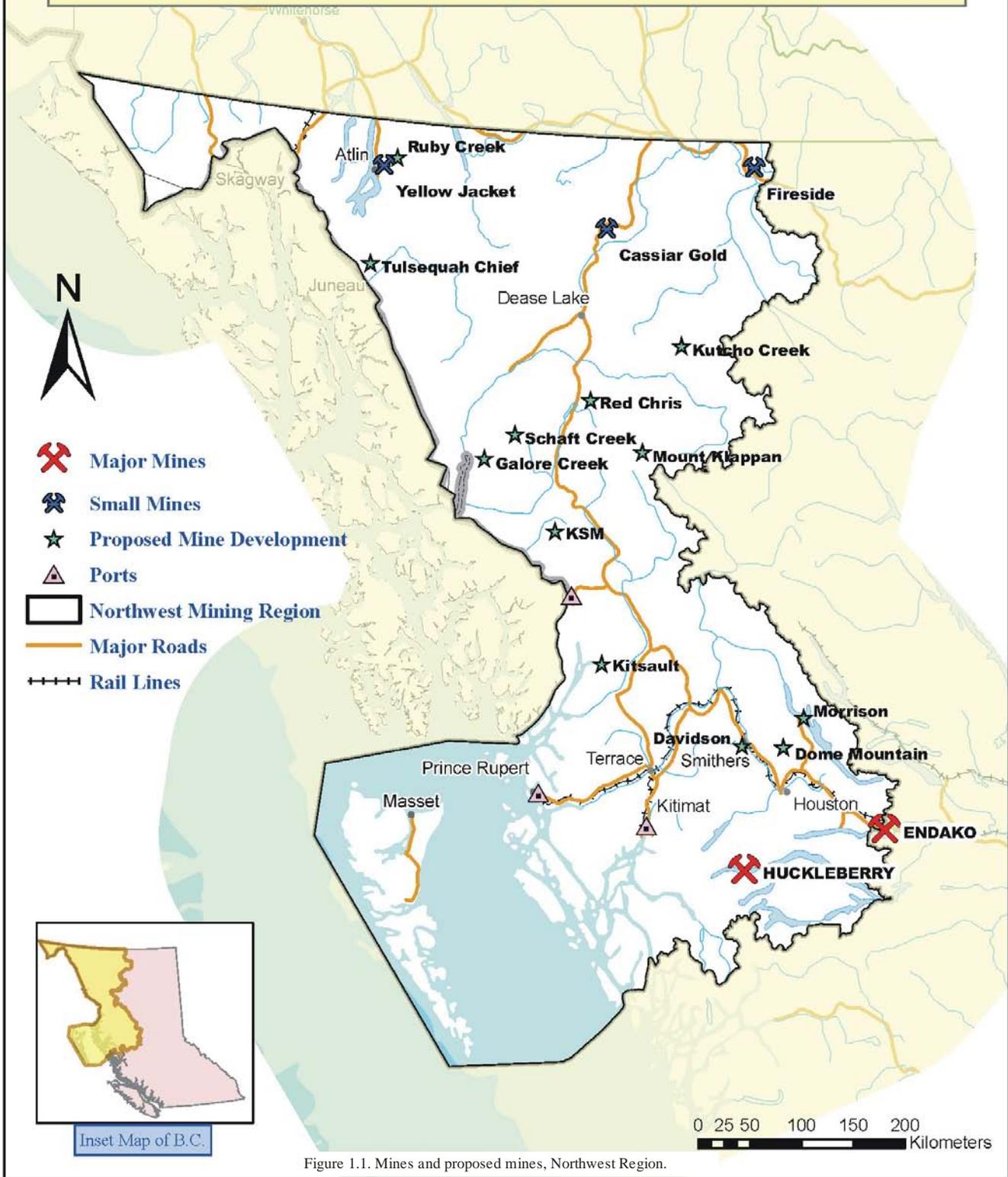


Figure 1.1. Mines and proposed mines, Northwest Region.

TABLE 1.1. MINE PRODUCTION AND RESERVES, NORTHWEST REGION

Mine	Operator	Production (2008)	Tonnes milled (2008)	Grade	Reserves (Dec 31, 2008)
Endako	Thompson Creek Metals Company (75%) & Sojitz Corporation	5612 tonnes molybdenum	10 767 000	0.070% Mo	279 200 000 tonnes at 0.050% Mo (includes low-grade stockpile)
Huckleberry	Huckleberry Mines Ltd. (50% Imperial Metals Corp.)	16 882 tonnes copper, 85.2 t molybdenum	6 031 300	0.316% Cu, 0.006% Mo	8 368 000 t at 0.362% Cu, 0.005% Mo
Fireside	Fireside Minerals Inc.	8000 tonnes	from stockpile		Not available

Figure 1.4 shows the distribution of expenditure; grassroots 0.4%, early stage 30.7%, advanced stage 30%, mine evaluation 38.1% and mine property 0.8%. Definitions of exploration stages are provided in the *Foreword* to this volume. Figure 1.5 shows spending distribution by mineral deposit type; porphyry copper (copper-gold and copper-molybdenum projects) 52%, gold and silver in vein-type deposits 34%, porphyry molybdenum 9%, polymetallic massive sulphide deposits 4% and skarn 1%.

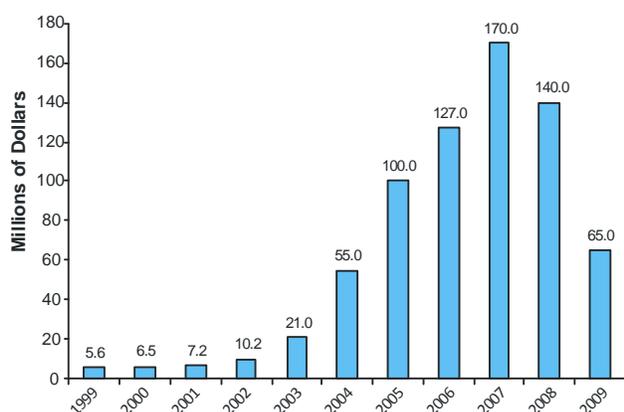


Figure 1.2. Annual exploration spending, Northwest Region.

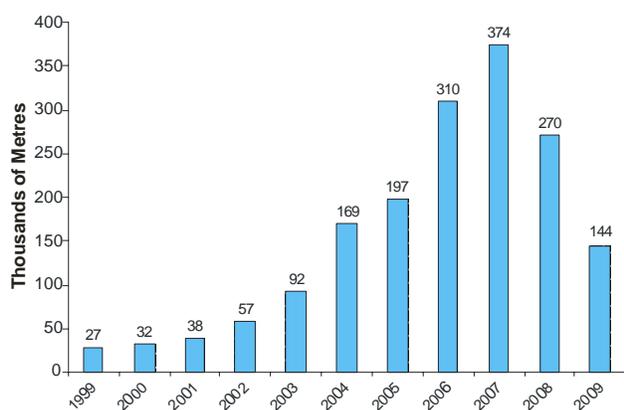


Figure 1.3. Annual exploration drilling, Northwest Region.

MINES AND QUARRIES

METAL MINES

The **Endako** open-pit molybdenum mine (MINFILE 93K 006) is 75% owned and operated by Thompson Creek Metals Company. Sojitz Corporation, a major Japanese-based molybdenum trading company, holds 25% interest. In 2008 the mine produced 5612 t of molybdenum from 10 767 000 t of ore with an average grade of 0.070% molybdenum. Thompson Creek scaled back 2009 production in response to weaker molybdenum markets and forecasts Endako output at between 3000 and 4200 t of molybdenum. Employment near year-end totaled 253, including 10 contractor employees.

Beginning in 2008 ore was mined from the newly developed West Denak pit. Ore passes through an in-pit crusher and then is transported on a 3 km conveyor. Mill throughput, molybdenum recovery (at 77.7%) and metal output all increased in 2008 over 2007 levels due to the higher grade and favourable characteristics of West Denak ore compared to that mined from the Endako pit.

A construction project to expand capacity of the Endako mill from 28 000 to 50 000 t of ore per day was halted in December 2008 due to a pronounced decline in demand for molybdenum, but work resumed in August 2009 when markets improved. The project is estimated to cost \$498 million of which \$62 million was expended in 2008 and \$39 million budgeted in 2009. The mill has been in operation since 1965 and the expansion project will improve efficiency of processing and enable treatment of lower grade ore. Included in the project is the installation of a new grinding circuit with a semi-autogenous (SAG) mill and ball mills, a modern floatation circuit and an upgrade of the roaster circuit.

Endako is a porphyry molybdenum deposit within the early Cretaceous Francois Lake granite batholith. Mineralization is related to a late aplite phase that intrudes an older coarse-grained phase. The ore body is a vein network that is 400 m wide by 3.5 km long,

elongated to the west-northwest and extends more than 400 m below surface at a moderate southerly dip. In the principal Endako pit, quartz-molybdenite veins with K-feldspar envelopes occur in the footwall of the South Basalt fault which dips 50° to 60° south and delineates the top of the ore zone. The hydrothermal system is rooted in the steep South Boundary fault. Post-mineral cross faults segment the ore zone into the Endako, East Denak and West Denak pits. In the long-term mine plan these will merge into a large ‘superpit’ (Figure 1.6). In-situ and stockpile ore reserves on the property at the beginning of 2009 were 279.2 Mt grading 0.050% Mo.

The **Huckleberry** copper mine (MINFILE 93E 037) is operated by Huckleberry Mines Ltd and is owned 50% by Imperial Metals Corp and 32% by Mitsubishi Material Corp. The remaining 18% is shared equally among Dowa Mining Ltd, Furakawa Company Ltd and Marubeni Corp. The mine is located 123 km by road south of Houston at the foot of Huckleberry Mountain and employs 275 people including camp and trucking contractors. Copper concentrate is trucked to the port of Stewart for shipment to Japan and molybdenum concentrate is trucked to Vancouver. Forecast 2009 production is 16 000 t of copper.

In June 2009 Huckleberry Mines announced a two year addition to mine life, to early 2012, by extending its mine plan in the Main Zone Extension (MZX) pit to include the Saddle zone. The Saddle zone is a bedrock ridge between MZX and the Main pit. The Main zone pit contains waste rock from the East pit and tailings that complicates mining of MZX. The company stated the Saddle zone “has a high potential to provide additional extensions to the mine life depending on copper price.” A 4000 m drilling program was conducted in the area. In 2008 Huckleberry milled 6 031 300 t of ore from the MZX pit grading 0.316% Cu and 0.006% Mo. Metal production amounted to 16 882 t of copper and 85.2 t of molybdenum. Copper recovery was 88.5% and molybdenum recovery was 23.2%. Ore reserves at the beginning of 2009 were 8 368 000 t at a grade of 0.362% Cu and 0.005% Mo.

Huckleberry is a porphyry copper deposit related to the late Cretaceous Bulkley intrusions. In the Main zone, copper mineralization occurs in hornfelsed and fractured Hazelton Group volcanic rocks adjacent to a 500 meter diameter granodiorite stock. The arcuate ore zone is 150-200 m wide by 600 m long and rims the contact of the stock. The East zone is larger, measuring 150 m wide by one km long, and is centred on a fault-controlled 40 m wide granodiorite dike that trends at 105°. Ore in both zones is a stockwork of quartz, pyrite and chalcopyrite, crosscut by gypsum-filled fractures. The Main and East zones are disrupted by the reactivated 105 Fault which resulted in 100 m of right lateral offset of ore. The Main Zone Extension is the faulted portion of the Main zone north of the 105 Fault.

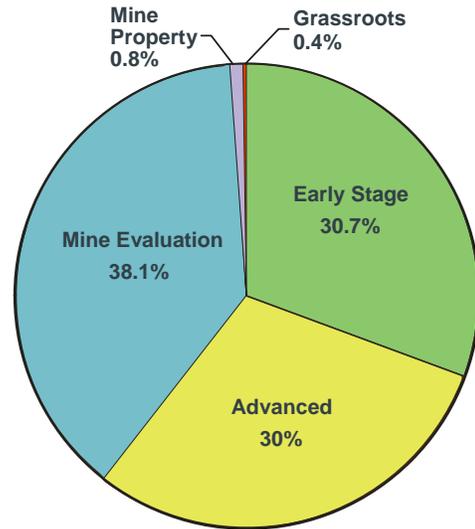


Figure 1.4. Distribution of total exploration spending in the northwest region.

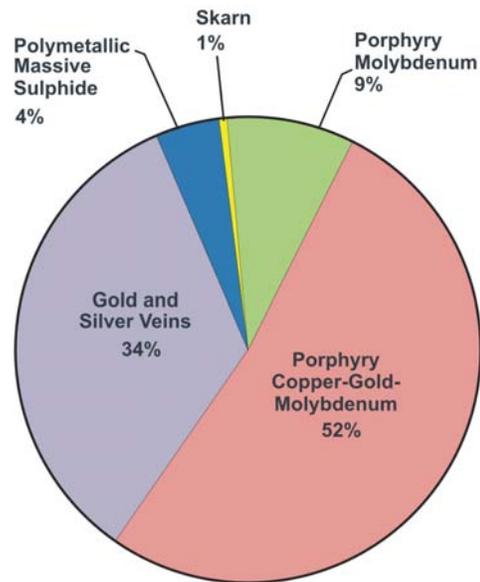


Figure 1.5. Spending distribution by mineral deposit type.

INDUSTRIAL MINERAL QUARRIES

Fireside barite quarry (MINFILE 094M 003) processed approximately 9500 t of product in 2009. Plant feed was derived mainly from material mined in 2006 and stockpiled at the site, 125 km east of Watson Lake. A small amount of barite was mined by excavator from near the crusher. The quarry is owned by a private company, Fireside Minerals Ltd of Red Deer Alberta. Fault-controlled barite veins are associated with gabbro dikes, of inferred Paleozoic age, emplaced into strata of the early Paleozoic North American continental shelf (Wojdak, 2008).



Figure 1.6. Endako molybdenum mine, aerial view of super-pit that will incorporate Endako, Denak East and Denak West, north is to the left.

Jade was produced from **Provencher Lake**, 80 km east of Dease Lake (MINFILE 104I 073, 092) and from **Cassiar** (MINFILE 104P 005). There was no activity at Polar Jade, an important producer for many years. There were two operators from adjoining properties at Provencher Lake where jade boulders are widely dispersed in glacial till. The Jade West Group extracted about 90 t, of which 30 t was saleable quality. Jade Guys Inc recovered about 50 t of raw jade and sold approximately 16 t. Cassiar Jade Contracting Ltd produced 8 t from material recovered in prior years from waste rock at the Cassiar asbestos mine. In northwest BC, nephrite jade is commonly formed at the contact between tectonically emplaced serpentinite and argillite of the Cache Creek and Slide Mountain oceanic terranes.

MINE DEVELOPMENT PROJECTS

Redfern Resources Ltd suspended construction of the **Tulsequah Chief** mine in December 2008 and filed for protection under the Companies' Creditors Arrangement Act in March 2009. Financing was unsuccessful and the company was assigned into bankruptcy in June. During 2007 and 2008 Redfern spent \$170.8 million on the Tulsequah project; building a 1200 m airstrip, 15 km of site roads and construction camp and purchase of equipment including river tugs and tow vehicles, diesel

power plant, rod, regrind and ball mills. Shortly before the shutdown a workforce of 104 people was on site.

Eagle Plains Resources Ltd and Prize Mining Corp formed a Joint Venture to mine the **Yellowjacket** gold property (MINFILE 104N 043) near Atlin. The project received a Small Mines Act permit for an open pit gold mine and onsite gravity concentrator to process up to 75 000 t of ore per year (Figure 1.7). The mine will operate on a seasonal basis, approximately May to October. The 2009 season began by processing the remainder of the bulk sample stockpile material. No gold was recovered and attention shifted to extraction of new ore from the open pit. A six metre wide gold zone was discovered during excavation of a ramp to access ore at the bottom of the pit. Approximately 40 000 t was mined, of which 9000 t was stockpiled for processing. Installation of a new tailings system delayed the operation and mechanical and electrical breakdowns meant the targeted milling rate of 350 t per day was not sustained. At the end of the season, a gold bar was poured weighing 2.284 kg (73.4 ounces). Development cost in 2009 was approximately \$3.4 million and past expenditure was \$14 million. Drilling and production data were assigned to an independent consultant to prepare a resource estimate and a winter drilling program is planned to assess near-term production material.



Figure 1.7. Yellowjacket gravity mill treating gold ore.

Native gold at Yellowjacket is associated with quartz veining and listwanite alteration developed in the Pine Creek fault zone and underlies placer gold deposits in Pine Creek. The fault zone is 20 m wide and is developed in serpentinite and basalt, components of the tectonic emplacement of the oceanic Cache Creek terrane. A bulk sample was mined in 2007 and processed in the pilot mill in 2008. Gold recovery amounted to approximately 21.8 kg (700 ounces) from 2880 t of rock.

Hawthorne Gold Corporation continued exploration and development aimed toward re-opening of the **Cassiar** gold mine (formerly **Table Mountain** mine). The mine comprises the Erickson underground workings (1979-1988), the Cusac underground workings (1986-1997) and a 270 tonne per day gravity flotation mill. The goal is to firm up resources that would provide for a minimum two years of operation. Restoration of the mill and ancillary facilities is required. A 40-person camp was installed and, in July, excavation of a 160 m ramp was begun to access the East Bain vein. Mechanical breakdowns and high water flow underground slowed the pace of development. The Katherine-Bonanza-Bain vein system (MINFILE 104P 113) is 7.5 km south of the mill in the area of the Cusac workings and is the southernmost vein mined on the Table Mountain property. East Bain has an inferred resource of 1158 t grading 68.57 g/t Au and an indicated resource of 20 100 t grading 21.21 g/t Au. Underground drilling is planned to upgrade the resource. Drilling from surface totaled 7524 m and explored geophysical targets in the so-called Gap area between the productive Jennie-Maura-Alison vein system in the Erickson workings and the Eileen-Michelle-Lily vein in the Cusac workings. Other geophysical targets were tested by drilling in the Pete, Wings Canyon and Katherine areas. Drilling also tested for extensions of the East and West Bain.

Drilling and rock trenching by Hawthorne on the nearby **Taurus** property (MINFILE 104P 012) sought to define zones amenable to open pit mining and grading more than 3.5 g/t Au. Taurus contains an inferred resource of 33.06 Mt grading 1.00 g/t Au. The Sable and 88 Hill zones were explored by 563 m of trenching and 3882 m of drilling. In August Hawthorne began surface mining of up to 10 000 t from the Sable zone (Figure 1.8). The material was hauled in highway trucks 10 km to the Table Mountain site and stockpiled as supplemental mill feed. Hawthorne shut down the Cassiar project in early November, having completed 129 m of underground development toward the Bain vein. Fifty people were on site at the time.

Gold at Cassiar occurs as free gold in a series of quartz-sulphide veins within a thrust-imbricated gently dipping sequence of basalt, serpentinite and argillite. Most veins are sub-vertical and strike 070°. Veins, which are developed in basalt near the northerly trending Erickson normal fault, dissipate or become contact-parallel structures in the overlying listwanite-altered serpentinite and, except for the Vollaug vein, do not extend upward into the argillite. The highest gold grades

are found within 50 m of the base of a serpentinite body where the ore grades 15-30 g/t Au. Grade diminishes at depth below the listwanite. At Taurus the erosional level is deeper, approximately several hundred meters below the important altered serpentinite cap and quartz veins generally grade 5 g/t Au or less, but locally exceed 20 g/t Au. Broad carbonate alteration zones around the steep and flat quartz veins contain about 1 g/t Au, associated with coarse pyrite and arsenopyrite. Cassiar district veins have short strike extent, typically less than 200 m, but the Vollaug vein is an exception; it is a 2.7 km long flat vein within argillite. Lode mining in the district produced 350 500 ounces (10 905 kg) of gold; placer mining contributing an additional 74 500 ounces (2317 kg) of gold.

MINE EVALUATION PROJECTS

Galore Creek Mining Corp, a 50-50 partnership between Teck Corporation and NovaGold Resources Inc, continued to improve and extend the **Galore Creek** access road. The road is now serviceable to Kilometre 48, at which point a 200-meter clear-span bridge is required to cross upper More Creek. Construction of other components of the project have been suspended since late 2007 (Figure 1.9). Reactivation of mine development depends on a feasibility study of the redesigned Galore Creek project (outlined in Wojdak and Febbo, 2009) and an amendment to the certificate awarded under the Environmental Assessment process. Galore Creek (MINFILE 104G 090) is a porphyry copper deposit associated with alkalic intrusive rocks of late Triassic age. Measured and indicated resources total 785.7 Mt grading 0.52% Cu, 0.29 g/t Au and 4.87 g/t Ag. Inferred resources, which include the nearby **Copper Canyon** deposit, stand at 522.5 Mt at 0.35% Cu, 0.29 g/t Au and 4.79 g/t Ag.



Figure 1.8. Cassiar Gold, Kristian Whitehead directs mining of a bulk sample from the Sable zone on the Taurus property.



Figure 1.9. Galore Creek, construction camp and equipment at Km 89.5, a stranded segment of the access road to the copper-gold deposit.

The **Red Chris** copper-gold project is owned by Imperial Metals Corporation and located 25 km by road from the settlement of Iskut. The project has provincial and federal environmental assessment certificates to develop a 30 000 tonne per day open pit mine. A Supreme Court of Canada decision whether to uphold the federal approval (awarded under the Canadian Environmental Assessment Act) is expected by early 2010. Open pit reserves in the Main and East zones, estimated in 2004, are 277.8 Mt grading 0.35% Cu and 0.27 g/t Au, at a cut-off grade of 0.2% Cu. Resources outside the pit, including the Far West and Gully zones, are 574.8 Mt grading 0.32% Cu and 0.28 g/t Au.

Red Chris (MINFILE 104H 005) is a porphyry copper-gold deposit developed in an early Jurassic monzonite stock emplaced very near the faulted north margin of the Bowser Basin. A major exploration program was conducted; a series of holes with a planned depth of 1500 m to explore the deep roots of the East zone, below the proposed open pit. At time of writing, seven holes had been reported, two more were completed and two were in progress. Hole RC09-350 returned an outstanding intercept, 4.12% Cu and 8.83 g/t Au over 152.5 m, beginning at a depth of 540 m. This is below the bottom of the designed open pit. That portion of the hole within the planned pit graded 0.17% Cu and 0.12 g/t Au, showing a profound change in the tenor of mineralization with depth. The high grade interval is an intense quartz-flooded and vein stockwork zone containing chalcopyrite and only minor bornite. Hole RC09-348 returned three intercepts; 0.87% Cu and 0.84 g/t Au over 255 m from a depth of 302.5 m (the bottom of the design open pit), 1.21% Cu and 2.41 g/t Au over 243.9 m from a depth of 725.4 to 969.3 m, and 1.52% Cu and 3.35 g/t Au over 129.9 m from a depth of 756 to 885.9 m. The other holes returned lower grade but all intersected 30 to 50 meter widths exceeding 1% Cu and 1 g/t Au. In 2007, a vertical hole in the core of the East zone intersected 1024.1 meters

grading 1.01% Cu, 1.26 g/t Au and 3.92 g/t Ag and bottomed in strong mineralization.

Other exploration activities at Red Chris included a deep penetration magnetotellurics and IP survey that gave insight to possible buried intrusive centres. Geological mapping and the drilling of 166 shallow holes to prospect bedrock (Figure 1.10) provided additional targets on the till-covered plateau for follow-up exploration drilling (S. Robertson, pers. comm., 2009).

Seabridge Gold Inc continued to advance the **KSM (Kerr-Sulphurets-Mitchell)** gold-copper project toward completion of a preliminary feasibility study (scheduled for March 2010) and an application under the BC Environmental Assessment Act anticipated in September 2010 (Figure 1.11). Seabridge contemplates a 120 000 tonne per day open pit mine on three proximal porphyry copper deposits (Figure 1.12). Capital cost is estimated at \$3.08 billion. The site is 30 km southwest of Highway 37 near Bell II and 18 km southeast from the end of the Eskay Creek road.

Resource infill drilling comprised 4000 m in the Mitchell zone, 3100 m at Sulphurets and 900 m at Kerr (MINFILE 104B 176, 191 and 182 respectively). Substantially better than expected grades and widths were returned from the Sulphurets zone. Geotechnical drilling (3500 m) provided information for determination of slope angles in the Mitchell open pit, the zone that would be



Figure 1.10. Red Chris, innovative mobile drill designed for short core holes to explore the till-covered Todagin plateau.



Figure 1.11. KSM, representatives of government agencies at the proposed Mitchell open pit during a project familiarization tour, as part of the Environmental Assessment process.

mined first. Environmental, archeological and engineering studies constituted a major part of the 2009 program. The proposed mill site and tailings impoundment are located 23 km to the northeast and would be linked to the mine by a twin tunnel beneath the Iron Cap zone and an alpine icefield. One tunnel would transport crushed ore from the mine in a slurry pipeline and return water, diesel fuel and electrical power; the other would transport personnel and supplies. Mineral resources in the three deposits, based on work up to the end of 2008, are tabled below.

Measured plus Indicated Resources

Zone	Tonnes (000)	Gold (g/t)	Copper (%)
Mitchell	1 509 900	0.64	0.18
Kerr	225 300	0.23	0.41
Sulphurets	87 300	0.72	0.27
Total	1 822 500	0.59	0.21

Inferred Resources

Zone	Tonnes (000)	Gold (g/t)	Copper (%)
Mitchell	514 900	0.51	0.14
Kerr	69 900	0.18	0.39
Sulphurets	160 900	0.63	0.17
Total	745 700	0.50	0.17

The KSM porphyry deposits are associated with the Mitchell intrusions, high level monzonite plugs and dikes that intrude volcanic rocks of the Jurassic Hazelton Group and are in fault contact with sedimentary rocks of the Upper Triassic Stuhini Group. All lithologies are altered and deformed. The Mitchell zone is exposed in an erosional window below the Mitchell thrust fault over an area of 1600 m by 500 m. The fault truncates the upper part of the deposit. The deposit comprises schistose rocks with abundant sericite, disseminated pyrite and a strongly

deformed quartz stockwork (Figure 1.13). Quartz veins constitute more than 50% of the rock in the core of the deposit. Chalcopyrite is the principal copper mineral. Copper and gold grades are remarkably uniform.

The Sulphurets zone, 2 km south of Mitchell, occurs at a higher structural level between the Mitchell and Sulphurets thrust faults. Mineral zones are structurally stacked but the principal Sulphurets zone is a moderately developed quartz stockwork that is cross-cut by a higher grade hydrothermal breccia zone. The top of the Sulphurets zone is truncated by the Sulphurets thrust which dips gently north. Drilling in 2009 intersected significant gold grade below the Sulphurets zone, e.g. 1.51 g/t Au over 33.3 m. Seabridge interprets this to be an easterly continuation of the Canyon zone (MINFILE 104B 183).

There was little fieldwork in 2009 on the **Kutcho Creek** copper-zinc project owned by Capstone Mining Corporation. The project continues in the pre-application stage of Environmental Assessment. Kutcho Creek is a volcanogenic massive sulphide deposit (MINFILE 104I 060) located 100 km east of Dease Lake. A new determination of mineral resources was announced, derived from in-fill drilling in 2008 that focused on the higher grade areas. Measured and indicated resources are estimated at 10 415 000 t grading 2.14% Cu, 2.85% Zn, 32.4 g/t Ag and 0.36 g/t Au. The inferred resource is estimated at 1 893 000 t at 2.09% Cu, 2.93% Zn, 33.6 g/t Ag and 0.46 g/t Au. Three elongate sulphide lenses (Main, Sumac and Esso) are arranged en echelon over a strike length of 3.5 km within schistose felsic volcanic rocks of early Triassic age. Capstone commissioned a preliminary economic assessment of the Kutcho project that scaled down the proposed mine to 2500 t per day at a capital cost of C\$133.5 million. Development would comprise a small open-pit followed by underground mining to supply most of the ore, and dry-stacked disposition of tailings.

The **Schaft Creek** project of Copper Fox Metals Inc continued in the pre-application stage of the environmental assessment process for a proposed 100 000 tonne per day open pit copper mine. There has been little activity on the project since a preliminary feasibility study in 2008. Schaft Creek (MINFILE 104G 015) is a porphyry copper deposit with a measured and indicated open pit resource of 812 Mt grading 0.30% Cu, 0.020% Mo, 0.21 g/t Au and 1.8 g/t Ag, at a 0.20% Cu equivalent cut-off.

Kitsault is a closed molybdenum mine located 140 km north of Prince Rupert that Avanti Mining Inc proposes to re-open. The project has a Mines Act permit but requires an amendment, primarily for a new tailings disposal site. The mine is still served by a power line and access road. Initial pit benches are developed. Work in 2009 focused on geotechnical drilling to evaluate new sites for a mill building, for a tailings dam and impoundment, and to assess conditions of the pit highwall (Figure 1.14). Test pits were dug to evaluate overburden

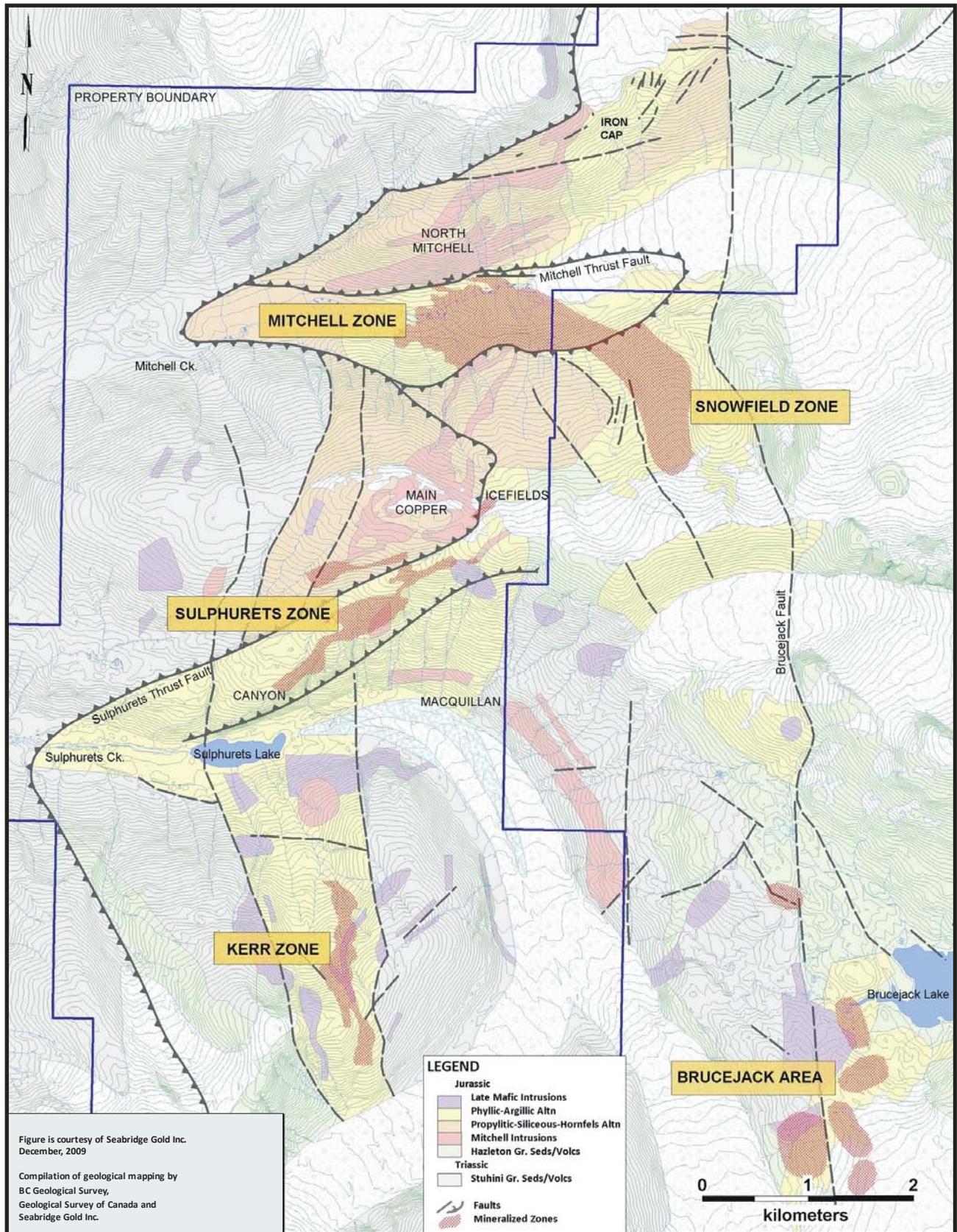


Figure is courtesy of Seabridge Gold Inc. December, 2009
 Compilation of geological mapping by BC Geological Survey, Geological Survey of Canada and Seabridge Gold Inc.

Figure 1.12. Generalized geology map, courtesy of Seabridge Gold Inc, showing the KSM property and part of the Snowfield property, owned by Silver Standard Resources Inc. Approximate location of mineralized zones are shown at Mitchell, Sulphurets, Kerr, Snowfield and in the Brucejack area. Snowfield comprises two subzones, Snowfield North and Snowfield. Alteration zones and the important Mitchell and Sulphurets thrust faults are delineated.



Figure 1.13. KSM Mitchell zone, quartz-chalcopyrite stockwork crenulated and disrupted during compressional deformation.



Figure 1.14. Kitsault, geotechnical drilling near the proposed plant site.

characteristics. Environmental and archeological studies were also conducted. A prefeasibility study was completed for a 40 000 tonne per day mine. It estimated a capital cost of \$US641 million and used a forecast molybdenum price of \$15.88 per pound. Kitsault operated between 1967 and 1972 and from 1981 to 1982 with a total production of 13 600 t of molybdenum.

The Kitsault molybdenum deposit (MINFILE 103P 120) has proven plus probable reserves of 215.3 Mt grading 0.085% Mo, upgraded from historic data by a major drilling program in 2008. Molybdenite occurs in an annular zone around a small early Tertiary stock that intruded Bowser Lake Group greywacke and siltstone, producing a hornfels aureole (Figure 1.15). Intrusive phases range from quartz diorite to quartz monzonite and late-stage aplite dikes. There are two other stocks with associated molybdenum mineralization on the property, known as Bell Moly and Roundy Creek. Recent basalt lava flows between Kitsault and Bell Moly, and extensive



Figure 1.15. Kitsault open pit, molybdenum ore forms an annular zone between the barren core of the stock (left) and hornfelsed sedimentary rocks (right).

till, hamper exploration for additional molybdenum resources.

The **Davidson** molybdenum project (MINFILE 093L 110) is located 10 km west of Smithers and is owned by Blue Pearl Mining, a wholly-owned subsidiary of Thompson Creek Metals Company. Blue Pearl submitted an Environmental Assessment project report in 2008 for a 2000 tonne per day underground mine that would ship high grade molybdenum ore to Endako Mine for processing. This development is linked with the upgraded mill under construction at Endako which would have a separate circuit to treat Davidson ore. If approved, ore haulage would be through a new 3 km adit at the base of Hudson Bay Mountain. Surface infrastructure would consist of a water treatment plant, access roads, onsite buildings and ore-handling facilities. Review of the Project Report is suspended until Blue Pearl supplies additional information requested by agency reviewers.

The Davidson molybdenum deposit is related to a blind late Cretaceous intrusive complex beneath Hudson Bay Mountain. The intrusive complex produced a hornfels zone in Hazelton Group volcanic rocks. The principal molybdenum ore zone, determined to be 75.3 Mt grading 0.177% Mo (measured plus indicated resource), is situated 300 m above a quartz porphyry plug. The preferred host rock is a granodiorite sill of inferred Jurassic age. The top of the underlying quartz porphyry contains a smaller molybdenum deposit that is characterized by crenulated quartz layers popularly referred to as 'brain rock'. Below the lower molybdenum zone, the quartz porphyry plug is cut by a granite stock, possibly a Nanika intrusion.

The **Dome Mountain** underground gold mine 35 km east of Smithers is proposed to be re-opened by Eagle Peak Resources Inc through an affiliated company, Metal Mountain Resources Inc. Dome Mountain comprises eight (or more) gold-bearing orogenic quartz veins within volcanic and sedimentary rocks of the Hazelton Group.

During 1991-1992, the Boulder vein (MINFILE 093L 276) produced 361.4 kg of gold (11 621 oz) from 30 890 t of ore. Initial activities in 2009 focused on confirmation of proven and probable reserves calculated in 1993 (pre NI 43-101) to be 181 780 t grading 14.9 g/t Au with possible reserves of 39 650 t at 12.6 g/t Au. Work comprised 5705 m of surface drilling and underground mapping of stopes to determine prior extraction.

Metallurgical testing was performed on a 57 kg sample. Gold occurs in native form; fine grained and generally associated with pyrite. The Boulder vein occupies a fault. An IP survey (performed in 2008) and a soil geochemical survey are interpreted by Eagle Peak to show a 250 to 450 m easterly extension of the Boulder vein beyond the underground workings. Late in 2009, Metal Mountain applied for a Mines Act permit to resume mining at a rate of about 250 t per day, using the two existing levels, 1290 m and 1370 m, and a new level at 1330 m elevation. The ore would be shipped off-site for custom milling.

Pacific Booker Minerals Inc is in the pre-application stage of the Environmental Assessment process for the **Morrison** copper-gold project. The EA office returned the initial application requiring revisions to it for the application to proceed. Morrison (MINFILE 093M 007) is a porphyry copper deposit with a measured plus indicated resource of 206 869 000 t grading 0.39% Cu, 0.20 g/t Au and 0.005% Mo. The inferred resource stands at 56 524 000 t grading 0.40% Cu, 0.21 g/t Au and 0.005% Mo. The company proposes to develop a 30 000 t per day open pit mine. The deposit is developed in a biotite-feldspar porphyry stock, one of the Babine intrusions of Eocene age. It is located 70 km northeast of Smithers.

MINERAL EXPLORATION

Table 1.2 lists significant exploration projects and their locations are illustrated in Figure 1.16, keyed to deposit type.

PORPHYRY COPPER PROJECTS

Porphyry copper deposits in the northwest often contain significant gold or molybdenum. Few deposits contain all three metals in economically significant amounts. Prospects in the Iskut-Stikine district are developed in late Triassic to early Jurassic igneous rocks within Stikine terrane prior to its accretion to North America. Pre-accretion porphyry prospects are primarily copper-gold projects; molybdenum is significant only at Schaft Creek. The intrusions are sub-alkalic, potassium-rich and of intermediate composition, typically monzonite and their volcanic equivalent. K-feldspar porphyritic rocks are common. Alkalic rocks, syenite and pseudoleucite-bearing trachyte that characterize the Galore Creek deposit, represent an end-member

composition. Some of the copper-gold deposits in the Stikine district have an extremely high gold to copper ratio, i.e. greater than 1 g/t gold for 1% copper. Depending on metal recoveries and relative prices, gold may be more economically important than copper in some deposits and occurrences that can be referred to as porphyry gold-copper projects. This includes the Mitchell, Sulphurets, Snowfield and Bronson Slope deposits. At the Red Chris and Kinaskan deposits, the ratio of gold (in g/t) to copper (in per cent) is approximately 1:1.

Porphyry copper-molybdenum prospects predominate in the Skeena district. Some copper-gold prospects occur (e.g. Zymo) but the gold content is appreciably less than in the Iskut-Stikine district. Skeena district porphyry prospects are all contained in post-accretion intrusions comprising the extensive late Cretaceous Bulkley, and more localized Eocene Nanika and Babine calc-alkaline intrusions. The three suites have separate distribution patterns but all occur within a transverse geologic feature known as the Skeena Arch. Bulkley and Babine intrusions are generally intermediate in composition; medium to coarse granodiorite is typical of the Bulkley suite and biotite-feldspar porphyry is characteristic of the Babine suite. Nanika intrusions contain more quartz and potassium feldspar, and comprise pink granite and quartz porphyry rhyolite dikes. Bulkley intrusions are associated with the Huckleberry, Poplar and possibly the Zymo deposits. Babine intrusions are linked to formation of the past-producing Granisle and Bell mines and the Morrison deposit. A Nanika intrusion is associated with the Berg deposit.

ISKUT-STIKINE DISTRICT

Important exploration programs carried out on the Red Chris and KSM properties are described in the preceding section on Mine Development projects.

At the **Snowfield** property Silver Standard Resources Inc built two camps, deployed 80 people and mobilized 7 drills for the largest exploration program in the region. The Snowfield property adjoins KSM to the east; 65 km north of Stewart (refer to Figure 1.12). The program comprised resource definition drilling in the Snowfield North zone and wide-spaced drilling at Brucejack; an area of intense exploration from 1980 until 1994. The scale of work at Brucejack was augmented by encouraging results from zones that had undergone little or no previous drilling (Figure 1.17).

The Bridge and nearby Galena Hill zones (MINFILE 104B 200 and 197 respectively) are underlain by sericite-altered volcanic rocks and K-feldspar porphyritic intrusive rocks, both cut by quartz breccia veins. Hole SU-19, one of the best holes in the Bridge zone, returned 0.87 g/t Au over 552 m. Drill set-ups utilized a series of nunataks near the margin of the icefield south of Brucejack Lake (Figure 1.18). Visible gold was encountered in some drillholes at Galena Hill; hole SU-12 intersected 16 949 g/t Au and 8696 g/t Ag over 1.5 m.

TABLE 1.2. MAJOR EXPLORATION PROJECTS, NORTHWEST REGION

Property	Operator	MINFILE	Commodity	Deposit Type	Work Program
Atlin Gold	Blind Creek Resources Ltd	104N 044	Au	Orogenic vein	DD (1200 m, 17 holes)
Big Bulk	AngloGold Ashanti Holdings PLC	103P 016	Cu, Au	Porphyry	DD (2100 m, 3 holes)
Bronson Slope	Skyline Gold Corp	104B 077	Au, Cu	Porphyry	DD (740 m, 2 holes)
Brucejack	Silver Standard Resources Inc	104B 197, 200	Au, Ag	Epithermal	DD (17 846 m, 37 holes)
Cassiar Gold (Table Mountain & Taurus)	Hawthorne Gold Corp	104P 012, 113	Au	Orogenic vein	TR; DD (11 406 m); BU
Cassiar Moly	Velocity Minerals Ltd	104P 035	Mo	Porphyry	UG; DD (84 m)
Clone	Canasia Industries Corp	103P 251	Au	Vein	DD (1675 m, 35 holes)
Deer Horn	Golden Odyssey Mining Inc	093E 019	Au, Ag	Vein	G; GP; DD (1700 m); EN
Dome Mountain	Metal Mountain Resources Inc	093L 276	Au	Orogenic vein	UG; DD (5705 m); MS; EN
Dome South	Golden Odyssey Mining Inc	093L 332	Cu, Ag	Vein	DD (1111 m)
Golden Eagle	Troymet Exploration Corp	104M 044	Au	Vein	DD (505 m, 5 holes)
Homestake Ridge	Bravo Venture Group Inc	103P 216	Au, Ag	Epithermal Vein	AB-EM; DD (13 436 m, 48 holes)
Huckleberry Mine	Imperial Metals Corp	93E 037	Cu, Mo	Porphyry	DD (4000 m, 14 holes)
KSM	Seabridge Gold Inc	104B 176, 191, 182	Au, Cu	Porphyry	DD (8000 m); GD (9500 m) EN; PF
Kitsault	Avanti Mining Corp	103P 120	Mo	Porphyry	GD (1600 m); EN; PF
Lone Pine	Bard Ventures Ltd	93L 027, 028	Mo	Porphyry	DD (2495 m, 9 holes)
Mt Dunn	Paget Minerals Corp	104B 079	Cu, Au	Porphyry	DD (1587 m, 5 holes)
Nizi	Solomon Resources Limited	104I 032	Au, Ag	Epithermal Vein	DD (416 m, 2 holes)
Premier	Ascot Resources Ltd	104B 054, 154, 147	Au, Ag	Epithermal Vein	TR; DD (7465 m, 48 holes)
Red Chris	Imperial Metals Corp	104H 005	Cu, Au	Porphyry	GP; DD (8782 m, 7 holes)
Red Cliff	Decade Resources Ltd	104A 033	Au, Cu	Vein	DD
Rock and Roll	Pacific Northwest Capital Corp	104B 377	Au, Ag, Zn	VMS	AB-EM, DD (540 m, 5 holes)
Snowfield	Silver Standard Resources Inc	104B 179	Au, Cu	Porphyry	DD (23 778 m, 42 holes)
Terrace	Argonaut Resources Inc	103I 062, 076	Au, Ag	Vein	DD (864 m, 11 holes)
Treaty Creek	American Creek Resources Ltd	104B 078	Au, Ag	Epithermal Vein	DD (9520 m)
Trek	Romios Gold Resources Inc	104G 029	Au, Cu	Porphyry	DD (2370 m, 9 holes)
Zymo	Eastfield Resources Ltd	093L 324	Cu, Au	Porphyry	DD (1800 m, 5 holes)

Work Program Abbreviations:

A = access; trail, road construction on claims; AB-EM = airborne electromagnetics; AB-MG = airborne magnetics; AB-RD = airborne radiometrics; BU (X tonnes) = bulk sample (weight in tonnes if known); CD = condemnation drilling; CQ = coal quality testing; CT = carbonization test (coal); DD (Xm) = diamond drilling totaling X metres; EN = environmental baseline studies/monitoring, remediation work; FS = feasibility studies; G = geology, mapping, etc; GC = geochemical sampling (rock, soil, silt, etc); GD = geotech drilling; GP = geophysics (general); IP = Induced Polarization; 3D-IP; MG = magnetics; MK = marketing-primarily for industrial mineral products; MS = metallurgical studies; OB = overburden drilling; OP-BU = open-pit bulk sample; P = prospecting; PD = percussion drilling; PF = pre-feasibility studies; PP = Pilot plant, R = reclamation; RC = reverse circulation drilling; TR = trenching, UG (X m) = X metres of underground development; UG-BU = underground bulk sample; UT = UTEM; VLF; WT = washability test (coal)

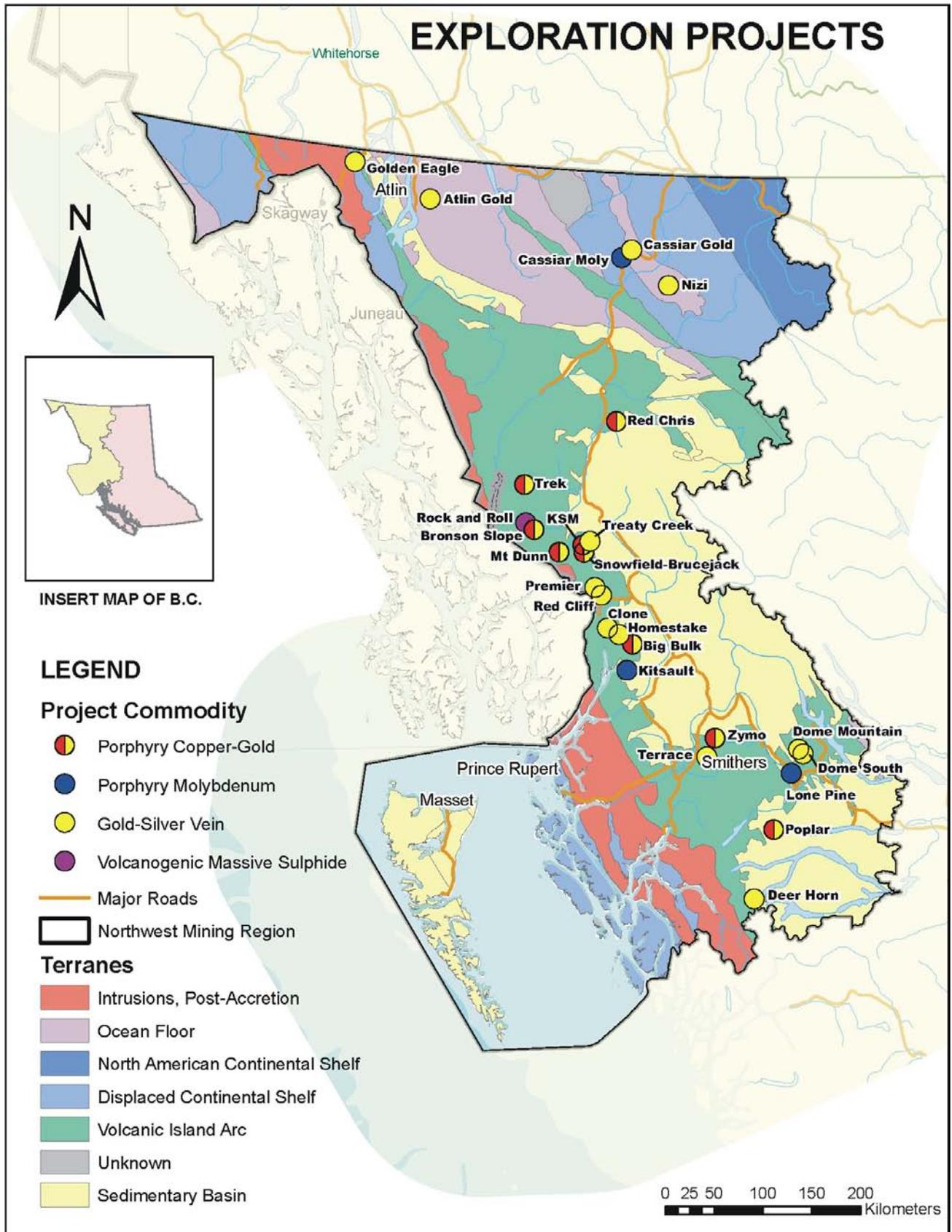


Figure 1.16. Exploration projects, Northwest Region.



Figure 1.17. Snowfield-Brucejack camp, looking south to Galena Hill zone (the gossan bluff) and toward the Bridge zone on the skyline.



Figure 1.18. Snowfield-Brucejack, two drills at work on the Bridge zone, view is toward the north.

A 20.6 m interval that included the 1.5 m interval averaged 5.33 g/t Au (with high gold assays cut to 31.1 g/t Au) and 159 g/t Ag. Hole SU-5, with no visible gold reported, graded 1.26 g/t Au and 20.4 g/t Ag over 155.0 m. Drilling also tested the Mammoth and SG zones.

Silver Standard completed 17 846 m of drilling in 37 holes in the Brucejack area. A total of 798 historic surface and underground drillholes were incorporated in a new resource estimate. Measured plus indicated resources in six zones at Brucejack total 120.5 Mt grading 1.04 g/t Au and 16.9 g/t Ag. Inferred resources are estimated at 198.0 Mt grading 0.76 g/t Au and 11.2 g/t Ag. A cut-off grade of 0.35 g/t gold-equivalent was used, and grade capping levels were determined for each zone from probability and capping graphs.

At Snowfield North, 4 km north of Brucejack, drillholes were spaced 100 m apart in order that inferred gold resources could be upgraded to measured and indicated categories (Figure 1.19). Silver Standard

completed 23 778 m of drilling in 42 holes. Snowfield North is characterized by intense quartz veining. The veins are deformed (flattened and crenulated), gold occurs with chalcopyrite and grades of copper and gold are remarkably uniform. Host rocks appear to be sericite-altered intrusive rocks. Geological and mineralogical features appear to be identical to the Mitchell zone at KSM. Seabridge geologist M. Savell (Rock Talk presentation, February 2009) suggests that Snowfields North is the upper part of the Mitchell deposit displaced by 2 km of easterly movement on the Mitchell thrust fault (refer to Figure 1.12). If this interpretation is correct, the restored Mitchell-Snowfield deposit totals 3.5 billion tonnes with roughly 40% of it on the Silver Standard property.

A new resource estimate for Snowfield (Snowfield and Snowfield North sub-zones) that incorporates the 2009 drilling determined 847.1 Mt in the measured and indicated categories grading 0.72 g/t Au, 0.12% Cu and 92 ppm Mo. Inferred resources are 639.7 Mt grading 0.37 g/t Au, 0.08% Cu and 89 ppm Mo. Both calculations used a cut-off of 0.5 g/t gold-equivalent. Metallurgical studies are in progress and include investigation of rhenium content. Molybdenite in the Mitchell-Snowfield deposit contains exceptionally high levels of rhenium (W.D. Sinclair, pers. comm., 2009).

Despite their close proximity, the Snowfield and Snowfield North zones have different characteristics (K. Konkin, pers. comm., 2009). The Snowfield zone is characterized by a weak, undeformed quartz-pyrite-molybdenite stockwork, contrasting with the deformed, quartz-rich, chalcopyrite-bearing stockwork at Snowfield North. Gold at the Snowfield zone is present as electrum encased in pyrite (versus chalcopyrite) and the grade is about 1.2 g/t (versus 0.7 g/t Au). The transition between the two zones appears to be abrupt; it is speculated by the author that an intervening fault has down-dropped the Snowfield side, exposing a higher structural level in the undeformed Snowfield gold zone.



Figure 1.19. Snowfield North, four drills at work in the large gold-copper zone; the Snowfield gold-molybdenum zone is located further upslope, above the highest drill.

The **Mount Dunn** prospect (MINFILE 104B 079) 70 km northwest of Stewart was explored by Paget Minerals Corporation. A drill program consisted of five widely spaced holes (1587 m) along a north-striking zone of sheeted quartz veins in a linear body of monzonite. Chalcopyrite and local bornite and molybdenite are reported. Historic chip sampling returned 0.87% Cu and 1.67 g/t Au across 10.7 m. The best drill intersection came from the most southerly and lowest elevation drillhole which returned 0.23% Cu and 0.28 g/t Au over 80.1 m. Grades are inferred to improve to the south and with depth. More work is planned in 2010.

On the **Trek** property (MINFILE 104G 029) located at Kilometre 92 of the Galore Creek access route, Romios Gold Resources Inc continued to drill a copper-gold breccia and fracture vein zone (Figure 1.20). Mineralization is related to a northeast fault and occurs in monzonite dikes and fractured andesite country-rock. Romios drilled 9 holes (2370 m) over a 250 m by 700 m area. Most holes intersected short intervals of high copper and/or gold values within wide intervals of low grade; for example TRK09-01 intersected 0.12% Cu and 0.18 g/t Au over 151 m including a 1.5 m interval grading 5.22% Cu and 4.67 g/t Au.

Romios Gold Resources Inc also drilled four holes on its **Newmont Lake** skarn gold prospect (MINFILE 104B 281) located 32 km south of Trek. These tested an IP anomaly adjacent to the Northwest zone but did not intersect gold mineralization. On the Dirk nunatak (MINFILE 104B 114) 5 km west of the Northwest zone, sampling of silicified limestone rafts within a syenite intrusion returned 2.9% Cu and 0.64 g/t Au over 8.0 m.

Skyline Gold Corporation reactivated its **Bronson Slope** copper-gold project (MINFILE 104B 077) adjacent to the reclaimed Snip gold mine. Two holes were drilled 400 m southeast along trend of the deposit to test the CE zone. Work in the late 1980's indicated wide, low-grade gold intercepts in potassic to propylitic alteration, and containing short intervals of semi-massive pyrite, sphalerite and galena. Results from the current drilling confirmed the character of gold mineralization and returned significant intercepts that include visible gold. Hole SK-09-1 intersected three separate intervals; 1.50 g/t Au over 26.5 m, 1.82 g/t Au over 22.4 m and 1.86 g/t Au over 18.7 m. Hole SK-09-2 intersected 4.36 g/t Au, 75.9 g/t Ag, 0.13% Cu and 1.15% Zn over 27.0 m. The hole averaged 0.97 g/t Au over its full 284.7 m core length. The Bronson Slope deposit contains a measured plus indicated resource of 225.1 Mt grading 0.36 g/t Au and 0.14% Cu and an additional 91.6 Mt inferred at a grade of 0.27 g/t Au and 0.13% Cu. The deposit consists of a quartz-magnetite replacement and stockwork zone (Figure 1.21) at the top of the Red Bluff syenite stock. A second aspect of the 2009 program was to resample core to quantify the magnetite content so that it can be added to the resource estimate.

At its **Glenora King** (GK) property (MINFILE 104G 003) near Telegraph Creek, Strategic Metals Ltd



Figure 1.20. Trek, drilling a copper-gold breccia from a steep slope set-up.



Figure 1.21. Bronson Slope, quartz-magnetite vein stockwork and replacement.

conducted a prospecting and soil geochemical program. Volcanic rocks near the contact of a high-level alkalic pluton contain shear and replacement zones with significant copper and gold values. Extensive copper and gold soil anomalies will receive detailed follow-up in 2010, likely to include diamond drilling.

AngloGold Ashanti Holdings PLC, a major gold-producing company, acquired an option on the Big Bulk prospect (MINFILE 103P 016) near Kinskuch Lake 50 km southeast of Stewart. Previous work identified extensive but sub-economic porphyry type mineralization related to a sub-volcanic intrusion about 4 square km in size. A deep-penetration IP survey performed in 2008 detected a strong anomaly at 350 m depth that was tested in 2009 by three holes, each approximately 700 m deep.

SKEENA DISTRICT

Zymo (MINFILE 93L 324) is an early-stage copper-gold prospect located 45 km west of Smithers. Eastfield Resources Ltd conducted a second round of drilling in the

Hobbes zone discovered in 2007. The westernmost step-out hole returned the widest intercept drilled on the property, 0.23% Cu and 0.13 g/t Au over 339 m (Figure 1.22). Another hole that tested below a 2008 drillhole, did not extend higher than average copper-gold grade to depth. Five holes were completed in the program. The Hobbes zone is 600 m long and corresponds to a strong IP chargeability anomaly that extends 400 m west of the drilling. Mineralization is developed in monzonite, associated with secondary potassium feldspar, biotite and magnetite. The monzonite is one of several similar bodies that lie within a 2 by 4 km magnetic anomaly, and are interpreted to be apophyses of a larger intrusion.

Exploration of the **Poplar** copper-molybdenum prospect located 45 km southwest of Houston was reactivated by Lions Gate Metals Inc. Poplar (MINFILE 093L 239) has a historic resource (pre N.I. 43-101) of 236 Mt at a grade of 0.37% Cu, 0.1 g/t Au and 0.0095% Mo based on 105 drillholes (23 164 m). The deposit is centred on a Bulkley granodiorite stock. Fifteen holes were drilled in 2005 by Aumega Discoveries Ltd on a separate intrusive body but were not reported. Lions Gate compiled past work, conducted geological mapping and performed an 18 km gradient IP survey.

A grassroots exploration program was carried out in the Babine area at **Turkey Mountain**, 10 km northwest of Granisle, by 753027 Alberta Ltd. The target was derived from the Quest West geophysical survey completed by Geoscience BC. The property is underlain by rocks of an early Tertiary volcanic centre. Correlative volcanic rocks at the Bell Copper deposit are closely related to a coeval Babine intrusion. Turkey Mountain also corresponds to a strong negative magnetic anomaly, 1.5 km wide, which is internal to a broad positive response. David Laing (pers. comm., 2009) hypothesized the anomaly may correspond to an alteration zone within an intrusion below the eruptive centre. A single drillhole 780 m deep was angled to cross the anomaly and also the projected trend of a Babine biotite feldspar porphyry dike. The hole intersected feldspar porphyry with strong hematite alteration, accounting for the magnetic response, but no copper mineralization.

PORPHYRY MOLYBDENUM PROJECTS

Molybdenum prospects occur in Cretaceous to Tertiary age plutons that post-date terrane accretion. There are two distinct areas of concentration, the Skeena Arch and the Atlin-Cassiar area. Skeena Arch molybdenum deposits are found in a number of intrusive suites: the early Tertiary Alice Arm and Nanika intrusions, the Jurassic Francois Lake batholith and perhaps in late Cretaceous Bulkley intrusions. In the Atlin-Cassiar area, molybdenum occurs mainly in late Cretaceous batholiths, the Surprise Lake and Cassiar batholiths in particular and also in Tertiary stocks.



Figure 1.22. Zymo, chalcopyrite and quartz in an altered, even-grained diorite.

Molybdenum deposits in Northwest BC can be divided into batholith-hosted and stock-hosted types based on host intrusion, deposit morphology and alteration. The latter correspond to the well-described Henderson deposit type but batholith-hosted deposits, important in Northwest region, are not widely recognized. Due to decreased activity on molybdenum deposits in 2009, the reader is referred to Wojdak and Febbo (2008) for more complete descriptions of several of the deposits noted below.

The Endako, Ruby Creek and Storie deposits belong to the batholith-hosted group. They are associated with multiple-phase granite batholiths in which the phases are distinguished primarily by texture (e.g. coarse, porphyritic or fine grained), not by composition. These deposits formed in a passive environment and consist of a wide-spaced molybdenite vein network that contains little quartz. Rich veins of coarse, nearly pure molybdenite are characteristic. Alteration of the host rock is minimal, comprising local vein envelopes of K-feldspar (Endako) or muscovite (Storie). Fluorite may be present (Ruby Creek). The deposits are laterally extensive, forming a tabular or blanket shape that is sub-horizontal at Storie and Ruby Creek, but moderately inclined at Endako. Storie and Ruby Creek are 100 to 200 m thick by 1000 m horizontally, though Endako is much larger (3.5 km). The molybdenum zone is rooted in a steep fault (South Boundary fault at Endako, Crone fault at Storie, Boulder Creek fault at Ruby Creek). Batholith-hosted deposits contain lower molybdenum grade than stock-hosted deposits but, if surface topography is favourable, they are well-suited to open-pit mining.

The Davidson, Lucky Ship, Lone Pine, Red Bird, Mount Haskins, Kitsault and other Alice Arm deposits belong to the stock-hosted group of molybdenum deposits. They are associated with small silicic intrusions approximately 500 m in diameter. Composition ranges from quartz diorite and quartz monzonite (Kitsault, Red Bird) to quartz porphyry rhyolite (Davidson, Lucky Ship,

Lone Pine), which may be the differentiated phase of a more intermediate pluton. The molybdenum deposit formed in a high-energy, in some cases explosive environment. This leads to a vertical deposit geometry with the molybdenum zone forming a hood near the top of the stock (Davidson, lower zone) or as an annular zone around the sub-vertical pluton (Lucky Ship, Red Bird, Kitsault). Stacked mineral zones may be present and mineralization can extend more than 2 km vertically (Davidson). Mineralization extends beyond the causative intrusion into altered or contact metamorphosed country rocks. Banded molybdenite veins are characteristic and breccia zones with veined clasts may be present, a result of multiple pulses of mineralization. Alteration comprises large-scale introduction of quartz as an intense stockwork and as quartz flooding. Fluorite may be present. Stock-hosted deposits tend to be higher grade than batholith-hosted, due perhaps to superimposed pulses of mineralization. The vertical morphology of stock-hosted deposits tends not to be well-suited to open-pit mining (except Kitsault); however, their higher grade may support higher cost underground mining. High rock strength and hardness imparted by silicification factors into consideration of underground mining methods and milling cost.

ATLIN-CASSIAR DISTRICT

Velocity Minerals Ltd reopened a 965 m adit on the Cassiar Moly prospect (MINFILE 104P 035). The adit (Figure 1.23) was driven in the late 1960's to explore surface showings but has since been inaccessible due to ice formation and scree cover at the portal. Underground mapping by Velocity found molybdenite occurs in north northeast faults and fractures over a 110 m width. It extends at least 268 m along trend in the workings and 253 m vertically to the surface showing. The zone was not sampled continuously; select intervals graded up to 0.403% Mo across 1.0 m. The property is 4.4 km south of the Storie prospect and is underlain by similar rocks; coarse to porphyritic phases of the Cassiar batholith. Winter conditions forced cancelation of a surface drilling program soon after the first hole was begun.

Velocity Minerals Ltd drilled four holes on its Haskins Mountain property, located north of Cassiar (MINFILE 104P 059). Based on work in 2008 the property has an inferred resource of 11.0 Mt grading 0.101% Mo at a cutoff of 0.05% Mo. The molybdenum zone is developed in an Eocene granite stock and adjacent metamorphic aureole and skarn.

Columbia Yukon Resources Inc deferred field activities on its Storie deposit (MINFILE 104P 069) near Cassiar during a period of weak molybdenum markets but worked with the Dease River First Nation to sign a traditional knowledge protocol agreement. A new resource estimate based on 2008 drilling upgraded the measured plus indicated resource to 139.82 Mt grading 0.064% Mo and the inferred resource to 58.39 Mt grading



Figure 1.23. Cassiar Moly, portal location in the rugged Cassiar Mountains.

0.059% Mo, both at a cutoff of 0.03% Mo. Mineralization is concentrated in a sub-horizontal tabular zone between texturally distinct phases of the Troutline stock, a distinct body within the Cassiar granite batholith. Molybdenite occurs as fracture coatings associated with muscovite, as disseminations and in narrow quartz veinlets.

SKEENA DISTRICT

Bard Ventures released a molybdenum resource estimate for its Lone Pine project (MINFILE 93L 027, 028) located 15 km north-northwest of Houston. Based on drilling to 2008, measured and indicated resources in the Alaskite zone are estimated at 110.34 Mt averaging 0.083% Mo with an additional 25.84 Mt inferred grading 0.088% Mo, at a cutoff of 0.04% Mo. The alaskite might be more appropriately named a quartz porphyry rhyolite dike. Much of the resource is located more than 300 m below surface and a preliminary open pit design gave a strip ratio of 10.8:1. Consequently, Bard focused its 2009 work on geological mapping that located a target area 800 m east of its mineral resource. Molybdenite was found in coarse grained, quartz and K-feldspar porphyritic granite and a border phase of quartz porphyry. The stock measures 500 by 300 m. A soil geochemical survey provided focus to the target area. Drilling began late in 2009. In addition to the leucocratic granite and quartz porphyry, which are assigned to the Nanika intrusions, drilling encountered a body of granodiorite that is correlated with the Bulkley intrusions.

MAGMATIC DEPOSITS

Turnagain is a bulk-tonnage nickel prospect in a zoned ultramafic complex, located 70 km east of Dease Lake and owned by Hard Creek Nickel Corporation. It is the only nickel project in the region. Measured plus

indicated resources are estimated at 695 Mt at a grade of 0.174% Ni and 0.014% Co (as sulphide minerals). The inferred resource is estimated to be 511 Mt at 0.173% Ni (as sulphide minerals). Determination of sulphide nickel is based on selective leach analyses; total nickel content is about 0.22%. Hard Creek contracted Norilsk Process Technology to determine the viability of its patented hydrometallurgical process to extract nickel and cobalt from a sample of Turnagain concentrate. There was no fieldwork in 2009.

POLYMETALLIC MASSIVE SULPHIDE PROJECTS

Volcanic hosted massive sulphide deposits span a wide age range and terrane affiliation in Northwest region. The Tulsequah Chief deposit is in Paleozoic strata; Kutcho Creek is in rocks of Triassic age and Eskay Creek is in Jurassic volcanic rocks.

The **Rock & Roll** project in the Iskut district was reactivated by Pacific North West Capital which drilled four in-fill core holes on the polymetallic deposit. A fifth hole tested a conductor identified by both a new AeroTEM survey and a historic horizontal loop survey. Stacked sulphide lenses occur within a sequence of argillite, siltstone and andesite of probable Triassic age. A historic inferred resource in the Black Dog zone contains 580 044 t grading 2.4 g/t Au, 335.9 g/t Ag, 0.64% Cu, 0.79% Pb and 3.1% Zn (MINFILE 104B 377).

Mountain Boy Minerals Ltd announced on October 6, 2009 that core logging had commenced on 38 core holes drilled in 2008 on the **Barbara Anne** (or BA) project (MINFILE 104A 178). The property is located 30 km northeast of Stewart. A sequence of well-bedded massive pyrite, iron-rich mudstone, chert and jasper is associated with spheroidal rhyolite in Hazelton Group strata. Silver, lead and zinc mineralization is associated with replacement-style barite and hematite alteration.

GOLD – SILVER PROJECTS

Gold-silver projects in the region targeted mainly orogenic and intrusion-related veins. In some cases these veins have associated base metal values. Gold-silver projects occur in various geologic terranes and are concentrated in four areas; the 'Golden Triangle' (or Stewart district) where most are related to Jurassic intrusions of Stikine terrane, the Atlin area where they are related to orogenic emplacement of Cache Creek terrane and to the terrane-bounding Llewellyn fault, the Cassiar area where gold veins are related to orogenic emplacement of Slide Mountain terrane, and the Skeena Arch where gold veins are mainly related to Cretaceous-Tertiary intrusions and secondarily to Cretaceous orogenic events.

ATLIN DISTRICT

Troymet Exploration Corporation returned to the **Golden Eagle** project located 50 km northwest of Atlin. Gold mineralization is related to splays of the Llewellyn fault, an important regional structure, and an intrusion that grades upward from granite to rhyolite. Five holes explored the LQ, Stibnite-Cowboy and West Gully zones (MINFILE 104M 044, 085, 039 respectively). Three holes intersected a structural zone of quartz veining and breccia that contains pyrite, arsenopyrite, sphalerite, chalcopyrite and pyrrhotite. The structural zone is more than 20 m wide and is tentatively correlated by Troymet 1300 m to an intersection in another drillhole. More drilling is required to test the mineral zone. A separate, 40 m wide mineralized fault zone was intersected in one hole in the West Gully zone. Assays are awaited.

Blind Creek Resources Ltd is a private company with extensive mineral tenure in the Atlin gold camp. The target of the **Atlin Gold** project is the source of placer gold deposits in the district. Lode gold occurs in quartz vein and breccia zones with carbonate (listwanite) alteration associated with tectonic emplacement of ultramafic rocks of the Cache Creek ophiolite complex. Eleven drillholes in the area of the Pictou prospect (MINFILE 104N 044), located 2 km east of Atlin, explored for a vein and alteration zone in the hangingwall of the Monarch Mountain thrust fault. At the time of writing, drilling was in progress at Otter Creek to test the easterly continuation of the Monarch Mountain structure and mineral zone. Continued drilling in 2010 is planned to intersect the Casino-Eagle-Rose lineament (C. Aspinall, pers.comm., 2009). Creeks draining the lineament have produced interesting gold nuggets from placer mining, including two in 2009 reported to weigh 58 to 62 oz.

Exploration of the **Nizi** prospect, 80 km northeast of Dease Lake in the Cry Lake area, was reactivated by Solomon Resources Limited (Figure 1.24). Two holes were drilled from the same site to test the Discovery "vein", a multi-stage stockwork of microcrystalline quartz, 'carbon', sulphide minerals and minor barite that lies within felsic volcanic rocks of possible Devonian to Mississippian age. The holes were angled below a 1992 drillhole that averaged 5.74 g/t Au and 28.6 g/t Ag over 13.77 m. Also in 1992, diamond-sawn channel samples of the Discovery vein returned 8.9 to 27.1 g/t Au and 597 to 1220 g/t Ag over widths of 1.0 to 3.5 m. The nature of the vein 'carbon' is unclear. It is extremely fine grained, dispersed in quartz veinlets imparting a black colour to the rock, and was misidentified in 1992 fieldwork as tourmaline.

'GOLDEN TRIANGLE' (THE STEWART DISTRICT)

At **Treaty Creek** (MINFILE 104B 078), 25 km southwest of Bell II on Highway 37, American Creek

Resources completed 9520 meters of drilling on the Eureka, Copper Belle, GR2 and Treaty Ridge zones (Figure 1.25). Holes on Treaty Ridge tested a strong EM anomaly in a stratigraphic interval that corresponds to the Eskay Creek deposit and intersected thin beds of pyrite. In the other zones gold and silver occur in a series of narrow quartz veins with galena, sphalerite and chalcopyrite in sericite-altered volcanic and sedimentary rocks of the Hazelton Group.

Teuton Resources Corporation completed two drillholes on the **Tennyson** property (MINFILE 104B 167) to test a gold-bearing arsenopyrite vein. The property is near Granduc, 35 km north of Stewart. The holes intersected a sericite alteration zone with 10% pyrite; analytic results were not available.

The **Premier Gold** property was optioned by Ascot Resources Ltd which subsequently completed 7465 m of drilling in 48 drillholes, mainly on zones in the northern part of the property that had been explored only to shallow depth by previous operators. The company is developing an epithermal vein model to explore the Northstar, Province, Martha Ellen, Montana (MINFILE 104B 146, 147, 092, 093 respectively) and other zones. Steeply dipping quartz-calcite veins, stockwork and breccia contain pyrite, sphalerite and galena. Gold and silver values range widely up to bonanza grade locally. Mineralization is linked to K-feldspar porphyry dikes derived from a Jurassic granodiorite pluton that cuts andesite of the Hazelton Group.

Nanika Resources Inc conducted a drill program on the **Silver Coin** property (also known as Silver Butte, MINFILE 104B 150) located 24 km northwest of Stewart. Silver Coin is a joint venture between Pinnacle Mines Ltd, Mountain Boy Minerals Ltd and Nanika Resources. Nanika Resources is the registered owner of the **Indi** claims but Mountain Boy owns 55% interest. Nanika Resources completed 7 drillholes on the Indi claims. Gold, zinc and silver-bearing epithermal veins and breccias occur in Hazelton Group andesitic volcanic rocks. The deposit is drilled at 20 m spacing. Measured and indicated resources are estimated at 9.7 Mt grading 1.355 g/t Au and 15.95 Mt inferred grading 1.849 g/t Au.

Decade Resources Ltd completed 31 core holes in the Montrose zone on the **Red Cliff** property near American Creek, 25 km north of Stewart. Some holes intersected veinlets of quartz with pyrite, chalcopyrite and minor sphalerite in a 30 m wide shear zone. Hole 2009-5 intersected 4.75 g/t Au over 39.6 m. Select holes returned higher grade intervals and sparked late season interest in the Stewart area. Fifty tonnes of gold ore were shipped from Montrose in 1940 and 1941 (MINFILE 104A 033).

The **Clone** property (MINFILE 103P 251) is located 16 km west of Stewart and is jointly-owned by Teuton Resources Corp and Silver Grail Resources Ltd. Shear-controlled quartz veins cut Hazelton Group volcanic rocks and contain disseminated native gold and sulphide minerals. Drilling in 2009 amounted to 1675 m in 35



Figure 1.24. Nizi, Discovery vein outcrops midway between the upper drill platform and the ridge crest, view toward the north.



Figure 1.25. Treaty Creek, Raul Sanabria supervised drilling in the GR-2 zone, view is north across Treaty glacier.

closely spaced holes. Several high-grade intercepts were reported; a resource estimate has not been prepared.

Bravo Venture Group Inc returned to the **Homestake Ridge** gold-silver prospect (MINFILE 103P 216), 35 km southeast of Stewart, to complete 13 436 metres of drilling in 48 holes. The focus of the program was to extend areas of high grade in the resource area and to explore the Homestake Silver zone, 800 m to the southeast. Bravo suggests that Homestake Silver may be an extension of the silver-rich, upper portion of the main Homestake zone. The zone also contains significant gold; the company reported an intercept of 49.0 g/t Au and 9027 g/t Ag over 0.7 m. An in-fill hole in the main deposit intersected 13.0 g/t Au and 19.5 g/t Ag over 11.9 m. Mineralization on the property consists of complex quartz-calcite veins and breccia, with associated sphalerite, galena, pyrite and chalcopyrite, in structures that are interpreted to be coeval with Hazelton Group volcanism. Based on drilling prior to 2007 the inferred

resource was calculated at 2.3 Mt grading 7.53 g/t Au, 31 g/t Ag and 0.27% Cu, at a 3 g/t Au cut-off. Late in the year, Bravo Ventures began work on the Silver Basin project, located 14 km southeast of Homestake Ridge.

SKEENA DISTRICT

On the **Kalum** property, 40 km north of Terrace, Eagle Plains Resources Ltd and Windstorm Resources Ltd carried out a soil geochemical survey and extended an IP survey north of the Burn gold showing (MINFILE 103I 211). The project targets an intrusion-related gold deposit. Prospectors found a new gold showing on the property.

The **Terrace** property covers a large area approximately 30 km northeast of Terrace. Apex Geoscience Ltd conducted work for Argonaut Resources completing nine short drillholes at M&K (MINFILE 103I 062) and two deep holes at Golconda (MINFILE 103I 076), the latter to test an IP anomaly. A series of base and precious metal quartz veins, including M&K, lie within an 8 km east-trending zone along the northern margin of the Lower Jurassic Kleanza pluton. Golconda is one of numerous precious and base metal vein occurrences that lie in a large embayment of Hazelton Group volcanic rocks intruded by dikes of the Cretaceous Carpenter Creek pluton.

The historic **American Boy** (MINFILE 093M 047) prospect 7 km northeast of Hazelton was explored by a new company, TAD Capital Corporation as the Hazelton South project. A series of quartz veins on the property contain base metals and significant gold and silver; a total of 348 t of ore were shipped between 1918 and 1955. TAD performed magnetometer and soil geochemical surveys and detailed geological work in preparation for a drilling program. The veins occur in the hornfels aureole of a Bulkley granodiorite stock.

At **Blunt Mountain**, 25 km east of Hazelton, Remington Resources Inc reappraised a series of high-grade gold-silver-lead-zinc veins by trenching and drilling. The Skilokis prospect (MINFILE 093M 099) was explored by Noranda Mining and Exploration Inc and Atna Resources Ltd in the 1980's. The veins occur in the hornfels aureole of a Bulkley granodiorite stock.

Deer Horn is a historic gold-silver prospect located 160 km south of Smithers (MINFILE 093E 019) and was the subject of a comprehensive exploration program by Golden Odyssey Mining Inc. Geological mapping, LIDAR and IP (15 km) geophysical surveys, channel sampling and diamond drilling (1700 m in 35 holes) were performed. A gold-silver-tellurium vein is developed in the hangingwall of a local thrust fault and may be related to a body of quartz diorite with tungsten mineralization (as scheelite). A historic unclassified resource (not NI 43-101 compliant) of 249 000 t grading 10.1 g/t Au and 294 g/t Ag was derived from some 600 m of underground workings developed in the 1950's (Figure 1.26). In the current program, historic holes were twinned to validate



Figure 1.26. Deer Horn, Harry Huffels and Cody Philpott at the adit and collapsed 1989-1990 drill core; the moderately dipping quartz-gold vein is visible above the portal.

important intercepts. Also, a 150-meter segment of the Main Vein was drilled with close-spaced holes; a bulk sample is being considered in 2010.

Golden Odyssey Mining Inc completed a program of nine core holes (1111 m) on its **Dome South** property, 45 km east of Smithers. Drilling targeted three zones; the Peggy polymetallic vein showing, a chargeability anomaly and a magnetic high anomaly. Geological work by the company determined that the Peggy showing occurs within silicified limestone near the transition between intermediate and felsic volcanic rocks. Surface sample analytic values were up to 7800 ppm Cu and 77.9 ppm Ag across 1.55 m. Drilling results were not available.

Callinan Mines Ltd completed a 40 km induced polarization survey over its new silver-base metal target area on the **Coles Creek** project. The property is located 90 km south-southwest of Houston. A proposed drilling program was not carried out.

OUTLOOK FOR 2010

Capital markets began to recover in 2009. Late in the year risk capital became more available for mineral exploration, as evidenced by nine drilling programs in Northwest region that began in October and November, a time when drilling programs normally conclude. Gold and silver prices are at very high levels. Copper and zinc are fairly strong and their prices are trending higher. The outlook for molybdenum is less certain. Based on these commodity and financial trends, the increase in exploration activity that began in the second half of 2009 is expected to continue and may gain strength in 2010. The focus in the northwest will be on gold and copper.

Porphyry copper projects in the Iskut-Stikine district, several uncommonly enriched in gold, will feature prominently in exploration, evaluation and development of new mines. A start on construction of the Northwest

Transmission Line will be an important step toward realizing the potential of some of these deposits. Reactivation of the Galore Creek project is possible, with Teck Corporation conducting a feasibility study of the redesigned project while applying for an amendment to its environmental assessment certificate. Imperial Metals is anticipated to pursue a Mines Act permit for an open pit mine at Red Chris, subject to confirmation of its federal development certificate by the Supreme Court. It is likely there will be an expanded deep drilling program at Red Chris in 2010, to follow up on very encouraging results. A reduced level of activity is anticipated at KSM as mineral resource and environmental data has largely been collected and the Project Report required for environmental assessment is being prepared. A high level of activity is likely to continue on the neighbouring Snowfield-Brucejack property. New gold resource estimates for the adjoining Brucejack, Snowfield, Snowfield North, Mitchell, Sulphurets and Kerr deposits have an aggregate total exceeding 4.37 billion tonnes containing more than 85 million ounces of gold. The location presents huge challenges to development so that economic viability is not assured, but this enormous resource will continue to command the attention of the mining industry.

Junior companies will continue to evaluate precious metal projects in the Stewart, Atlin, Cassiar and Skeena Arch districts for opportunities to develop small gold mines in the near-term, building on the experience of the Yellowjacket, Cassiar Gold and Dome Mountain projects. These are predominantly vein deposits with potential for high grade.

ACKNOWLEDGMENTS

The author is thankful for the contributions made by the mine staff, exploration geologists and prospectors who work in northwest B.C. This report would not be possible without their input and their hospitality while visiting projects is greatly appreciated. Lynn Bresser graciously prepared the regional maps (Figures 1.1 and 1.16) and Carey deHoog prepared the pie-charts. Constructive comments by Dave Lefebure led to significant improvements. Mike Savell shared his insight into the KSM area by generously providing the geological map shown as Figure 1.12, thereby clarifying the relationship between gold deposits in the Sulphurets district. Reviews by Tania Demchuk, Loren Kelly and Jay Fredericks resulted in further improvement. Skillful work by Garry Payie produced the final format. Errors or omissions remain the responsibility of the writer.

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NORTHEAST REGION: A SNAPSHOT

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¹The regional geologist position for the North-Central and Northeast regions was vacant from June until December 2009. Therefore this report is based only on information published by companies.

SUMMARY AND TRENDS

Despite the global financial crisis, 2009 saw exploration activity and mine development in the Northeast Region continue at high levels, comparable to 2008. The coalfield continued to attract interest from Asian investors due to the potential to open new mines and make use of the under-utilized rail and port facilities. The number of mine employees also grew through the year with the transition from contractors to staff.

Peace River Coal Inc (PRC), the operating entity for the Peace River Coal Limited Partnership (73.8% Anglo Coal Canada Ltd, 14.2% Hillsborough Resources Ltd, 12.0% Northern Energy and Mining Inc), continued mining its **Trend** property south of Tumbler Ridge, with the intent of adding to production from the nearby **Roman Mountain** deposit beginning in 2013. However, PRC put its work program for the **Horizon** project to the north of Roman Mountain on hold in 2009. In November 2009, Anglo American (UK) announced that the PRC assets were not considered part of the core assets of the corporation and would be sold. It is not expected that this decision will affect operations in the short term.

Western Coal Corp (WCC), formerly Western Canadian Coal Corp, continued operation of the **Perry Creek** mine within the **Wolverine Project** west of Tumbler Ridge, and of the **Brule** mine south of Chetwynd. The **Willow Creek mine** reopened in 2008 with the anticipation of coal sales in mid-2009. In late November 2008; however, mining operations were suspended temporarily at Willow Creek due to market uncertainties and the project remained on hold through 2009. Other projects, which the proponents intend to advance for mine development, are **EB** and **Hermann** (WCC), **Goodrich Central South** (First Coal Corp), **Gething** (Canadian Dehua International Mines Group Inc), and **South Hasler** and **B.C. Coal Project** (Unicorn International Mines Group Inc). In late November 2008, the **Hermann** project was granted an Environmental Assessment (EA) certificate.

First Coal was particularly active on its **Goodrich Central South** project east of Chetwynd, obtaining permits necessary for taking a 100 000 t bulk sample in 2010 and moving the components for the Addcar mining

system onto the site. The Belcourt-Saxon Coal Limited Partnership, a 50/50 joint venture of Peace River Coal with Western Canadian Coal, undertook a drilling project on the **Belcourt West** project southeast of Tumbler Ridge.

Estimated exploration expenditures for 2009 stood at \$20.1 million, only slightly below the \$21 million spent in 2008, but above the \$10.5 million in 2007. Similarly, 2009 drilling activity, at about 41 800 m, was down from 54 600 m in 2008 (Figures 2.1, 2.2), as some projects moved to more advanced stages of development activities. Locations of mines, developments and exploration projects are shown in Figure 2.3.

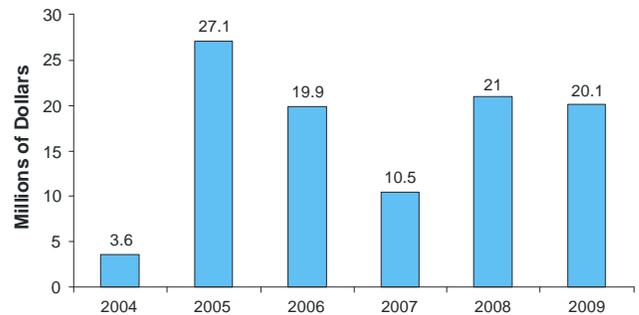


Figure 2.1. Annual Exploration Expenditures, Northeast Region.

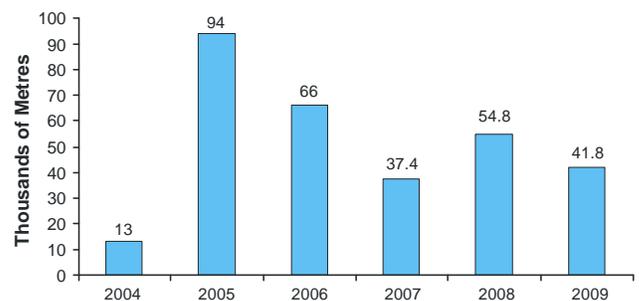


Figure 2.2. Annual Exploration Drilling, Northeast Region.

Operating Mines and Selected Major Exploration Projects in North East British Columbia 2009

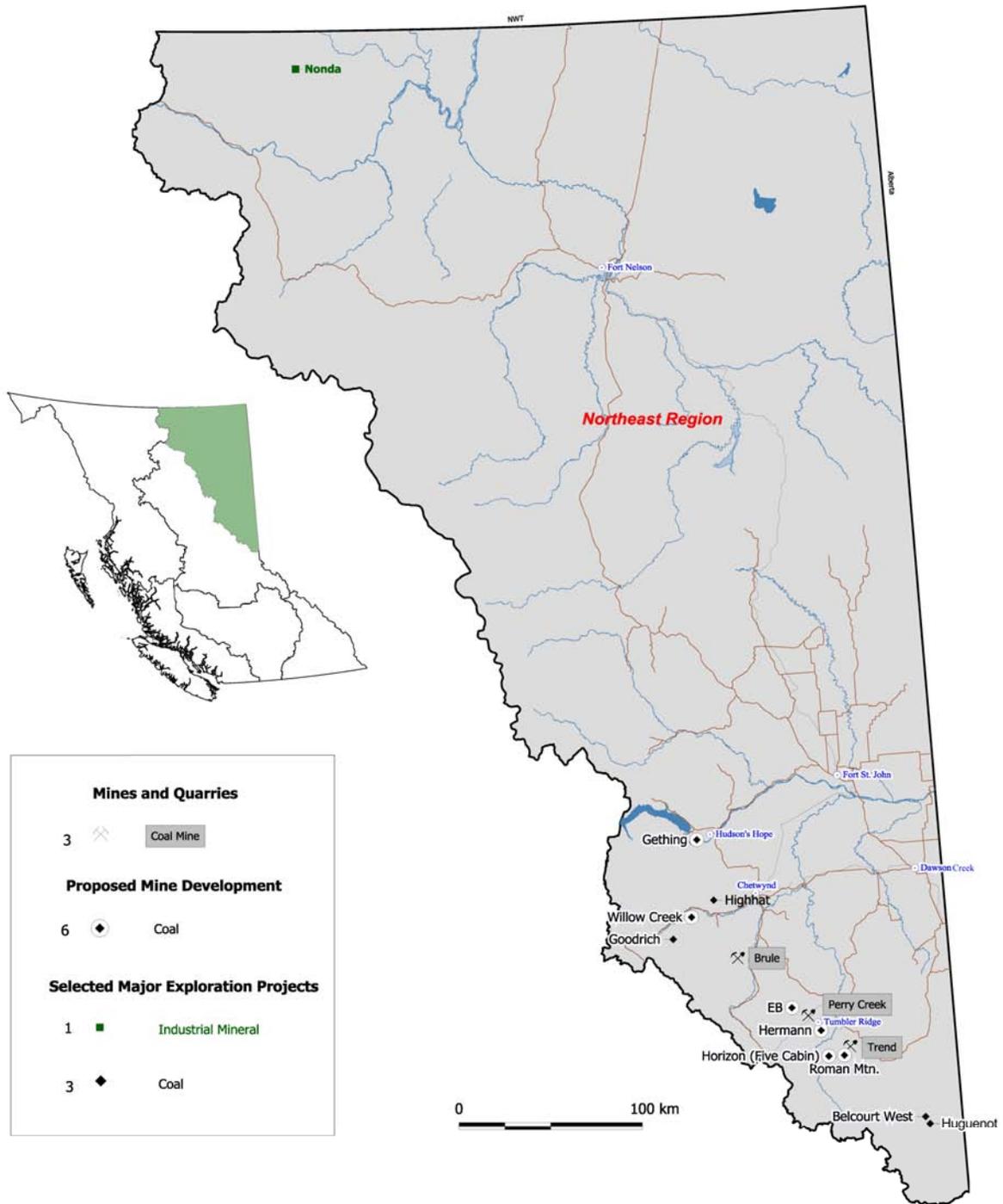


Figure 2.3. Operating Mines, Development Projects, and Major Exploration Projects, Northeast Region, 2009.

In 2009, the British Columbia Geological Survey, in cooperation with Peace River Coal and Western Coal Corp, held a coal symposium (Figure 2.4) and a geological field trip in the Tumbler Ridge area examining coal deposits and host stratigraphy. The symposium was well attended by industry geologists. Andrew Legun, Coal Geologist for the Geological Survey, led the regional fieldtrip (Figure 2.5) and presented concepts on the origin of the coal deposits.



Figure 2.4. Barry Ryan, consultant and ex of the BC Geological Survey. Presenting at the Northeast BC Coal Symposium in Tumbler Ridge.



Figure 2.5. Andrew Legun, coal geologist for the B.C. Geological Survey, leading the Coal Symposium field trip.

MINES AND QUARRIES

COAL MINES

Three coal mines were operating in the Northeast region in 2008, namely PRC's **Trend** mine, and WCC's **Perry Creek (Wolverine Project)** and **Brule** mines. Mining activity is summarized in Table 2.1.

Peace River Coal's **Trend** mine, commissioned in January 2006, is located about 25 km south of Tumbler Ridge. Medium-volatile bituminous coal is being mined from the Lower Cretaceous Gates (D, E, F, G/I and J seams) and Gething formations with a cumulative coal thickness of 15 metres, in a narrow pit that exploits a tight upright fold. Production in 2009 was targeted at 1 Mt of mostly metallurgical coal with a small amount of thermal coal. The estimated production life of the **Trend** mine is about ten years, based on reserves of 17 Mt (December, 2009). Peace River Coal's work force increased from 80 to about 333 in 2009 as PRC moved from contractor mining to owner operated mining. PRC's loadout rail facility, a few kilometres north of the Trend mine, was completed in 2007. From here the company ships, through the Ridley Terminals Inc at Prince Rupert, to markets in Japan, Korea and Europe. In 2010, PRC anticipates commencing mining from the Gething formation (phases 1-3) and returning to the Gates formation (phases 4-6) in 2012.

Western Coal Corp's **Wolverine** Project, about 25 km to the northwest of Tumbler Ridge, reached the cumulative production landmark of 5 Mt in 2009 and saw continued production from the **Perry Creek** mine, which began operations in July 2006 (Figure 2.6). Estimated production in 2009 is 1.46 Mt of clean metallurgical coal from the Gates Formation (E, F, G and J seams) with a cumulative coal thickness of 15 m. Mining operations, carried out by 398 employees, were primarily associated



Figure 2.6. Moving waste rock at WCC's Wolverine Mine.

TABLE 2.1. FORECAST MINE PRODUCTION, NORTHEAST REGION, 2009

Mine	Operator	Deposit Type/ Commodity	Work Force	Forecast Production (2009) tonnes	Measured and Indicated Resources (effective date)
Trend	Peace River Coal Inc	Metallurgical Coal	~330	1 000 000 t	17 Mt (December 2009)
Wolverine (Perry Creek)	Western Canadian Coal Corp	Metallurgical Coal	~400	1 461 000 t	28.9 Mt (April 2009)
Brule	Western Canadian Coal Corp	PCI Coal	~80	475 000 t	34.3 Mt (April 2009)

with Phase 3 of open pit development and the company is examining options for underground operations as it follows the coal seam. Subject to regulatory approvals, output is projected to increase to 3 million tonnes per year (Mt/yr), which would equal the capacity of the preparation plant. The projected pit life is ten years. Shipping is through Ridley Terminals Inc to markets in Asia, Europe and South America.

Current total reserves stand at 28.9 Mt measured and indicated for Perry Creek, to which could be added a total of 42.4 Mt if the nearby **EB** and **Hermann** deposits are included.

The WCC's **Brule** mine is located about 45 km south-southwest of Chetwynd adjacent to the former Dillon mine, which closed in September 2006 after reserves were exhausted. Brule began shipping "ultra-low volatile" pulverized coal injection (PCI) (bituminous) coal in March 2007, releasing coal from seams designated Upper, Lower and Seam 60, in the Gething Formation with a cumulative thickness of 12.2 m. Forecast production in 2009 was 0.48 Mt run-of-mine coal. *In situ* reserves as of April 2009 stood at 34.3 Mt. The Brule Mine employs about 79 WCC workers on-site, and the operation is in the transition process from contractor mining to owner-operated mining. At present, coal is trucked to the Bullmoose loadout facility. Plans had been to build a road northward to the **Willow Creek** mine (the Falling Creek haul route) to make use of that facility's wash plant and shipping infrastructure (Figure 2.7), but those plans were put on hold with the suspension of operations at Willow Creek. Western Coal Corp's two operating mines offer the combined potential of 6 Mt/yr of coal production for at least 15 years.

The agreement to acquire **Willow Creek** by WCC was finalized in 2009. Willow Creek produced from August 2004 to October 2006 under previous owner,

Pine Valley Mining Corporation. WCC began stripping operations again at Willow Creek in October 2008 only to suspend them at the end of November, 2008 with no production. In 2009, 9 staff were on site as the mine continued under care and maintenance. WCC's Willow Creek mine area is more complex structurally than those to the south, and is characterized by tight anticlines and synclines overturned to the west. Pulverized Coal Injection and metallurgical coal had been extracted previously from two pits in the "Central Zone," from the Gething Formation in which Seams 1 through 8 are accessible in tight upright folds. Initial production from the central zone of the re-opened mine, subject to approvals, could be about 900 000 tonne/yr, potentially increasing over the following two years to as much as 2.2 Mt/yr as the "North Zone" is developed (Figure 2.8). In 2009, WCC continued an on lease drilling program to define better the coal resource in the North Zone and conducted condemnation drilling for a potential waste site west of the north property adjacent to North Zone coal resources. Total *in situ* measured and indicated resources, as of April 2009, stood at 36.0 Mt. Mine life could be as long as 15 years depending, of course, upon the rate of production.

MINE DEVELOPMENT PROJECTS

An Environmental Assessment (EA) certificate is in place for WCC's **EB** deposit, with 11.8 Mt of *in situ* coal resource (April 2009), located near the Perry Creek operation, which would supplement production. A further deposit of WCC, the **Hermann** project, is located 16 km southwest of Tumbler Ridge, and would add an additional 30.6 Mt of *in situ* coal resources. An EA certificate for the Hermann coal mine project was granted in late November 2008.

MINE EVALUATION PROJECTS

Peace River Coal plans to supplement production from its **Trend** mine with production from **Roman Mountain**, which has a proposed 15-year life expectancy at an annual production of 2.5 Mt commencing in 2013. An EA submission for the Roman Mountain project is anticipated. Like Trend, Roman Mountain would exploit both the Gates and Gething formations. The main pit would release coal from the Gates Formation within an upright syncline; and Gething Formation coal would be mined from two small pits, one on each side of the main pit. To the north of Roman Mountain, PRC also proposes to develop the **Horizon** block as a combined open pit/underground operation.

First Coal Corp continued to work on its **Goodrich Central South** property southwest of the former Willow Creek mine. About 41 Mt of measured and indicated and 32 Mt of inferred metallurgical coal resource have been identified, principally in the Bickford Formation but with some in the overlying Gething Formation (Figure 2.9). First Coal plans to extract a 100 000 t bulk sample by remote means using an adaptation of a conventional AddCar unit to the steeply-dipping seams at the proposed mine site (Figures 2.10, 2.11). Contingent upon a successful outcome, the property may advance to EA and mine permitting in 2010. In 2009, no drilling activity was undertaken as the company prepared permits and equipment for bulk sampling. Some initial trenching was completed.



Figure 2.7. Willow Creek wash plant.



Figure 2.8. John Stockman, WCC geologist explaining Willow Creek geology.



Figure 2.9. Skender Sulaj, First Coal's site geologist, showing coal seams at the Goodrich Project.



Figure 2.10. Addcar components arriving at the Goodrich Property.

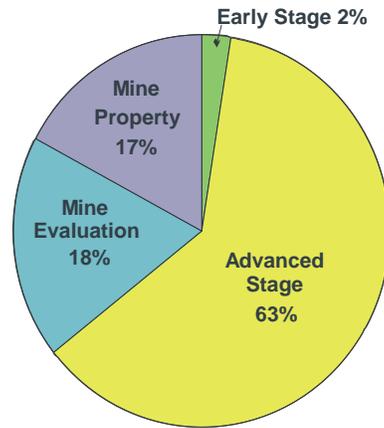


Figure 2.12. 2009 exploration expenditures by category.

COAL EXPLORATION

Significant exploration projects in the Northeast Region are listed in Table 2.2. This compilation was assembled prior to the end of the calendar year and contains some estimates of the work completed. Figure 2.12 offers an estimated breakdown of 2009 expenditures by category (early stage exploration, advanced-stage exploration/deposit appraisal, mine evaluation, and mine property exploration). Please refer to the introduction to this publication for the definitions of each of these exploration stage categories.

EXPLORATION HIGHLIGHTS

South Of Tumbler Ridge

During 2009, Peace River Coal Inc continued the development process for its **Roman Mountain** project, located adjacent to the Trend mine, with submission of an application to the Environmental Assessment Office anticipated. About 30 Mt of coal had been identified in

the Roman Mountain deposit. The coal measures at Roman Mountain occur in a tight upright syncline at the top of the mountain and extend for up to 7 km along strike. The pre-application environmental assessment process for the project began in 2007, and the intent is to commence production in 2013. In 2009, the Partnership also completed 7000 m of on-lease drilling at the adjacent **Trend** mine to extend reserves. At PRC's **Horizon** project, there was no drilling activity in 2009 as the company models a new resource estimate that incorporates the Horizon, **South Ridge**, and **Barbara** projects, to be combined under the Horizon project. About 45 Mt of metallurgical and PCI coal resource have been identified historically, and this is expected to increase under the new modelling.

The Belcourt-Saxon Coal Limited Partnership, a 50/50 joint venture of Peace River Coal with WCC, undertook a 5-hole drill project comprising approximately 1000 m on the **Belcourt West** project, located about 90 km southeast of Tumbler Ridge. The partnership is exploring a set of Gates Formation coal seams. In January 2009, a National Instrument (NI) 43-101 statement was filed that indicated 86 Mt of proven reserves, 167 Mt of measured and a further 4 Mt of

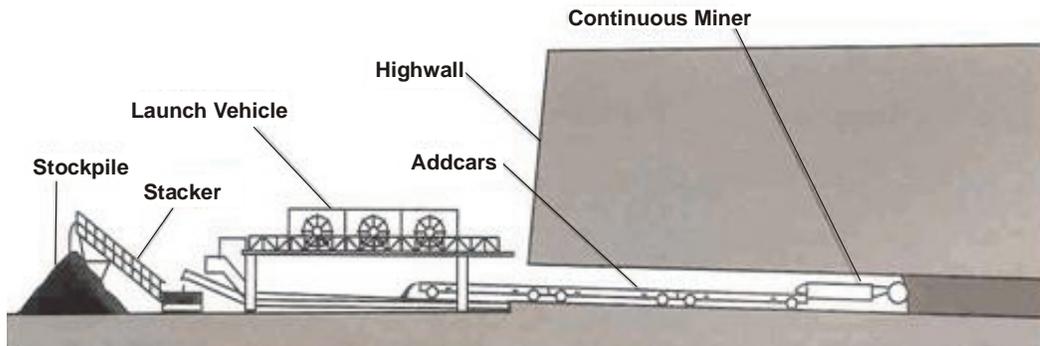


Figure 2.11. Addcar mining system.

TABLE 2.2. SIGNIFICANT EXPLORATION PROJECTS IN THE NORTHEAST REGION

Property	Operator	MINFILE (NTS ref.)	Commodity	Deposit Type	Work Program
Belcourt West	Belcourt-Saxon Coal Limited Partnership	093I 014, 016	Metallurgical Coal	Sedimentary	A, PD (1000 m)
Brule (Blind Pit)	Western Canadian Coal Corp	093P 007	ULV PCI Coal	Sedimentary	PD (1 050 m)
Goodrich Central South	First Coal Corp	093O 034	Metallurgical Coal	Sedimentary	TR, EN, OP-BU
Highhat	Trefi Coal Corp	(093P.041)	Metallurgical Coal	Sedimentary	G, PD (1000 m)
Horizon (Five Cabin)	Peace River Coal Inc	(093I.086)	Metallurgical Coal/PCI Coal	Sedimentary	On hold
Huguenot	Colonial Coal Corp	(093I.049, 50)	Coal	Sedimentary	G
EB (Wolverine)	Western Canadian Coal Corp	093P 015	Coal	Sedimentary	On hold
Perry Creek (Wolverine)	Western Canadian Coal Corp	093P 025	Metallurgical Coal	Sedimentary	A, PD (6 635 m) DD (200)
Roman Mountain	Peace River Coal Inc	093I 030	Metallurgical Coal	Sedimentary	A, EN, PF, PD (9 000 m) DD (1 000 m)
Trend Mine Extension	Peace River Coal Inc	093I 030	Metallurgical Coal	Sedimentary	PD (4 000 m) DD (3 000 m)
Willow Creek	Western Canadian Coal Corp	093O 008	Metallurgical Coal/PCI Coal	Sedimentary	DD (455 m) PD (2 030 m)

Work Program Abbreviations:

A = access (trail, road construction on claims); AB-EM = airborne electromagnetics; AB-MG = airborne magnetics; AB-RD = airborne radiometrics; BU (X tonnes) = bulk sample (weight in tonnes if known); CD = condemnation drilling; CQ = coal quality testing; CT = carbonization test (coal); DD (Xm) = diamond drilling totalling X metres; EN = environmental baseline studies/monitoring, remediation work; FS = feasibility studies; G = geology, mapping etc.; GC = geochemical sampling (rock, soil, silt etc.); GD = geotech drilling; GP = geophysics (general); IP = Induced Polarization; 3D-IP; MG = magnetics; MK = marketing (primarily for industrial mineral products); MS = metallurgical studies; OB = overburden drilling; OP-BU = open-pit bulk sample; P = prospecting; PD = percussion drilling; PF = pre-feasibility studies; R = reclamation; RC = reverse circulation drilling; TR = trenching; UG (Xm) = X metres of underground development; UG-BU = underground bulk sample; UT = UTEM; VLF; WT = washability test (coal)

indicated resources. Following an exploration program in 2008 on its nearby **Huguenot** project, Colonial Coal Corp did not undertake further drilling in 2009 as it prepared a NI 43-101 statement. The company was following the southeast extension of the Belcourt South coal deposit onto their property and successfully defined coal seams in both the Gates and Gething formations in the northwestern portion of the property. In 2009, the company did some minor work to extend the investigation

to the remainder of the property, south of Holtslander Creek.

Wolverine Valley Area

Western Coal Corp continued its on-lease drilling program around the **Perry Creek** mine in its Wolverine Project area, planning to define and extend reserves to about ten years at the projected production rate. Thirty-eight rotary and one diamond drill boreholes were

completed, totalling about 60 800 m. Included in the Wolverine Project is the nearby **EB** deposit. Whereas the Gates Formation beds at the Perry Creek operation are characterized by tight upright folds, at EB the unit is nearly flat-lying. About 8 Mt of run-of-mine (ROM) metallurgical coal are available at EB (April 2009), and no further work occurred on this property in 2009. Western Coal Corp also conducted an on-lease exploration program at its **Brule** mine, completing some 2500 m of percussion drilling in 33 holes. WCC's **Hermann** project is located south of the Perry Creek mine and about 16 km southwest of Tumbler ridge. Exploration drilling on the property is complete, and in late November, 2008 the Province granted the company an EA certificate for the proposed mine. Mining is proposed from four pits to access five seams (E, E4, F, G and J) of the Gates Formation, having an aggregate thickness of 14.8 m. From a coal resource of 10.7 Mt (April, 2009), production would be at the rate of 0.8 to 1.1 Mt/yr.

Hudson Hope Area

Canadian Dehua International Mines Group Inc intends to develop its **Gething** property, located about 25 km west of Hudson's Hope, as an underground operation. Production would be from the upper 150 m of the Lower Cretaceous Gething Formation, in which previous exploration identified 8 significant coal seams with an inferred resource of 98 Mt of coal. By late 2007, the project was in the EA pre-application stage. In 2009, the company completed 14 drill holes with a total of approximately 11 200 m to further define the resources. The **Highhat** project, operated by Trefi Coal Corp, was also the site of drilling activity in 2009, and a NI 43-101 statement was issued that estimated measured and indicated reserves of 39 Mt and resources of nearly 91 Mt.

OUTLOOK FOR 2010

Coal prices remained strong in 2009 compared to historic values, although reduced from the highest prices ever in 2008. These high prices tended to insulate the coal sector in otherwise uncertain economic times and the region around Tumbler Ridge benefited from the coal mining and exploration jobs and demands for services. Metallurgical coal prices are expected to remain high for 2010 driven largely by Demand from Asian markets.

The opportunity to attract Asian investment to the northeast coalfields is significant. The Ministry of Energy, Mines and Petroleum Resources is working with investor groups, trading houses and mining companies in China, Japan and South Korea to promote investment, through the provision of information, in B.C.'s mineral resources. During the 2009 Asia Investment Mission, coal opportunities attracted very strong interest from investors in this region as economies generally remain

strong (and particularly so in China) despite the financial crisis. Marketing B.C.'s investment opportunities to the Asia region is coordinated by the Marketing and Investor Relations Branch and the British Columbia Mineral Development Office of the Ministry of Energy, Mines and Petroleum Resources.

ACKNOWLEDGMENTS

This snapshot is less than complete for 2009 as the position of Regional Geologist in the Ministry's Prince George Office was vacant for most of the year. In order to provide some basic information on activities in the region, ministry staff undertook a brief review of activity in the NE Region. The writer wishes to thank John DeGrace, former Regional Geologist for the extensive records that he left, without which this summary would be much less complete. The writer also wishes to acknowledge, with thanks, the support of staff in the Prince George Regional Office, and in particular Mines Inspectors Victor Koyanagi for his assistance in providing information. Special thanks are also extended to Patrick Saunders, of the Geological Survey Branch, for his work in preparing the regional map. Also, thanks to Dave Lefebure, Chief Geologist, and Tania Demchuck, Manager of Geoscience Marketing and Partnerships in the Geological Survey Branch for providing valuable suggestions and feedback. Of course, any errors or omissions are the sole responsibility of the author.

NORTH-CENTRAL REGION: A SNAPSHOT¹

By Paul Wojdak, MSc, PGeo

¹The regional geologist position for the North-Central and Northeast regions was vacant from June until December 2009. Therefore this report is based only on information published by companies.

SUMMARY AND TRENDS

Gibraltar copper-molybdenum mine continued with a major expansion project that, together with expanded ore reserves, will maintain the operation for at least 25 years at current copper prices. The Kemess copper-gold mine will close in 2011. Exploration at the Mount Polley copper-gold mine continued to be successful, in particular at discovering higher grade zones below open-pit depth. A combination of underground and open-pit mining may occur within a few years to maintain the operation beyond 2015.

The proposed Mt. Milligan copper-gold mine received approval from both provincial and federal agencies. It is poised for development, depending on successful financing of the estimated \$915 million cost to build the mine.

Exploration activity focused on copper-gold porphyry projects in the Quesnel Terrane both north and south of Prince George. Gold Fields Limited and Newcrest Mining Limited, both major mining companies, were attracted to the region and optioned promising projects from junior explorers. Major programs were conducted at the Pine property in the Toodoggone district and at Woodjam North in the Likely area. In the same belt, continued exploration on the Kwanika property identified an important structural control to copper-gold mineralization (Figure 3.1).

There were significant developments in two gold districts. On the Nechako plateau, a promising zone of epithermal gold mineralization was discovered on the Blackwater-Davidson property. In the Wells-Barkerville area, new estimates of gold resources were announced on the Spanish Mountain, Frasergold and Bonanza Ledge properties.

A significant discovery of rare earth metals (cerium, lanthanum, neodymium) was made in the Wicheeda carbonatite complex northeast of Prince George near the Rocky Mountain Trench.

METAL MINES

Mount Polley copper-gold mine is located 100 km by road northeast of Williams Lake and is wholly-owned by Imperial Metals Corp. A total of 6.9 Mt of ore were mined in 2008 producing 27 350 t Cu, 1460 kg Au and 16 200 kg Ag. Reserves at the beginning of 2009 were 46.2 Mt grading 0.34% Cu, 0.29 g/t Au and 0.95 g/t Ag.

Estimated production in 2009 is 19 000 t Cu, 1650 kg Au and 7200 kg Ag. Most ore mined in 2009 came from the Springer pit where 85% of property reserves are located. Springer ore is highly oxidized and consequently metal recoveries were low, in the order of 60% for copper and 70% for gold. Ore was also supplied from the Southeast and Wight pits, with the last of Wight ore mined in mid-year. The Pond zone was developed and the first ore is expected to be delivered to the mill in early 2010. The current mine life is to the end of 2015.

Mount Polley is an alkalic porphyry copper deposit. Exploration at Mount Polley focused on drilling in the Boundary zone, although the Pond zone and northwest of the Springer pit were also tested. A highlight drillhole in the Boundary zone returned a 157 m intersection grading 1.73% Cu, 1.11 g/t Au and 10.5 g/t Ag beginning at 158 m below surface. This and other high grade intercepts are considered unsuitable to be mined by open pit, in consideration of depth and strip ratio, and will be explored for potential underground mining. Beginning in 2010 the Boundary zone will be drilled from an underground ramp to be driven from the north wall of backfilled Wight pit. High copper grade was also intersected in the Pond zone with a 9.3 m intersection grading 6.40% Cu, 0.89 g/t Au and 67.7 g/t Ag in skarn-type mineralization. Continued drilling targeted an underground mineable resource. Exploration drilling near the Springer pit targeted a potential expansion of open-pit resources.

The **Kemess South** copper-gold mine is located 430 km northwest of Prince George or 240 km north of Smithers and is 100% owned by Northgate Minerals Corporation (Figure 3.2). The mine operates at 52 000 tonnes-per-day and employs 400 people full-time. Production in 2009 is forecast at 5340 kg Au (171 600 ounces) and 23 500 t Cu. Reserves at the beginning of 2009 stood at 34.2 Mt grading 0.41 g/t Au and 0.17% Cu. In 2008, Kemess processed 16.9 Mt of ore producing 5760 kg Au (185 162 ounces) and 23 545 t of Cu. Metal recoveries were 67% for gold and 79% for copper. Improvements to the metallurgical process in 2009 are expected to significantly improve metal recovery. Mine closure is scheduled in early 2011.

The **Gibraltar** copper-molybdenum mine continued a major expansion and modernization program in 2009 that will lead to a 50% increase in copper output in 2010. The mine is located near Williams Lake and is 100% owned by Taseko Mines Limited. Late in the year Taseko announced a tentative agreement to sell 25% interest in

Operating Mines and Selected Major Exploration Projects in North Central British Columbia 2009

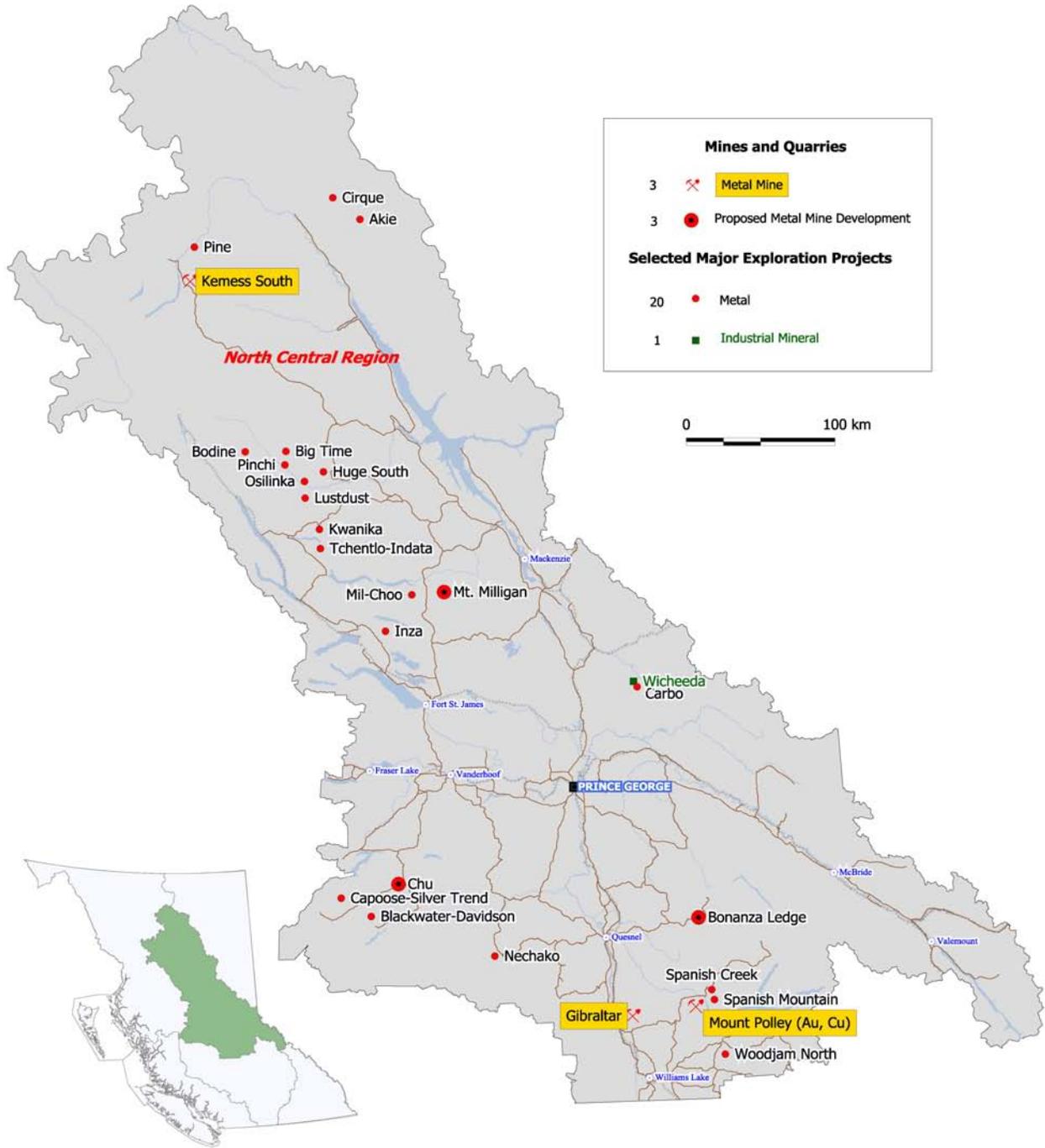


Figure 3.1. Mines, Development and Major Exploration Projects in North-Central Region, 2009.



Figure 3.2. Mining of the Kerness South deposit.

Gibraltar to Sojitz Corporation for \$180 million. Taseko would manage the new Joint Venture operation. A total of \$250 million was spent in 2008 and 2009 on new mining equipment and concentrator upgrades. Ore reserves at the beginning of 2009 were 428 Mt at a grade of 0.315% Cu and 0.008% Mo, sufficient for 25 years of mine life at the new milling rate of 49 900 tonnes-per-day, with an additional 870 Mt of measured and indicated resources grading 0.298% Cu and 0.008% Mo. Production in 2008 amounted to 34 900 t Cu and 380 t Mo from 12.3 Mt of ore milled. Metal recoveries were 76% for copper and 32% for molybdenum. A small proportion, roughly 3% of the copper, was produced from oxidized stockpiles by solvent extraction and electrowinning. Gibraltar is expected to produce 32 000 t Cu and 310 t Mo in 2009, based on projection of data from the end of the third quarter to year-end (Table 3.1).

MINE DEVELOPMENT PROJECTS

Terrane Metals Corporation prepared a feasibility update for development of the **Mt. Milligan** copper-gold deposit. The project has a BC environmental assessment certificate and a BC Mines Act permit to build a 60 000 tonne-per-day open-pit mine and, on December 1, 2009 received a federal environmental assessment certificate. Proven and probable ore reserves are stated at 482 Mt

grading 0.20% Cu and 0.39 g/t Au. Capital cost is estimated to be \$915 million. To assist in financing construction of the mine, Terrane Metals and Goldcorp Inc. (majority owner of Terrane) signed an option agreement whereby Goldcorp may convert its equity interest in Terrane into a participating joint venture in the Mt. Milligan project. If developed, the mine is expected to have a life of 22 years. Late in the year the provincial and federal governments announced plans to upgrade a connector road between Mackenzie and Fort St. James, anticipated to improve access to the mine from both communities. Mt. Milligan is an alkalic porphyry copper-gold deposit with a measured and indicated resource of 706.7 Mt grading 0.18% Cu and 0.33 g/t Au.

MINE EVALUATION PROJECTS

At the **Bonanza Ledge** gold project in the Wells-Barkerville area, International Wayside Gold Mines Ltd conducted mechanical trenching and drilling in order to upgrade the inferred gold resource to measured and indicated categories. A 2009 technical report on the property disclosed resources of 264 264 t averaging 6.51 g/t Au (measured), 193 086 t averaging 4.46 g/t Au (indicated) and 206 742 t averaging 3.77 g/t Au (inferred) at a cut-off grade of 1.7 g/t Au. International Wayside reported a pre-feasibility study for a 200 tonne-per-day open-pit gold mine with ore to be trucked 110 km to the idle QR mill for treatment. The QR mill is owned by Cross Lake Minerals Ltd which is undergoing restructuring under creditor protection. International Wayside struck a non-binding agreement-in-principle with Cross Lake to purchase the QR mill at an undisclosed price.

The **Chu** molybdenum project, located 80 km south of Vanderhoof, entered the BC environmental assessment process in 2009. However, project owner TTM Resources Inc conducted little fieldwork on the property due to tight financing, particularly for molybdenum projects. Measured plus indicated resources at Chu are estimated at 313.25 Mt grading 0.060% Mo at a cut-off grade of 0.04% Mo. Quartz-molybdenite veinlets are developed in an elongate zone where a swarm of granodiorite dikes have invaded hornfelsed sedimentary and volcanic rocks.

TABLE 3.1. MINE PRODUCTION AND RESERVES, NORTH-CENTRAL REGION, 2009

Mine	Operator	Production (2008)	Tonnes milled (2008)	Reserves (Dec.31, 2008)
Gibraltar	Taseko Mines Limited	34 900 t Cu, 380 t Mo	12 300 000	428 000 000 t at 0.315% Cu, 0.008% Mo
Kerness South	Northgate Minerals Corp	23 545 t Cu, 5760 kg Au	16 900 000	34 200 000 t at 0.17% Cu, 0.41 g/t Au
Mount Polley	Imperial Metals Corp	27 350 t Cu, 1460 kg Au, 16 200 kg Ag	6 900 000	46 200 000 t at 0.34% Cu, 0.29 g/t Au, 0.95 g/t Ag

EXPLORATION

Porphyry Copper Projects

Gold Fields Toodoggone Exploration Corp conducted a major exploration program on the **Pine** porphyry copper-gold property located 23 km north of the Kemess mine (Table 3.2). The program comprised geological mapping, geophysics and a planned 4000 m of core drilling. Geophysical work included a low-level airborne magnetic survey and a 420-km IP and gravity grid. Mineralization occurs in early Jurassic granodiorite near the contact of coeval Toodoggone volcanic rocks. A crew of 35 to 40 were employed in the field.

Serengeti Resources' **Fleet** property is located 50 km south of the Kemess copper-gold mine in the Quesnel Terrane. Several porphyry-style copper-molybdenum-gold showings occur on the Fleet property, some with historic copper intercepts. An untested induced polarization anomaly near the 1970-era drillholes is considered a prime exploration target by Serengeti.

On the **Croy Bloom** copper-gold project, a planned drilling program by Newcrest Mining Limited was deferred due to First Nations' access issues. Newcrest has an option to earn 51% interest in the property from Serengeti Resources Inc. The deferred drill program was to follow-up on four holes drilled by Newcrest in 2008 that intersected widespread, but low grade mineralization. Croy Bloom is located 85 km south of the Kemess mine.

The **Pinchi** porphyry copper-gold property located 270 km northwest of Prince George was acquired by Amarc Resources Ltd. Drilling began in September to explore strong, extensive and coincident magnetic and induced polarization anomalies in an area of glacial gravel with no rock outcrop. The property adjoins the Lorraine prospect and is underlain by rocks of Quesnel Terrane about 120 km south of the Kemess mine.

The **Big Time** porphyry copper-molybdenum property was explored by Amarc Resources Ltd and Falkirk Resources Corp. The property is located west of the Pinchi fault and west of the Lorraine deposit. IP and soil geochemical surveys were completed but drilling was deferred.

Serengeti Resources drilled six widely-spaced holes on the **Osilinka** property, located 35 km northwest of Kwanika. Three of the holes, whose location was guided by geochemical and geophysical anomalies, intersected weak copper and gold mineralization associated with zones of silica and potassic alteration.

On its **Kwanika** copper-gold project, Serengeti Resources Inc continued drilling in the South zone (Figure 3.3). Early in 2009, the company announced an

indicated resource in the Central zone of 182.6 Mt grading 0.29% Cu and 0.28 g/t Au at a cut-off grade of 0.25% Cu equivalent. The property is located 140 km northwest of Fort St. James in the Quesnel Terrane. Mineralization is constrained between the Pinchi fault to the west and the Hogem batholith to the east. Drilling in 2009 identified the West fault, a structurally controlled mineralized zone along the west side of the South zone (Figure 3.4). Defined by seven holes, the West zone is 350 m long by 500 m in depth and has an average drill intercept width of 126.6 m that grades 0.41% Cu, 0.09 g/t Au and 0.022% Mo. This newly recognized structure has an untested target length of 2.3 km.

The **Tchentlo-Indata** area in the southern portion of the Kwanika property, 10-25 km south of the Central zone deposit, was explored by six widely-spaced shallow drillholes. Only traces to minor amounts of mineralization were found.

Serengeti Resources Inc drilled on the adjoining **Choo** and **Mil** copper-gold properties located 15 to 25 km southwest of Mt. Milligan. Two 300 metre-deep holes were drilled at Choo to test large and intense aeromagnetic and induced polarization anomalies below historic shallow drillholes. The historic holes intersected anomalous copper-gold values in altered volcanic rocks.



Figure 3.3. Kwanika; drilling on the copper-gold project.



Figure 3.4. Kwanika; Hugh Samson, project geologist, and Eric Moore, geotechnician, process drill core.

TABLE 3.2. SELECTED EXPLORATION PROJECTS, NORTH-CENTRAL REGION, 2009

Project	Operator	MINFILE	NTS (if no MINFILE)	Deposit Type	Work Program
Akie	Canada Zinc Metals	94F 031		Massive Sulphide	G
Aspen	Tsedeka Resources			Industrial Mineral	BU
Big Time	Amarc Resources Ltd		93N.082	Porphyry	GC, IP
Blackwater Davidson	Richfield Ventures Corp	93F 037		Vein	DD (2532 m)
Bodine	Amarc Resources Ltd	93N 179		Massive Sulphide	DD
Bonanza Ledge	International Wayside Gold Mines Ltd	93H 019		Vein	TR, DD (1346 m), EN, PF
Capoose Silver Trend	Silver Quest Resources Ltd	93F 040		Vein	DD (1692 m)
Carbo	Commerce Resources Corp. & Canadian International Minerals Inc		93I.041	Carbonatite	G, GC
Huge South	Amarc Resources Ltd		93M.100	Porphyry	GC, IP
Inza	Strongbow Exploration Inc	93K 111		Porphyry	IP
Kwanika	Serengeti Resources Inc	93N 018, 073		Porphyry	DD
Lustdust	Alpha Gold Corp	93N 009, 044		Skarn	DD (6365 m)
Mil- Choo	Serengeti Resources Inc	93N 227		Porphyry	DD
Mt Polley	Imperial Metals Corp	93A 008		Porphyry	DD
Nechako Gold	Endurance Gold Corp	93B 003		Sedimentary replacement	DD (536 m)
Nonda	Stikine Gold Corp		94N.072	Industrial Mineral	DD (934 m)
Osilinka (Cat)	Serengeti Resources Inc	94C 050		Porphyry	DD
Pinchi	Amarc Resources Ltd		93N.092	Porphyry	DD
Pine	Goldfields Toodoggone Exploration Corp	94E 016		Porphyry	IP & gravity (420 km), DD
Spanish Mountain	Skygold Ventures Ltd	93A 043		Vein	DD (5000 m)
Tchentlo-Indata	Serengeti Resources Inc		93N.034	Porphyry	DD
Wicheeda	Spectrum Mining Corp	93J 014		Carbonatite	DD (1835 m)
Woodjam North	Gold Fields Limited	93A 078		Porphyry	G, GC, GP, DD

Work Program Abbreviations:

A = access; trail, road construction on claims; AB-EM = airborne electromagnetics; AB-MG = airborne magnetics; AB-RD = airborne radiometrics; BU (X tonnes) = bulk sample (weight in tonnes if known); CD = condemnation drilling; CQ = coal quality testing; CT = carbonization test (coal); DD (Xm) = diamond drilling totaling X metres; EN = environmental baseline studies/monitoring, remediation work; FS = feasibility studies; G = geology, mapping, etc; GC = geochemical sampling (rock, soil, silt, etc); GD = geotech drilling; GP = geophysics (general); IP = Induced Polarization; 3D-IP; MG = magnetics; MK = marketing-primarily for industrial mineral products; MS = metallurgical studies; OB = overburden drilling; OP-BU = open-pit bulk sample; P = prospecting; PD = percussion drilling; PF = pre-feasibility studies; PP = Pilot plant, R = reclamation; RC = reverse circulation drilling; TR = trenching, UG (X m) = X metres of underground development; UG-BU = underground bulk sample; UT = UTEM; VLF; WT = washability test (coal)

Similarly, drilling on the Mil property targeted deep coincident IP and magnetic anomalies that are associated with a glacial till gold anomaly.

Strongbow Exploration Inc conducted an IP survey on the **Inza** copper-gold porphyry property, located in Quesnel Terrane 55 km north-northwest of Fort St. James. Work by previous operators found copper mineralization in monzonite and Takla Group volcanic rocks and delineated soil geochemical anomalies.

Recent logging has improved access and exposed new copper occurrences.

Gold Fields Limited, through a subsidiary company, optioned the **Woodjam North** copper-gold property from joint venture partners Fjordland Exploration Inc and Cariboo Rose Resources Ltd. The Woodjam property, located 45 km northeast of Williams Lake, was subdivided into north and south components. Gold Fields conducted a comprehensive program that

included geological mapping, soil geochemistry and a 75 km induced polarization survey, the latter focused on an area north of the Megabuck and Deerhorn zones. A low-level airborne magnetic and radiometric survey was flown over the entire Woodjam property in the search for new zones of porphyry mineralization. Core drilling began in October with 4000 m planned to test the Takom and Deerhorn zones where previous drill intercepts include 0.26% Cu and 0.40 g/t Au over 127 m and 0.25% Cu and 0.62 g/t Au over 51 m, respectively. A further 2000 m of drilling was allotted to test targets arising from the above mentioned surveys.

The Woodjam property lies within the Quesnel Terrane which hosts numerous copper-gold porphyry deposits. Rocks on the property comprise diorite to monzonite of the Upper Triassic Takomkane batholith and coeval mafic volcanic rocks of the Takla Group. No work was done by Fjordland and Cariboo Rose on **Woodjam South** where a 2008 drillhole intersected 1.01% Cu and 0.44 g/t Au over 201 m.

Polymetallic Massive Sulphide Projects

The **Bodine** copper-zinc project of Amarc Resources Ltd. is located northwest of Fort St James in the Sitlika belt of volcanic rocks. Channel samples returned grades of 1.79% Cu over 2.9 m and 1.37% Cu over 2.4 m. A program of three drillholes began in September targeting a volcanogenic massive sulphide deposit. The first hole, with a planned depth of 450 m, explored downdip of two holes drilled in 2008 that intersected broad intervals of stringer-style mineralization with highly anomalous zinc and copper. Drilling in 2008 tested extensive zinc, copper, silver and lead soil anomalies, associated IP signatures and intersected thick sequences of felsic volcanic rocks.

Amarc Resources advanced two other massive sulphide prospects in the Sitlika volcanic belt. Soil geochemical and IP surveys were carried out on the **Huge South** and **Olsen** properties.

There was no drilling at the **Akie** sedex zinc-lead project in 2009. Canada Zinc Metals conducted a regional exploration program in search of new mineralized targets within their extensive mineral tenures. The property is underlain by folded shale and siltstone of the Upper Devonian Gunsteel Formation and has an inferred resource of 23.6 Mt grading 7.6% Zn, 1.5% Pb and 13 g/t Ag. Several new mineral occurrences were identified as a result of the 2009 program. The most prospective are the GPS barite-laminated pyrite showing and the Breccia sphalerite-galena-barite showing on the Pie property. The GPS showing is hosted by black shales similar to, and along strike from, rocks containing the Cirque deposit. The Breccia occurrence is at a shale-limestone contact, a common stratigraphic position for lead-zinc mineralization in the Kechika Trough.

The **Cirque** sedex deposit, also in the prospective Gunsteel Formation, has a geological resource of 38.5 Mt grading 8.0% Zn, 2.2% Pb and 47 g/t Ag that dates from 1986 and is not NI 43-101 compliant. Joint venture partners Teck Corporation and Korea Zinc Company Ltd deferred a planned 7000 m drilling program until 2010.

Gold-Silver Projects

Richfield Ventures Corp optioned the **Blackwater-Davidson** epithermal gold property on the Nechako plateau from Silver Quest Resources Ltd. Results from an initial 2532 m drilling campaign led to a second phase program that continued at the time of writing (Figure 3.5). Intercepts include 1.26 g/t Au over 148 m in one hole and 1.06 g/t Au over 207 m from another. Large diameter core (HQ size) was drilled to maximize recovery. Mineralization is a siliceous breccia, accompanied by pyrite, sphalerite and galena, which is developed in highly altered and brecciated felsic volcanic to subvolcanic rocks interpreted to be a rhyolite dome (Figure 3.6). Blackwater-Davidson is near the Capoose and 3Ts projects, an area of epithermal gold-silver mineralization

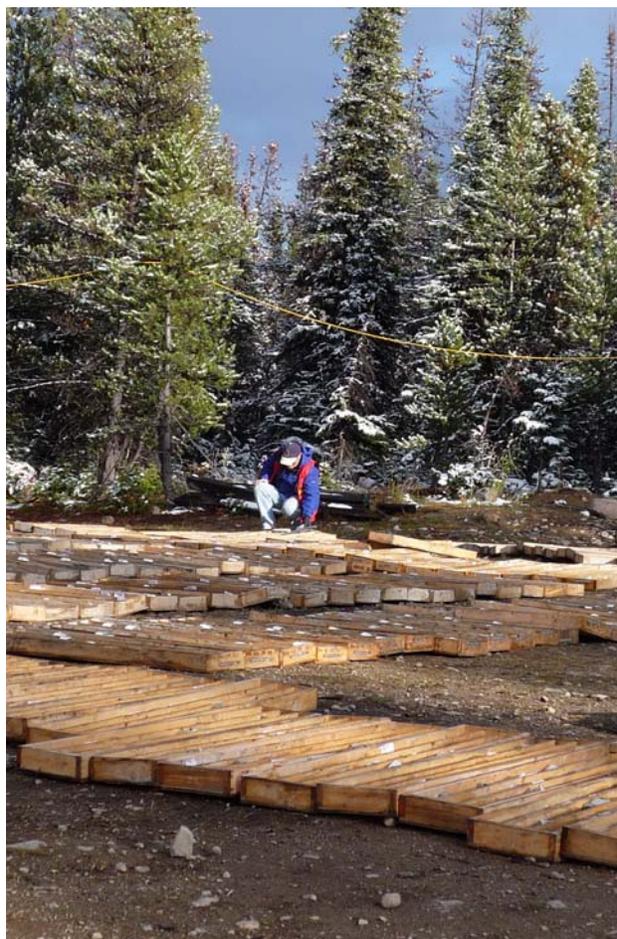


Figure 3.5. Blackwater-Davidson; Andre Panteleyev logs diamond-drill core.



Figure 3.6. Blackwater-Davidson; brecciation and silica veining in flow-banded rhyolite.

located 105 km southwest of Vanderhoof.

On the **Capoose-Silver Trend** project, Silver Quest Resources Ltd completed 13 core holes totalling 1692 m. The property covers three zones of disseminated silver and gold mineralization and a 4.5 km long geochemical anomaly. Historic resources in the Capoose deposit (not NI 43-101 compliant) are estimated at 28.2 Mt grading 36.0 g/t Ag and 0.34 g/t Au. Hostrocks are garnet-bearing rhyolite sills and hornfelsed argillite. The 2009 program was designed to test several targets including a southern extension of the Capoose deposit. Drillhole D-09-100 intersected two zones of significant mineralization; an upper zone graded 67.9 g/t Ag and 0.26 g/t Au across 16 m and a second zone, 29 m deeper in the hole, graded 61.8 g/t Ag and 4.72 g/t Au over 9.0 m.

The **Nechako** Gold property of Endurance Gold Corporation was explored by three diamond-drill holes. The property is located 90 km west of Quesnel. A previous operator discovered widespread low grade gold in flat lying chert pebble conglomerate of the lower Cretaceous Skeena Group. Gold seems to correlate with hematite alteration in the conglomerate. Clay-altered and pyritic quartz porphyritic felsic dikes (or rhyolite flows) were intersected in two holes. A one meter sample from a felsic dike returned 2.33 g/t Au. The third hole intersected a 68 m interval of strong hematite alteration within conglomerate but did not contain significant gold.

On the **Spanish Mountain** gold project, Skygold Ventures Ltd conducted in-fill drilling on its Main zone gold resource and drill-tested regional targets. The property is located 6 km east of Likely. In early 2009, the company announced a measured plus indicated resource of 102.26 Mt averaging 0.785 g/t Au (at a cut-off of 0.5 g/t Au) within the Main zone. In-fill holes recovered HQ-size core and sought to define an area near surface that contains higher gold grade. A minimum of 25 holes totalling at least 4000 m was planned. Twelve regional exploration holes were completed and found that significant gold mineralization extends at least 350 m north of the Main zone. Gold occurs in an orogenic setting; with disseminated pyrite and in quartz veinlets

developed in complexly folded and weakly metamorphosed argillaceous sedimentary rocks.

Hawthorne Gold Corporation disclosed a resource estimate for its **Frasergold** project in 2009, derived from drilling in 2008. Measured plus indicated resources stand at 34.08 Mt averaging 0.559 g/t Au. Metallurgical studies were undertaken. The Frasergold property is located 100 km east of Williams Lake. Gold occurs in a series of quartz veins and segregations developed in strata that were deformed under orogenic conditions.

Alpha Gold Corporation conducted a 6365 m drilling program on its **Lustdust** gold project located 250 km northwest of Prince George. Gold and copper occur in skarn and manto zones developed within a sequence of limestone, siltstone and mafic tuff of the Cache Creek Group, intruded by the dikes and sills of the Eocene Glover stock. The program comprised in-fill holes in the Canyon Creek skarn zone, tested for a northern extension and replicated historical holes that had not been surveyed. Pyrite, chalcopyrite, sphalerite, galena, arsenopyrite and pyrrhotite are associated with garnet and other calc-silicate minerals.

Rare Earth Metals

Drilling results from the **Wicheeda** rare earth elements (REE) project 80 km northeast of Prince George stimulated interest in carbonatites along the Rocky Mountain Trench. The property is owned by Spectrum Mining Corporation, a private company, which conducted an 11-hole program (1835 m) to follow up on promising results from a four-hole program in 2008. Several intrusive bodies of carbonatite and syenite breccia are emplaced over a 15 km distance. The carbonatite consists of massive, coarse-grained dolomite-ankerite to calcite. The breccia comprises syenite clasts in a carbonatite matrix. Minor constituents of the carbonatite include K-feldspar, biotite, cordierite, pyrochlore, columbite, magnetite, pyrite, monazite and a bastnaesite-synchisite-parasite mineral. The latter two mineral species are enriched in rare earth metals. All drillholes returned significant values, for example, 1.3% Ce, 0.64% La and 0.26% Nd over 144 m, beginning at the collar, in hole 2009-09. Preliminary investigation of mineral processing suggests the Wicheeda material is amenable to conventional processing to produce a marketable concentrate.

The **Carbo** project of Commerce Resources Corp and International Minerals Inc is located 5 km southeast of Wicheeda. Geological mapping and prospecting were conducted, as well as rock, silt and soil geochemical surveys. The latter delineated a strong cerium anomaly over a one kilometre distance. Trenching and drilling are planned in 2010.

Industrial Mineral Projects

The **Nonda** property near the British Columbia border north of Toad River was acquired by Stikine Gold Corporation as a potential source of high-quality silica. Silica sand is used to recover gas by hydro-fracturing the reservoir rock in certain unconventional gas fields. The Horn River basin, located 150 km to the east, is an important new unconventional gas field. Nine holes were drilled in three 3-hole fences to test quartzite strata within the Lower Silurian Nonda Formation.

2010 OUTLOOK

In 2010, a continued high level of exploration work is expected in the Quesnel copper-gold porphyry belt where large deposits will continue to attract the interest of major companies. Gold projects in the Wells-Barkerville and Nechako districts will also figure prominently, due to the high price of gold. The discovery of a rare earth metals prospect northeast of Prince George will spur exploration for other carbonatites along the Rocky Mountain trench. The level of activity in the Kechika sedex lead-zinc belt may increase with a revival of work on the Cirque deposit.

ACKNOWLEDGMENTS

This report may not include some important projects, in particular on industrial mineral quarries. The author regrets the omission of significant properties and exploration programs. The author credits Patrick Saunders for expert work to prepare the map (Figure 3.1) and thanks Richfield Ventures and Serengeti Resources for providing digital photos of their projects. Dave Lefebure, Tania Demchuk and Jay Fredericks reviewed an early draft and George Owsiacski's skill in formatting improved the final product.

SOUTH-CENTRAL REGION

By **Bruce Madu, P.Geo,**
Regional Geologist, Kamloops

SUMMARY AND TRENDS

Exploration expenditures in South-Central BC in 2009 fell to approximately \$21 million ending a decade long run of increasing expenditures, including all time spending highs in the previous two years (Figure 4.1). During the year the financial crisis, which started in 2008, eased somewhat as markets and commodity prices rebounded and companies were again able to raise money. Many companies chose to conserve capital during the year to meet administrative expenses, but not fund field programs after having drawn down the corporate coffers in recent years. The sharply lower drilling total reflected, in part, the financing crisis, but more significantly that many advanced programs have moved beyond large definition drilling programs and are now in pre-production development or advanced resource studies. This year's total of 41 000 m (Figure 4.2), therefore, largely represents pioneering drillholes to test step outs or new exploration models rather than "grid" drilling.

Given lean exploration budgets for junior companies, there was more reporting of grassroots exploration at properties that have seen more focused exploration in recent seasons. An apparent rise in grassroots exploration from 3% to 7% of the total exploration total (Figure 4.3) partially reflects this, but the actual amount spent was similar to previous years. It was interesting to observe some discoveries reported simply from "walking the property". Many companies also spent time this year analyzing previously collected data, generating new exploration concepts and preparing for future programs.

In several cases companies shifted their exploration focus to gold properties to align with the strong gold prices, often at the expense of commodities such as molybdenum. There was growing interest through the year in rare earth elements with many of the region's nepheline syenites being tenured.

The south-central region saw significant capital investment at mine and mine development projects. At **Highland Valley Copper** the mine life extension to 2019 involved a \$120 million capital investment this year. Mine development at the **New Afton** project continued with an investment of approximately \$66 million toward full production in late 2012. Development at the **Copper Mountain** project is progressing rapidly with an estimated \$50 million capital investment aimed at mill construction and other site activities. Pre-mining stripping is anticipated in 2010 with full production to begin shortly thereafter.

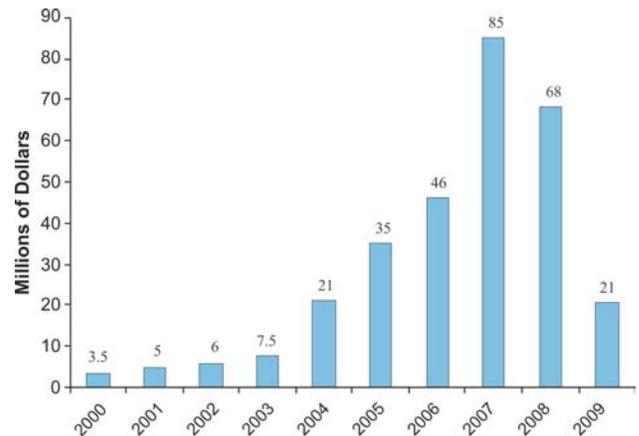


Figure 4.1. Annual exploration spending, in millions of dollars, south-central region.

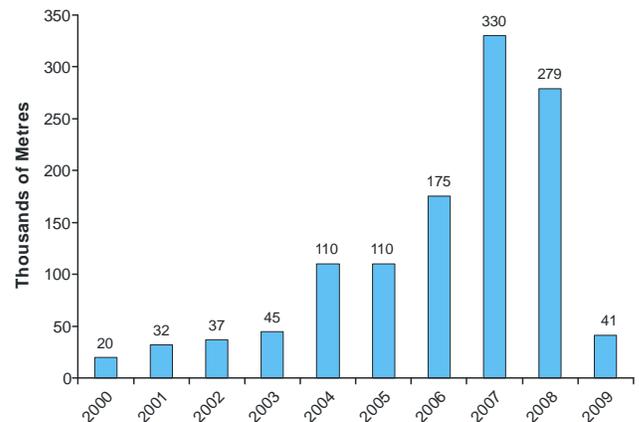


Figure 4.2. Annual exploration and development drilling, in thousands of metres, south-central region.

Three projects are now in the Environmental Assessment process: the **Prosperity** (copper-gold), **Harper Creek** (copper) and **Ruddock Creek** (zinc, lead, silver) projects. Ongoing work at the Prosperity project has increased the reserves of the deposit by almost 70% and made it one of the largest undeveloped deposits in the country. A recommendation from the review of the project is anticipated in early 2010. Work at the Harper and Ruddock Creek properties this year was aimed at better understanding the deposits and little was done to move them along in the review process.

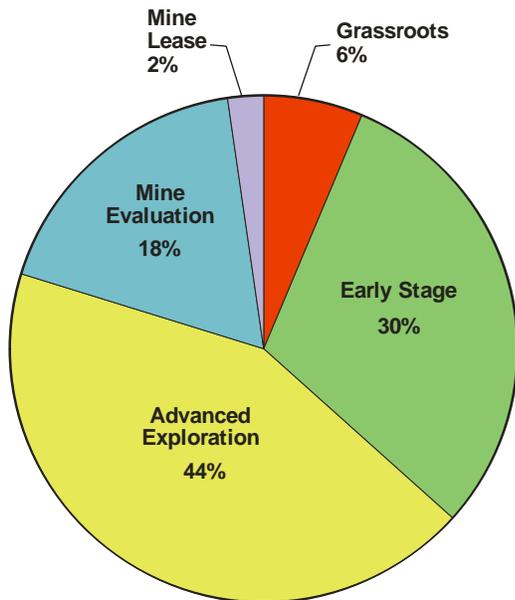


Figure 4.3. Annual exploration expenditures divided by exploration stage, south-central region.

Owing to this region's blessing of high quality, bulk mineable, porphyry-style deposits this target remains a perennial favorite. Copper-gold projects remained the most significant of these, with many companies focusing more closely on the gold-enriched zones of their projects as was the case at the **Lac La Hache**, **Newton Mountain** and **Miner Mountain** projects. Activities at the **Ajax**, **Getty Copper** and **Dot** properties were focused on completing economic assessments, feasibility studies or resource calculations. Field programs were completed at the **Rateria**, **Logan Copper**, **Yalakom** and **Taseko** properties. Copper-molybdenum targets were less active this year, perhaps from the volatility of molybdenum prices which were off from recent very high prices. At the **Crazy Fox** property a minor drill program was completed but resources were also directed toward the Ace showing: a nearby gold showing on an adjoining property. Similarly at the **North Brenda** property copper-molybdenum exploration was sidelined in favor of exploring for gold in a similar setting to the nearby **Elk** project.

Exploration for high-grade gold-silver veins occurred at the **Bralorne** Mine project where the company is intensely exploring the BK zone in an effort to re-open this prolific past producer. Scoping level studies are underway at both the **Elk** and **Blackdome/Elizabeth** projects to set a pathway and resume mining at these past producers of gold and silver. At the **Panorama Ridge**, **Spanish Creek**, **Windpass** and **Prospect Valley** properties higher grade gold-silver veins are present within broad zones of low-grade gold mineralization that are under exploration for bulk tonnage gold mineralization. The recent high gold prices have encouraged companies to direct ship high-grade bulk

samples for custom milling as was seen at the **Watson Bar** and **Bonaparte Gold** properties. Both projects shipped mineralized rock to the Kinross Gold Corporation owned mill in Republic, Washington.

It was a quieter year for stratiform polymetallic massive sulphide deposits after several years of steady interest. Prices for zinc and lead have steadily risen through the year and with smelting facilities for those metals within the province, interest should return to the numerous deposits in this region. Programs were completed at the **Moore** and **SPN** properties on the Adams Plateau whilst many other projects were idle.

As mentioned above, rare earth elements and other high-technology metals were of keen interest to the industry this year. Anchoring much of the exploration activity in the North Thompson River area, the **Blue River Carbonatite** project is defining a growing tantalum and niobium resource. At the **Mount Copeland** project, core from last year's drilling for skarn-hosted molybdenum is being analyzed for light rare earth elements owing to the presence of nepheline syenites at the property.

Each year discoveries that have been reported or been made aware to Ministry staff are noted. It is often challenging to sort out truly original discoveries from new zones on established properties or known showings that haven't been captured in previous reporting. None the less, it is interesting to feature them as insights to the fact that in mature exploration districts there are still discoveries to be made and that there is a lot of prospective geology in the province that has simply been overlooked or never examined at all. The specifics of the discoveries are discussed in more detail in the main body of the paper. The author accepts that there will be omissions in this list as it cannot represent all of the discoveries that have been made this year.

In the Adams Lake region three prospectors have made what appear to be two original discoveries: Tom Robinson's Longspur showing at the **Midday** property and partners Tom McDonald and Alfie McKay at the Hammer zone on their **Stellar** property. Both properties are in prospective zinc-lead-copper areas and both are showing gold enrichment as well. In the Guichon Creek batholith near Logan Lake, two companies are reporting success in finding new mineralization: Happy Creek Minerals Ltd announced the new NTP zone at its **West Valley** property and SNL Enterprises reported success at the Blue, Midway and Cliff showings at its **Logan Copper** property. Both of these properties are hosted in a similar geological environment and are relatively close to the world-class Highland Valley copper-molybdenum mine. In the Goldbridge camp, where prolific amounts of gold have been produced from high-grade mesothermal gold-quartz veins, two properties announced discoveries. At the **Bralorne Mine** project of Bralorne Gold Mines Ltd three new veins were encountered in drilling at the BK zone, the significance of which is still undetermined, but it is encouraging to realize that after over 80 years

since the start of mining and exploration new veins can still be found. Closer to Lillooet, the **Ample-Goldmax** property often yields high-grade gold intersections and this year Supreme Resources Ltd announced the results of some 2008 drilling that appear to have revealed a new area of mineralization. A final discovery involves some late 2009 work at the **Newton Mountain** project where Amarc Resources Ltd have announced long intersections of low-grade gold mineralization at what appears to be a transitional environment from porphyry-style copper-gold through to epithermal-style gold mineralization.

MINES AND QUARRIES

All of the operating mines in the region are listed in Table 4.1 and their locations are shown on Figure 4.4.

METAL MINES

Highland Valley Copper, a partnership of Teck (97.5%) and Highmont Mining Company Ltd (2.5%), continues to invest a large amount of capital and operation time towards both the 2013 and 2019 mine plans (Figure 4.5). Stripping was nearing completion on the east wall push back in the Valley pit when geotechnical concerns forced the company to address stress cracks that were encountered. Final remedial designs are anticipated near year end and will likely involve a large amount of additional stripping to reduce the load on the pit walls and release of the 2013 mine plan ore. The company received approval in October for a new ore zone within the Valley pit which it will mine in conjunction with stripping above the west wall as part of the 2019 mine plan. Shortfalls in mill feed from the Valley pit are anticipated during this time and will be supplemented by lower grade ore from the Lornex and Highmont pits. Capital expenditures related to mine extension development rose through the latter part of the year in light of the geotechnical issues and are estimated at approximately \$120 million.

Average mill throughput is forecast to be similar to 2008 levels at 121 000 t per day or approximately 44 Mt for the year (Figure 4.6). Copper production is estimated at 115 000 to 120 000 t compared to an actual production of 119 300 t for 2008. Molybdenum production is forecast at around 2700 t which is up significantly from the actual production of 1905 t in 2008 owing in part to the mining of higher grade portions of the Valley pit. The company has been forecasting a drop in production for 2010 until the Valley pit becomes fully accessible and will have to be resourceful to maintain steady production levels.

Several other mine-mill complexes remain on care-and-maintenance status. Many of these have been closed since the mid-1990s, awaiting the discovery of additional ore and/or higher metal prices. They have permits and

substantial infrastructure in place and represent opportunities for renewed mining or custom milling. These complexes include the **Goldstream** copper-zinc, **Blackdome** gold-silver, and **Bralorne** gold mines. Efforts at bringing these mines back into production are discussed in subsequent sections.

COAL MINES

There is one coal producer in the south-central region, the **Basin** mine of Compliance Energy Corporation located near Coalmont (Figure 4.7). The mine produces thermal-grade coal but has been on care and maintenance since 2007. The company is reporting progress on the sale of the mine operation to Jameson Resources Limited of Australia. Feasibility studies are underway and currently reported resources include 87 Mt in the measured and indicated category plus 36.7 Mt in the inferred category. Results of the full feasibility are expected in the second quarter of 2010, at which time the transfer of mine ownership may occur.

INDUSTRIAL MINERAL QUARRIES AND AGGREGATES

There are more than fifteen industrial mineral quarries and processing plants employing over 250 people in the region. These operations provide stable jobs in many small to medium-sized communities including Kamloops, Kelowna, Lillooet, Cache Creek, Ashcroft, Princeton and Merritt. There are very good opportunities for additional growth in this sector due to the wide variety of rock types and deposits in the region, excellent transportation infrastructure, proximity to growing markets in western North America, and the relative ease of permitting.

The **Kamloops** cement plant and **Harper Ranch** limestone quarry of Lafarge Canada Inc continue to supply cement to meet strong demand in western Canada. Lafarge also draws materials from the **Falkland** and **Buse Lake** quarries, which provide gypsum and alumina-silica rock respectively.

The **Decor** pit of Pacific Bentonite Ltd supplies alumina-rich burnt shale to the Lafarge cement plant in Kamloops. The shale beds occur directly above the Hat Creek coal deposit, located west of Cache Creek. Although most of the material is sold to Lafarge, other uses exist such as the surfacing of baseball diamonds. The property is also known to host a large bentonite deposit which is being investigated for municipal engineering and tile manufacture applications.

Also near Cache Creek, Graymont Western Canada Inc operates the **Pavilion** limestone quarry and lime plant on the Pavilion Indian Reserve. Graymont has a forty-year lease with the Ts'kw'aylaxw First Nation who form the bulk of the employees at the mine.

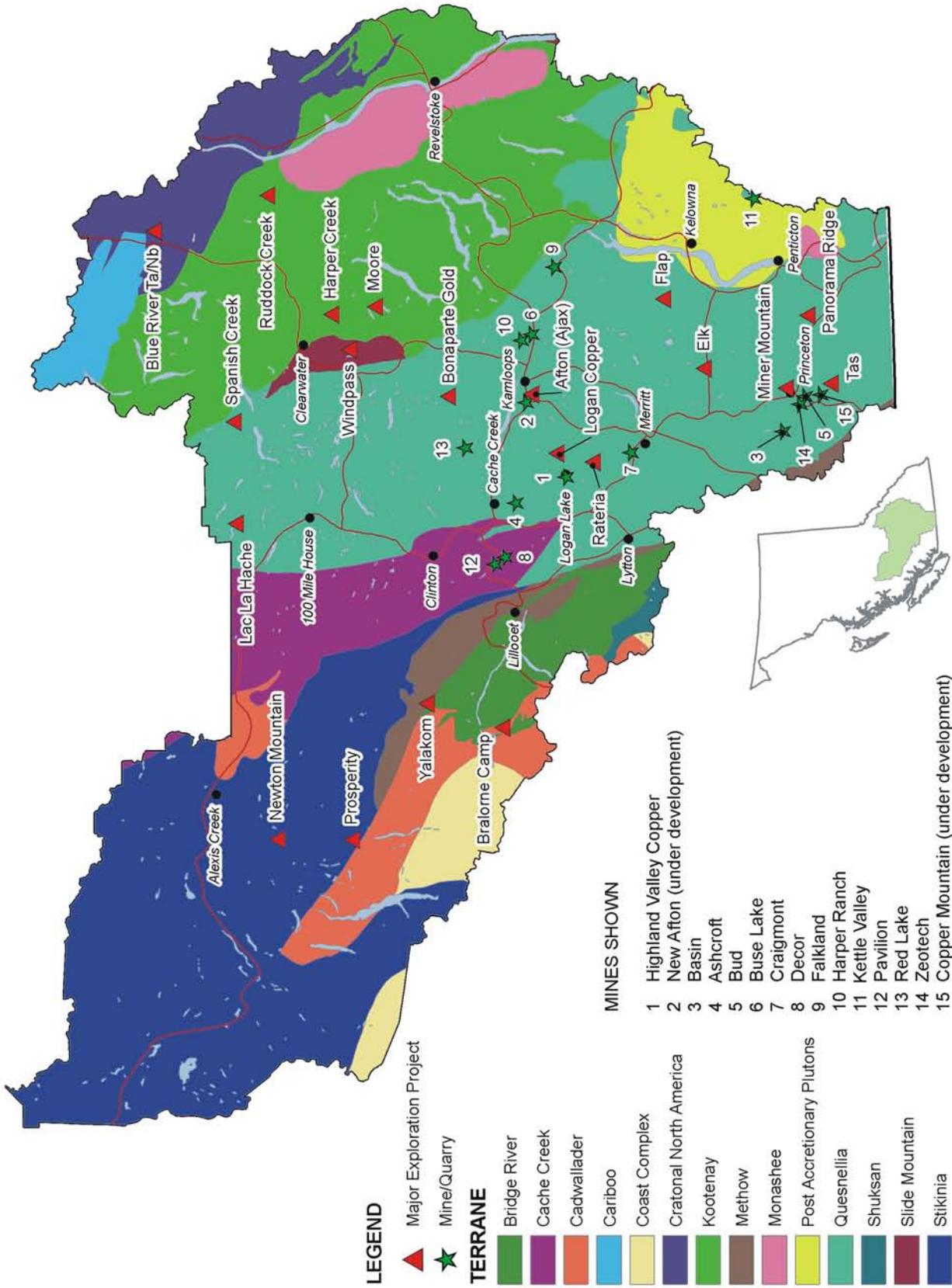


Figure 4.4. Mines, quarries and major exploration projects, south-central region, 2009.

TABLE 4.1. – SOUTH-CENTRAL REGION FORECAST MINE PRODUCTION 2009.

Mine	Operator	Deposit Type / Commodity	Forecast Production in 2009 (tonnes or kilograms)	Number of Employees	Proven and Probable Reserves (at Jan. 1, 2009)
Metals					
Highland Valley Copper	Teck / Highmont Mining Company Ltd	Calc-alkalic porphyry Cu-Mo	115 000 Mt Cu, 2 700 Mt Mo, minor Au and Ag	1 015	430 500 000 Mt at 0.30% Cu and 0.007% Mo
Coal					
Basin	Compliance Energy Corp	Thermal coal	0	On care and maintenance	
Industrial Minerals					
Ashcroft	IG Machine and Fiber Ltd (IKO Industries Ltd)	Basalt (roofing granules)	~350 000 Mt	55 (plant & quarry)	
Bud	Absorbent Products Ltd	Bentonite		see Red Lake	
Buse Lake	Lafarge Canada Inc	Volcanic ash (alumina-silica)		see Harper Ranch	
Craigmont	Craigmont Mines Joint Venture	Magnetite tailings	60 - 70 000 Mt	~30 (plant; seasonal)	
Decor	Pacific Bentonite Ltd	Alumina, landscape rock		~2 (including trucking)	
Falkland	Lafarge Canada Inc	Gypsum	6 000 Mt	see Harper Ranch	
Harper Ranch	Lafarge Canada Inc	Limestone	~220 000 Mt	32 (plant & 3 quarries)	
Kettle Valley quarries	Kettle Valley Stone Company	Ashlar, flagstone, thin veneer		~40 (plant & quarries)	
Pavilion	Graymont Western Canada Inc	Limestone	190 000 Mt	~34 (plant & quarry)	
Red Lake	Absorbent Products Ltd	Diatomaceous earth		40 (plant & 3 quarries)	
Zeotech Bromley Creek	Heemskirk Canada Ltd	Zeolite			

East of Ashcroft, IG Machine and Fiber Ltd, a subsidiary of IKO Industries Ltd, operates the **Ashcroft** basalt quarry and roofing granule plant. The granules are sized and coated with one of several distinct colours on site, and then shipped by rail and truck to IKO asphalt shingle plants in Calgary, Alberta; Sumas, Washington; Chicago, Illinois and elsewhere in North America.

Craigmont Mines Joint Venture operates the **Craigmont** magnetite operation located near Merritt where tailings from the old Craigmont copper mine are processed. The plant normally operates on a seasonal basis (March to December), however, due to strong demand, processing may continue through the winter months. The magnetite is used in coal washing plants in western Canada and the Centralia mine in Washington

State. Remaining tailings are forecast to be exhausted within the next one to two years and the company is evaluating several other possible feed sources.

At its plant in Kamloops, Absorbent Products Ltd manufactures cat litter, barn deodorizer, industrial absorbents, and carriers for agricultural products. These are prepared from diatomaceous earth mined from the **Red Lake** quarry northwest of Kamloops, and bentonite mined from the **Bud** quarry at Princeton.

Heemskirk Canada Ltd continues to market agricultural and absorbent products, produced from a stockpile at the **Zeo-Tech/Bromley Creek** zeolite quarry near Princeton. The material is transported to its plant in Lethbridge.

Opal Resources Canada Inc produces attractive fire opal gemstones and jewelry from the **Klinker** property, located west of Vernon. Opal occurs as fracture and vesicle-fillings in andesitic to basaltic laharic breccia of the basal Kamloops Group (Eocene). Presently, the gemstone jewelry is marketed from a retail store in Vernon and is aimed at the BC tourist market; however, the company aims to develop other North American markets.

Decorative rock and dimension stone are produced at numerous small quarries throughout the region. The best known producer is the Kettle Valley Stone Company of Kelowna which sells flagstone, ashlar, facing stone and landscape rock mined from the **Nipple Mountain, Kettle Valley, Canyon** and **Gemini** quarries. Kettle Valley's workforce has grown to about 40 people year round, mainly employed in the Kelowna processing facility. The products include dacite ash, gneiss and basalt, and are mainly used in high-end residential and commercial developments in the western United States of America (U.S.A.) and central and western Canada.

MINE DEVELOPMENT PROJECTS

The locations of mine development projects in the region are shown on Figure 4.4.

After a late 2008 announcement that the development of the **New Afton** mine was to be slowed, New Gold Inc has continued on a revised schedule to carry this project through to production in 2012. On the surface most work was suspended through the year; however, the mill building was completed and some mill components were installed (Figure 4.8). Much of the work at the site was conducted underground where development drifts to the base of the ore body were completed and the conveyor decline was significantly advanced. In the second quarter, advancement of the conveyor decline intersected the existing workings and provided a second access to the underground development that has facilitated more effective movement of equipment and personnel. Approximately 3 km of the 4.5 km conveyor access is now complete as well as over 5 km of underground



Figure 4.5. Overburden stripping at the east wall expansion of the Valley pit at the Highland Valley Copper mine near Logan Lake.



Figure 4.6. The mill at the Highland Valley Copper mine which processed approximately 44 Mt of ore in 2009.



Figure 4.7. The idle Basin thermal coal mine near Coalmont was the subject of a feasibility study this year as part of a potential sale and resumption of mining.

development (Figure 4.9). The company has also resumed dewatering the Afton pit into the Pothook pit. The capital expenditures on the project are estimated at \$66 million for the year, and the company reports an additional \$355 million will be required to bring the mine into full production. Underground development is expected to continue through 2010 and a resumption of surface activities thereafter in 2011.

The company has been actively working on updating its resources for the property from previous years' drilling of zones beneath the currently blocked out reserves (Figure 4.10). Currently stated measured and indicated resources are 65.6 Mt at 1.02% Cu and 0.77 g/t Au. Within that are probable reserves of 44.4 million tonnes of 0.98% Cu and 0.72 g/t Au that contain approximately 435 million kilograms of copper and 32 million grams of gold. The resources were reported as of September 2006, and with the significant changes in metal prices, exchange rates and new drill results since then, the update is timely.

The resumption of mining at the **Copper Mountain** project of Copper Mountain Mining Corporation and Mitsubishi Materials Corporation has advanced at a quick pace in 2009. The project involves the development of a super pit which incorporates three former pits and the construction of a new 35 000 t per day mill (Figure 4.11). Following the decision to proceed with the project in the fall of last year, the company has signed a definitive agreement with Mitsubishi Materials Corporation who has become a 25% share partner in the project and will purchase the mine's concentrates for the life of the operation. Soon after the company reported it had increased its proven and probable reserves to 211 Mt of 0.36% Cu and anticipated gold and silver credits. In early fall the company completed a successful financing and raised over \$50 million to fund some of their portion of the development costs. In September, pouring of the new mill building foundations began and should be completed in early winter with erection of the building commencing in spring 2010 (Figure 4.12). The company has ordered its fleet equipment of electric shovels, trucks and dozers in anticipation of beginning pre-mining stripping in 2010. Capital expenditures to the third quarter were \$36.8 million dollars on the project and final expenditures for the year are yet to be reported but are likely to be over \$50 million. Current estimates for the total capital cost for the project will be \$437 million. The project continues in the Mine Development Review Process for a final permit amendment prior to the full resumption of mining activities.

MINERAL EXPLORATION HIGHLIGHTS

Major exploration projects are listed in Table 4.2. and their locations are shown on Figure 4.4

The announcement of the Geoscience BC QUEST-South Project is a major investment in public geoscience and will provide a huge amount of new information to



Figure 4.8. The completed mill building at New Gold Inc's New Afton mine development site as seen from the Trans Canada Highway.



Figure 4.9. A Jumbo at the New Afton mine development site which now includes over 5 km of underground development and a 4.5 km conveyor decline that is nearing completion (photo courtesy of New Gold Inc).



Figure 4.10. Core sample of high-grade, deep mineralization at the New Afton project which may bolster currently outlined resources in an update currently underway.

guide companies exploring in the region. The \$2.5 million program of geophysics and geochemistry spans from Williams Lake to the U.S.A. border and incorporates the Kamloops, Merrit and Princeton regions. A 45 000 square km airborne gravity survey was launched in the summer as well as the field collection of over 1000 new stream sediment samples (Figure 4.13). Despite its extensive exploration history, stream sediment sample density in the Kamloops region is some of the lowest in the province. The program will also reanalyze over 9000 archived samples to modern standards. The industry can look forward to the release of the data generated from this project during 2010.



Figure 4.11. Panorama of the Copper Mountain site south of Princeton where a new 35 000 t.p.d. mill is under construction by Copper Mountain Mining Corporation.



Figure 4.12. Foundations being poured this fall will allow the construction of a new mill building at the Copper Mountain mine development to begin in the spring of 2010 (photo courtesy of Copper Mountain Mining Corporation).



Figure 4.13. Geoscience BC contract field staff were busy in 2009 collecting over 1000 new stream sediment samples for the Quest South project. The BC interior can be challenging with its arid conditions as shown here.

TABLE 4.2. MAJOR EXPLORATION PROJECTS, SOUTH-CENTRAL REGION, 2009.

Property	Operator	MINFILE	Commodity	Deposit Type	Work Program
Ajax	Abacus Mining and Exploration Corp	092INE012, 013, 028, 030	Cu, Au, Ag, Pd	Porphyry	PFS, DD
Blackdome	J-Pacific Gold Inc.	092O 053, 051, 052	Au, Ag	Vein / Breccia	PFS
Blue River Ta/Nb	Commerce Resources Corp.	083D 005, 035	Ta, Nb	Magmatic	DD (5586), MS, PFS, G
Bralorne	Bralorne Gold Mines Ltd.	092JNE164, 001	Au, Ag	Vein / Breccia	UG, DD (4200 m), G, PFS
Elizabeth	J-Pacific Gold Inc.	092O 012	Au, Ag, Cu, Mo	Vein / Breccia	PFS
Elk	Almaden Minerals Ltd.	092HNE096	Au, Ag	Vein / Breccia	MS, PFS
Flap	Molycor Gold Corp. / Goldrea Resources Corp	082LSW119	Au, Ag	Vein / Breccia	DD (~2000 m)
Iron Mist	American Creek Resources Ltd.	092P 178, 179	Fe	Skarn	DD (673 m), G
Harper Creek	Yellowhead Mining Inc.	082M 008, 009	Cu, Ag, Au, Zn, Mo	Massive Sulphide	G, PFS, EN
Lac La Hache	GWR Resources Inc.	092P 001, 002, 034, 035	Cu, Au	Porphyry	DD (3620 m), GC, G
Moore	Almo Capital Corp.	082M 051	Cu, Pb, Zn, Ag, Mo	Massive Sulphide	DD (~1500 m)
Panorama Ridge	Goldcliff Resource Corp.	082ESW052, 259	Au	Skarn	GC, P
Prosperity	Taseko Mines Ltd.	092O 041	Cu, Mo, Au	Porphyry	GD, FS
Rateria	Happy Creek Minerals Ltd.	092ISE092 150, 060	Cu, Mo	Porphyry	G, P, GC, DD (~2000 m)
Ruddock Creek	Selkirk Metals Corp. / Imperial Metals	082M 082, 083	Zn, Pb, Ag	Massive Sulphide	PFS, GP, G, GC
Spanish Creek	Skygold Ventures Ltd.		Au	Vein / Breccia	DD (3043 m), GP-AB
Treasure Mountain	Huldra Silver Inc.	092HSW016, 018	Ag, Pb, Zn	Vein / Breccia	PFS
Bonaparte Gold	Encore Renaissance Resources Corp	092P 050	Au	Vein / Breccia	UG, BS
Miner Mountain	Sego Resources Inc	092HSE078, 203	Cu, Au, Ag	Porphyry	GP-IP, TR

TABLE 4.2 (continued from previous page)

Property	Operator	MINFILE	Commodity	Deposit Type	Work Program
Tas	Supreme Resources Ltd.	092HSE193, 192	Cu	Porphyry	GP-IP, DD (~1500 m)
Logan Copper (Dab)	SNL Enterprises Ltd.	092ISE012, 190	Cu, Mo, Ag	Porphyry	DD (~2000 m)
Yalakom	Barrick Gold Corporation	092O046	Cu, Au, Mo, Ag	Porphyry	DD (~3500 m), G, GC
Windpass	Molycor Gold Corp	092P 039	Au, Ag, Cu	Vein / Breccia	DD (~2000 m), TR (746 m)
Newton Mountain	Amarc Resources Ltd	092O050	Au, Cu	Porphyry	DD (~2500 m)
Waverley/Tangier	Armadillo Resources Ltd	082N 014, 015	Pb, Ag, Au, Zn, Cu	Massive Sulphide	DD (762 m), GP:MG, GP:EM

Work Program Abbreviations:

A = access; trail, road construction on claims; AB-EM = airborne electromagnetics; AB-MG = airborne magnetics; AB-RD = airborne radiometrics; BU (X tonnes) = bulk sample (weight in tonnes if known); CD = condemnation drilling; CQ = coal quality testing; CT = carbonization test (coal); DD (Xm) = diamond drilling totaling X metres; EN = environmental baseline studies/monitoring, remediation work; FS = feasibility studies; G = geology, mapping, etc; GC = geochemical sampling (rock, soil, silt, etc); GD = geotech drilling; GP = geophysics (general); IP = Induced Polarization; 3D-IP; MG = magnetics; MK = marketing-primarily for industrial mineral products; MS = metallurgical studies; OB = overburden drilling; OP-BU = open-pit bulk sample; P = prospecting; PD = percussion drilling; PF = pre-feasibility studies; PP = Pilot plant, R = reclamation; RC = reverse circulateon drilling; TR = trenching, UG (X m) = X metres of underground development; UG-BU = underground bulk sample; UT = UTEM; VLF; WT = washability test (coal)

The British Columbia Geological Survey (BCGS) has completed several programs in the south-central region in recent years. West of Williams Lake, Mitch Mihalynuk and his crew completed regional mapping in the Puntzi Lake area in 2008. They discovered that the areal extent of Chilcotin flood basalts is actually small and that there were far more Mesozoic volcanic and igneous rocks exposed in the area than previously known. This heightens the potential for various styles of mineralization, particularly in relation to the mid to late Jurassic Chilanko igneous complex. In the same region, results from a till sampling and surficial mapping program have been released by Travis Ferbey. Gold grain counts and determinations for arsenic and antimony suggest there is potential for gold mineralization in the Redstone map area and to the west. The source for elevated copper, nickel, chromium and mercury values in a group of adjacent samples, in the same map area, is unknown. Nickel and chromium values could be related to an unmapped mafic or ultramafic unit or perhaps mantle xenoliths within locally occurring Chilcotin Group flood basalts while coincident elevated copper and mercury values are perhaps more likely related to a mineralized system and (or) bedrock structure(s). These data, in combination with results from the regional bedrock mapping completed in the Puntzi Lake area, suggest this region of the southern Interior Plateau is deserving of more detailed follow-up work.

Nick Massey continues his fieldwork in the western Nicola Group in the Princeton area. Near the contact with

the Eagle Creek pluton, the rocks are highly metamorphosed and deformed in contrast with the typically lower metamorphic grades seen in rocks elsewhere in the Group. The felsic character of some of the rock units compounds interest in the rocks and suggests potential for volcanogenic mineralization. The BCGS is supporting Shelley Oliver at the University of British Columbia who is completing graduate studies on the structural and metamorphic history of the rocks to test that they are correctly mapped as part of the Nicola Group. Nearby at the Copper Mountain project, Mitch Mihalynuk and Jim Logan have attained accurate radiometric age dates from Rich Friedman at UBC that show that arc volcanism, intrusion and mineralization at the deposit were clearly contemporaneous. This gives a deserved nod to the careful field observations of Vic Preto who contended this in his groundbreaking work on the rocks from 1965-72.

Larry Diakow has completed a second season of field research within mid-Cretaceous rocks of the Spences Bridge Group in an area southwest of Merritt. New U-Pb isotopic dates ranging from 102 to 106 show calc-alkaline rocks of the Spences Bridge Group are Albian in age, and potassic vein alteration at the Prospect Valley prospect also yielded an Ar-Ar date of 104 Ma indicating the synchronicity of epithermal gold-quartz vein formation and Spences Bridge Group magmatism. He also completed a week of field research related to the Nicola Group located just to the east.

PORPHYRY PROJECTS

Thompson Rivers and Shuswap Lake

Abacus Mining and Exploration Corp. has completed a preliminary economic assessment of the **Ajax** copper-gold porphyry deposit near Kamloops which encompasses the former producing Ajax pits of the Afton mine (Figure 4.14). The study contemplates a 60 000 tonne-per-day operation exploiting the measured and indicated resource of 442 Mt at 0.30% Cu and 0.19 g/t Au. The company has completed an earn in agreement with New Gold Inc over the surrounding claims to its wholly owned tenures giving it the ability to pursue a feasibility study and further financing for the project. Late season drilling began in an area southeast of the Ajax East pit where the target is near surface higher value mineralization suitable for development as a starter pit. Called the Ajax East extension (previously the Monte Carlo), the zone is thought to be a fault displaced portion of the Ajax East pit.

Several other properties around the Iron Mask Batholith saw minor amounts of work this year. Partners Gold Mask Ventures Ltd and Morgan Gold and Minerals Corp undertook minor trenching and target prioritization at their **GM** property west of the Ajax project. At the **Galaxy** property of Discovery-Corp Enterprises Inc, the company requisitioned a 3-D model of the Galaxy deposit to aid in determining future exploration priorities. North of Kamloops Lake at the **Copper Creek** property of Christopher James Gold Corp, the company evaluated targets based on a recently flown airborne geophysical survey.

Mine site exploration occurred during the year at the **Highland Valley Copper** mine, which is centered in the Guichon Creek Batholith, where Teck drilled in support of the expansion plans at the mine. Work was undertaken at the upper west wall of the Valley pit where a push back is underway as part of the 2019 mine plan.

Happy Creek Minerals Ltd was back drilling at the **Rateria** porphyry copper-molybdenum property, strategically located about 12 km southeast of the Highland Valley mine. Last year the company reported very positive results from drilling at Zone 2 (incorrectly reported in last year's summary as Zone "A"). This year they followed up with three holes that have expanded the zone to over 450 m. Four widely spaced reconnaissance holes tested a large geological corridor to the southwest of Zone 2 and are reported to contain favorable fracturing and alteration with a minor amount of copper sulfides. A new target called the "High-Res" was drilled this year with a single hole and copper sulfides as well as native copper are reported to have been intersected. Results for this year's drilling are pending. The company also explored the **West Valley** property where two grab samples taken this season have defined a new discovery called the NTP zone. The samples were taken 65 m apart



Figure 4.14. Bob Friesen of Abacus Mining and Exploration Corp explaining the geology of the Ajax pits to a group representing the Japan Oil, Gas and Metals National Corporation and other companies with interests in the BC mining industry.

and returned 1.7% Cu plus 0.37 g/t Au and 1.4% Cu plus 0.07 g/t Au.

Just north of the Highland Valley mine, Getty Copper Inc received a positive pre-feasibility engineering study for the **Getty North** and **Getty South** porphyry copper deposits. The study contemplates a 15 000 tonne-per-day operation that would produce cathode copper and molybdenum trioxide over a period of 17 years. The two deposits are reported to contain an indicated resource of 86.6 Mt of 0.4% copper and inferred resource of 22.1 Mt of 0.35% Cu. Molybdenum resources are reported only for the Getty North deposit which contains 0.005% Mo in both resource classifications.

Further south in the Guichon Batholith, Dot Resources Ltd announced it had completed a resource calculation at the **Dot** property, which contains the former producing Aberdeen Mine and Vimy showing. The total resources for the property include an indicated resource of 4.47 Mt of 0.42% Cu, 0.01% Mo, 2.9 g/t Ag and 0.04 g/t Au and an inferred resource of 2.39 Mt of 0.4% Cu, 2.9 g/t Ag and 0.03 g/t Au, both at a 0.2% Cu cut-off. The indicated resource was entirely sourced from the Southeast zone whereas the inferred resource was accumulated from the Southeast, Copper and the East zones. The Northwest zone did not contribute to the current resource estimate. The company announced it was proceeding with further IP geophysical surveys and drilling in 2009. The company has yet to drill to test evidence that the southeast and northwest zones are in fact a singular horizon.

SNL Enterprises Ltd drilled at the **Logan Copper** project located 6 km east of the Highland Valley Copper mine again this year. The property is reported to cover the Bethsaida phases of the Guichon Batholith. Results from last year's drilling at the Dansey property produced some long intersections from the North zone such as hole 08-SND-02 which intersected 153 m of 0.15% Cu and hole 08-SND-04 which intersected 167 m of 0.10% Cu.

In both holes, mineralization was within 8 m of the top of the hole.

This year's work was focused again at the North zone where five holes were completed, and at the Midway showing – a target generated by MMI soil surveying, follow up prospecting and mapping – three holes were drilled. Early results from the North zone included intersections that ranged from 0.65 to 8.36 m and graded from 0.20 to 0.30% Cu. Results from the remainder of the North zone drilling at the “Blue” showing and at the “Midway” showing, located 1300 m to the south-southwest, are pending. Of noteworthiness is the company's reporting of numerous new showings in this mature exploration district. Although heavily explored, the company has won discoveries such as the Blue, Midway and Cliff showings, to name a few, with a combination of MMI soil sampling, prospecting and mapping.

Newmac Resources Inc carried out a drill program of three holes at the **Crazy Fox (Anticlimax)** porphyry molybdenum-tungsten property north of Little Fort where drilling since the 2007 breakthrough hole has extended mineralization over 800 m to the south from where it was first encountered. This year's target was defined by a geochemical anomaly, geophysical evidence and abundant granitic float; however, the program did not intercept the intrusive rock in the area and the anomaly remains unexplained. The company completed more ground magnetometer work at the **Moira** property located northwest of Clearwater in search of similar styles of mineralization.

West of Little Fort, Candorado Operating Company Ltd released results from last year's drilling at the **Deer Lake** property where the company is searching for skarn and porphyry copper-gold mineralization. At the Road showing encouraging results included hole DL08-02 which had a near surface intercept of 96.2 m of 0.1% Cu and 0.33 g/t Au while at the Lightning zone the best intersection was 62.4 m of 0.36 g/t Au and minor Cu. Further planned drilling had not started yet at the time of writing. Nearby, Christopher James Gold Corp completed further geological and geochemical studies and trenching and its suite of properties in this region. Several deposit styles are being pursued within Nicola Group volcanic rocks especially skarn mineralization similar to Candorado's property to the south.

South Cariboo-Chilcotin Plateau

The **Prosperity** gold-copper porphyry deposit of Taseko Mines Ltd continues in the provincial and federal environmental assessment process. Recommendations from those processes are expected in early 2010. The company restated its proven and probable reserves in November to now include a markedly larger 831 Mt at 0.23% Cu and 0.41 g/t Au. This reportedly represents an increase of almost 70% from its previously stated reserves and makes it one of the largest undeveloped deposits in

the country. At the site the company undertook studies around geotechnical issues related to mine design.

Amarc Resources Ltd optioned the **Newton Mountain property** located approximately 40 km north of the Prosperity deposit where they drilled fourteen holes. This property has been idle since some very promising drill results were released in 2006 by a previous operator, such as 2.33 g/t Au and 0.15% Cu over 49 m in hole DDH 06-12 and 0.51 g/t Au over 97 m found in hole DDH 06-03. Although classically explored as a porphyry copper-gold target, the current focus is on epithermal bulk tonnage-style mineralization. Drilling was completed in late November and early reports reveal that a significant discovery has been made. Vertical hole 9004 cut 189 m of mineralization that graded 1.56 g/t Au, 7.9 g/t Ag, 0.08% Cu and 0.17% Zn starting at a core depth of 6 m. Long intersections of mineralization are reported in other results released to date and several holes are yet to be reported on at the time of writing. The company states the style of alteration and mineralization at the property appears to be transitional from typical copper-gold porphyry to an epithermal-type gold deposit.

At the **Taseko Lake** porphyry copper, gold and molybdenum property, located 15 km south of the Prosperity project, Galore Resources Inc is retaining its interest in this highly prospective region. This year saw the company complete two holes at the Hub property in an effort to extend known mineralization at a priority target defined by a very large airborne magnetic anomaly. Last year's drilling indicated a strong, quartz-sulphide stockwork hosted in altered, multi-phase intrusive and volcanic rocks. The best hole into this zone was 08TSK-06 which was mineralized over its entire 305 m length and returned 294 m of 0.14% Cu and 0.01% Mo.

At the **Lac La Hache** porphyry copper-gold property, GWR Resources Inc drilled the Aurizon South zone after re-logging previous years' core and geophysical and geochemical information yielded new exploration targets. Seven holes were completed to confirm a new exploration model that predicts a westerly, down section displacement of highly mineralized, hydrothermally altered monzonites as intersected in hole AZS08-07 which yielded 26 m of 0.86% Cu and 6.26 g/t Au. Partial results have been released to date, which shows success with the program, with deep intersections such as AZS09-12 cutting 18 m of 0.62% Cu and 1.2 g/t Au. Given an improved understanding of the environment that hosts copper-gold mineralization, the company plans further drilling aimed at shallower intersections in untested areas. The company also continues to determine additional targets on this large property with ongoing geological mapping and MMI soil sampling.

Happy Creek Minerals Ltd continued to evaluate the extensive and prospective holdings it has in the Boss Mountain area northeast of Lac La Hache. The company conducted grassroots level work at the **Fox** tungsten-molybdenum skarn as well as at the **Silverboss** and **Hen**

properties where gold-copper and molybdenum porphyry mineralized systems are the target.

Gold Bridge-Bralorne-Lillooet

Barrick Gold Corporation was active at the **Yalakom** project northwest of Lillooet. It is the first program at the property in numerous years. The objective of this year's program was to upgrade the geological understanding on the Poison Mountain deposit and analytical results from previous work. The company completed a drill program as well as geological and geochemical work.

Mineralization at Poison Mountain is associated with two granodiorite to quartz diorite stocks (the Main and North porphyries) which intrude sedimentary rocks of the Lower Cretaceous Jackass Mountain Group. Mineralization consists mainly of pyrite, chalcopyrite, molybdenite and bornite, which occur as disseminations and fracture-fillings and in veins associated with quartz. Historical resources at the Copper Creek zone include indicated resources of 280 Mt grading 0.26% Cu, 0.14 g/t Au, 0.007% Mo and 0.514 g/t Ag. The Fenton Creek zone contains inferred resources of 18.3 Mt grading 0.31% Cu and 0.128 g/t Au.

Cresval Capital Corp undertook grassroots exploration at its **Bridge River Copper** project, located 40 km west-northwest of Goldbridge. The property contains the Nichol, Russnor and BR showings which are calc-alkaline porphyry copper-molybdenum-gold targets within the Bridge River Pluton.

Similkameen River

At the **Copper Mountain** project most of the corporate efforts were focused on mine development as discussed above and little exploration was undertaken beyond some detailed geological mapping and petrographic work. Summary results from the 63 126 m of drilling in 2008 were released early in the year and highlight significant potential for pit expansion northwest and southeast of the currently outlined super pit: these are the Copper King and Oriole zones respectively. Drillhole CM08P2-151 is the most north-westerly hole in the Copper King zone completed in this campaign and it intersected 85 m of 0.36% Cu with minor gold and silver. Within the Oriole zone previously released results are showing potential for a high-grade zone that may provide valuable mill feed at the start up of the operation. Drilling is forecast to resume again in 2010.

Supreme Resources Ltd completed a Quantec Titan-24 induced polarization survey at its **Tas** property located south and east of the Copper Mountain project. Buoyed by the results of the survey the company has initiated a drill program at the property.

Approximately 5 km south of the Copper Mountain project, Anglo-Canadian Uranium Corp has expanded its tenure holdings at the **Princeton Copper** project in light of the renewed activity in the region. The company has

been active for several years in the region drilling the Friday property and Reco (Rico) zone. This year the company hand trenched and sampled several areas to determine further exploration plans.

Sego Resources Inc was active at its **Miner Mountain** property located just 4 km to the northeast of Princeton. Mineralization is generally hosted within microdiorite of the Nicola Group and there may be a genetic link to Deer Valley Fault to the west which juxtaposes these volcanic rocks with sedimentary rocks of the Eocene Princeton Group. The company completed a deep penetrating Quantec Titan-24 induced polarization and resistivity survey early in the year which provided upwards of 23 targets for further exploration (Figure 4.15). One of the target areas is near the surface around the South zone where previous trenching has shown higher gold grades: this formed the focus of much of the trenching completed this year. The company has reported expansions of the South zone with results such as 16 m of 0.34 g/t Au and 0.32 g/t Ag in Trench 88 (including 31.47 g/t Au and 27.2 g/t Ag over 1 m). Trench 87 extended southeast from last year's successful Trench 36 and yielded 26 m of 0.28g/t Au and 0.51 g/t Ag. The company has a signed Memorandum of Understanding with the Upper Similkameen Indian Band who is providing the company with excellent contract services. This led to a joint receipt of an award for best exploration reclamation in 2008 from the Technical and Research Committee on Reclamation.

East of Kentucky Lake and north of Princeton, Victory Resources Corporation expanded its holdings around the Toe & Wen properties and renamed the property the **Toni**. Last year the company drilled the property in search of gold-copper mineralization in both mesothermal quartz veins and a porphyry environment. Christopher James Gold Corp completed mapping this year to better understand geological structure and evaluate potential targets at its **Big Kidd** property located near Aspen Grove.



Figure 4.15. A Quantec Titan-25 deep penetrating IP survey set up at the Miner Mountain project just north of Princeton (photo courtesy of Sego Resources Inc).

Okanagan

Jasper Mining Corp has been very active at its **Isintok** molybdenum-copper-silver project in recent years. Located southwest of Summerland the property has seen previous work by Anaconda Canada Exploration Ltd and Canex Aerial Exploration Ltd who delineated a historical near-surface resource of 23 Mt of 0.161% Cu and 0.04% Mo. The near-surface nature of the mineralization has meant the company has been highly successful in drilling coincident IP and soil survey anomalies. Early this year, the company released some impressive long intersections such as hole IS-08-50 which intersected 392 m of 0.09% Cu, 0.01% Mo with minor gold and silver and IS-08-26 which intersected 271 m of a similar grade. The company has yet to analyze core from last year's drilling program that it plans on completing this winter.

Partners Molycor Gold Corp and Goldrea Resources Corp released a resource estimate for the **Empress** property west of Summerland and 15 km south of the former Brenda Mine. Last year, a nineteen hole drill program tested molybdenite-pyrite-chalcopyrite mineralization found as disseminations, veinlets and quartz stringers within porphyritic quartz monzonite rocks of the Middle Jurassic Osprey Lake batholith. The near surface location of much of the mineralized resource provides encouragement for exploitation from an open pit. The company reports an indicated resource of 1.70 Mt of 0.095% Mo and inferred resource of 1.66 Mt of 0.095% Mo based on a cut-off of 0.05% Mo priced at US\$10 per pound.

SKARN PROJECTS

Thompson Rivers and Shuswap Lake

American Creek Resources Ltd drilled its **Iron Mist** property located 60 km north of Kamloops. At the property the company is evaluating the iron content of what appears to be a magnetite skarn at the contact of a gabbro-diorite intrusion and metamorphosed sedimentary rocks of the Harper Ranch formation. Magnetite mineralization is found as seams and pods with some of the larger zones measuring 1 m in width and up to 15 m in length. The company reported last year that grab samples ran from 43.5% to 61.7% Fe and 0.32% to 0.4% V. Early reports indicate the company was successful in intercepting magnetite-rich zones in all seven holes completed.

Okanagan

Goldcliff Resources Corp got a late start at the **Panorama Ridge** gold skarn project a few km east of the historic Nickel Plate gold mine at Hedley. The company began shipping large quantities of 2008 drill core samples

during the summer after a timely August financing. It also received the final interpretation of a fall 2008 airborne geophysical survey that has defined new targets both at the project and at a regional scale. The company reports a regional scale, northeast trending structure is indicated in the survey that it believes is fundamentally related to gold mineralization at the Panorama Ridge property as well as the greater Nickel Plate camp. Conceptually, the major structure and cross-cutting structures would serve as conduits for mineralizing fluids, synthesizing many of the deposits in the region into a more singular genetic model. Detailed stream sediment surveying was completed this year and, given the new model for the region, the company is expected to give its new targets a high priority for ground follow-up trenching and drilling.

At the **Gold Hill** project near Hedley, Vega Gold Ltd, completed a trenching and mapping program at the property. Work was focused at the Snowstorm, Junction and Hed showings.

Columbia River

On the south flank of Frenchman Cap Dome, Torch River Resources Ltd reported on last year's drilling at the **Mount Copeland** high-grade molybdenum skarn project. The property is a past producer that was active briefly as an underground operation between 1970 and 1973. Mineralization consists of disseminated, massive and stockwork-hosted molybdenite within pegmatite and aplite along a boundary of an extensive nepheline syenite body. The modest program produced some short intervals of higher grade mineralization ranging from 0.3 to 2.7 m and grading between 0.14 to 0.53% Mo. The company didn't undertake field work this year but did reanalyze sections of nine of the 2008 holes for the presence of rare earth elements known to be hosted within nepheline syenite rocks in the region.

VEIN AND BRECCIA PROJECTS

Thompson Rivers and Shuswap Lake

Encore Renaissance Resources Corp has been permitted to remove high-graded quartz vein material from its **Bonaparte Gold** property located 35 km north of Kamloops. The property is underlain by sedimentary and volcanic rocks of the late Paleozoic Harper Ranch Group and intruded by Triassic and/or Jurassic granodiorite, quartz monzonite and diorite that are believed to form part of the Thuya batholith. Mineralization primarily occurs in a series of north trending quartz veins hosted mainly by quartz diorite intrusive rocks. Locally, the massive white quartz veins contain up to several per cent sulphides consisting of pyrite with lesser chalcopyrite, pyrrhotite and molybdenite. Native gold is also evident but generally is associated with silver-grey tellurides.

The objective is to ship the materials to the Kinross mill in Washington State, U.S.A., for processing and recovery of precious metals. There is not a stated resource for the material to be mined and the company is indicating it anticipates a similar grade to a bulk sample that was removed from the property in the 1990's. Current efforts are aimed at undercutting and mining the Jewelry Box vein (Figure 4.16).

Paramount Gold and Silver optioned the **Vidette Lake** property located 50 km north of Kamloops and up the Deadman River Valley. The company has completed some preliminary work on the property this season. Regionally the valley hosts the former Vidette Mine which produced gold, silver and copper between 1933 and 1940 from epithermal quartz veins hosted within volcanic rocks of the Upper Triassic Nicola Group.

Prospector Mo Kaufman had his **Jake** property returned to him in late 2008 after some concerted work had shown potential for a shear-hosted gold-bearing system defined by limited surface outcrops, previous drilling and a kilometre long geophysical signature. At the property, mineralization consists of quartz with pyrrhotite, chalcopyrite, pyrite and bismuthinite in veins and stringers hosted by sheared andesite tuffs of the Devonian to Permian Fennell Formation. Since there is a paucity of bedrock, induced polarization and magnetic geophysics has proven effective in highlighting targets, and more survey work was completed this year to extend previous anomalies. With undrilled targets left over from the previous program and new potential outlined in this year's work, the property should be attractive to companies looking for an early stage gold property.

Newmac Resources Inc undertook grassroots level exploration at the **Ace Gold** showing which is contiguous to its Crazy Fox property near Little Fort. Historic grab samples have been reported to assay from 10 to 27 g/t Au and minor historic drilling has occurred at the showing. Gold mineralization is associated with quartz-arsenopyrite veins hosted within argillites likely belonging to the Upper Triassic Nicola formation. The company has defined a gold-arsenic and gold-polymetallic-in-soil anomaly in a belt approximately 150 m wide and 1300 m long.

At the **Windpass** property, 8 km east of Little Fort, Molycor Gold Corp trenched and drilled this former producer which yielded 1 071 684 grams Au between 1932 and 1939 as well as 53 469 grams Ag and 78 906 kg of Cu (Figure 4.17). At the property a series of echelon mineralized quartz veins are hosted within the Devonian to Permian Fennell Formation of the Slide Mountain Group. Locally, the veins are typically hosted within a chlorite-altered diorite sill and mineralized with pyrite, chalcopyrite, bismuth sulphide, free gold, magnetite and tellurides. The presence of free gold was evident in a summer chip sample WP09-AR-07 which assayed a bonanza -grade of 316.5 g/t Au at the North



Figure 4.16. The start of a portal to exploit the Jewelry Box vein at the Bonaparte Gold property of Encore Renaissance Resources Corp north of Kamloops.



Figure 4.17. One of many lengthy trenches at Molycor Gold Corp's Windpass property near Little Fort.

zone over an unspecified interval. Preliminary drill results are reported as encouraging and indicate the potential for mineralization away from previously known zones. To date the best results are from holes WP09DDH5 and WP09DDH6 which intersected 1.52 m of 15.85 g/t Au and 0.61 m of 19.65 g/t Au respectively.

South Cariboo-Chilcotin Plateau

The **Blackdome** gold-silver mine and mill of J-Pacific Gold Inc is located northwest of Clinton and remains on care and maintenance. This underground mine operated in the 1980's and again briefly from October 1998 to May 1999. Mineralization consists of narrow, high-grade epithermal quartz veins. The 200 tonne per day mill is intact and the property has a historic inferred mineral resource of 124 120 t grading 12.8 g/t Au and 33.7 g/t silver. Nearby, the company also holds the Elizabeth property where bonanza-grade gold is hosted within northeast trending, steeply northwest dipping mesothermal veins that crosscut the Blue Creek diorite intrusion. The company did not undertake any field activities for the year but was active in characterizing the resources at the properties. At mid-year the results of a mineral resource evaluation at the **Elizabeth** property were announced where inferred resources were stated to be 522 900 t grading 12.3 g/t Au at a 5 g/t cut-off. The company has also announced it is proceeding with a preliminary economic assessment of both projects which contemplates underground mining of resources and transport of Elizabeth ore to the Blackdome mill for processing. This involves the review and updating of resources at the Blackdome mine to reflect modern reporting standards. Late in the year the company indicated it will change its name to Sona Resources Corp.

At the **Watson Bar** property north of Lillooet, Durfeld Geological Management Ltd prepared and shipped approximately 1000 t of high-grade gold-silver-bearing quartz veins to a custom mill familiar with such ore. Quartz-sulphide veins and carbonaceous shear zones are hosted within feldspathic and volcanic lithic arenites of the early Cretaceous Jackass Mountain Group (Figure 4.18a). The ore was mined by excavator (Figure 4.18b) and trucked directly from project (Figure 4.18c) to the custom milling facility. Early indications are that the expected grades were achieved making the effort a technical success.

Fraser River

Consolidated Spire Ventures was active at the **Prospect Valley** property located 30 km west of Merritt. Improved access to the property was completed in October 2008 and will allow more economical infill drilling in support of outlining a low-grade bulk-mineable target. Early in the year the company reported it has received results of bench tests that indicated that gold could be recovered utilizing heap leach methods with acceptable levels of recovery. Field work was completed at the NW Dome, a large magnetic low that is thought to be coincident to an area of strong hydrothermal alteration - a key to mineralization at the property. At mid-year the property was optioned to Altair Ventures Incorporated who started a very late field program in snow covered conditions.

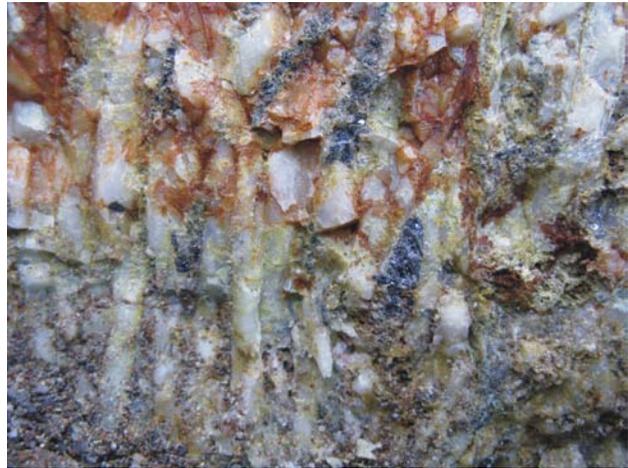


Figure 4.18a. A close up of a gold-silver-bearing quartz sulphide vein at the Watson Bar property. Photos for Figures 4.18 a, b and c courtesy of Durfeld Geological Management Ltd.



Figure 4.18b. Excavating the vein material at the Watson Bar property.



Figure 4.18c. At the Watson Bar property. Loading the bulk sample into a haul truck in preparation for direct shipping to the custom mill.

Fairmont Resources Inc have taken an option on the **Nicoamen River** project this year and completed geological and geophysical surveys in anticipation of drilling.

Strongbow Exploration Inc returned to the **Shovelnose** property located 30 km south of Merritt where it completed a trenching and mapping program. The program was intended to expand upon recent successes at the Line 6 and Mik showings, where gold mineralization is reported to be epithermal-style and related to shallow to moderately west dipping colloform-banded quartz veins hosted within silicified and clay altered felsic volcanic rocks.

Gold Bridge-Bralorne-Lillooet

The most advanced project in the famous Gold Bridge mesothermal gold-quartz vein camp is at the **Bralorne** mine of Bralorne Gold Mines Ltd. It operated continuously from 1928 to 1971 and was the dominant contributor to approximately 4.15 million ounces of gold that has been produced at this camp. Infrastructure on the property includes extensive underground workings, a partially completed tailings pond and a 100 tonne per day gravity/flotation pilot mill.

The company was very active in 2009 primarily with work on the BK zone at the property in a concerted effort to harbor sufficient resources to resume mining. A winter drill program at the BK zone was finished in February and it successfully delineated extensions to the BK zone and the previously known, parallel, Alhambra veins. The program also discovered three new veins. The company reports that it invested a great deal of time early this year data mining, digitizing historical data and incorporating current data to create better spatial modeling of the various veins and zones: a process that it thinks has already shown significant potential along strike for the BK and Alhambra veins. A new 440 m decline was started on the Lorne block to intersect the BK vein at the 575 sub level, some 70 m above the successful 2008 program that drifted along the structure at the 800 level. Ground conditions have slowed the progress of the decline during the course of the year and to date the target has not been reached.

In June the company received a resource estimate for the property, which stated the measured resources to be 17 627 t at 16.24 g/t Au and inferred resources of 142 300 t at 14.98 g/t Au. The measured resources only incorporated the 51B FW "A" and BK veins, while numerous blocks could only be assigned to the inferred category. To upgrade these resources the company has started a new portal at the 400 level and will drive a decline 228 m to intercept and further test the 51B FW and Taylor veins.

A surface drill program began in October to further test the BK zone above the 800 level, parallel veins such as the Alhambra, the veins discovered in the winter program and other areas of the BK zone where modeling

indicates heightened potential. Early results appear positive with the best assay to date being an intersection of the BK vein that yielded 0.6 m of 43.51 g/t Au. Numerous other significant results are reported that range from 0.2 to 0.5 m in width and grades of 3.36 to 9.5 g/t Au. The company undertook successful financings this year and raised upwards of \$5 million to advance this project.

Covenant Resources Ltd completed an MMI survey on its **Piebiter** property located 6 km southeast and along strike from many of the structural zones of the Bralorne camp. The property hosts numerous recorded mineral occurrences and a large multi-element soil anomaly that remains untested.

On the south side of Carpenter Lake and 10 km northeast of the Bralorne Mine, Menika Mining Ltd released results from last year's drilling of the Carter and Imperial zones at the **Reliance** property. The property hosts high-grade gold-arsenic-antimony mineralized quartz-carbonate veins within shear zones. Accompanying the shear zones are felsic dikes suggestive of a possible genetic link to the regional Cretaceous intrusions that provide a temporal and spatial focus to mineralization in the camp. Several of the holes attempted to twin successful holes from previous drilling during the years 1987-1988. At the Imperial zone the best results were deep intersections of 44.6 m of 1.4 g/t Au in hole I08-0001 and 52.1 m of 1.4 g/t Au in hole I08-0002. The property still contains untested MMI gold-silver-arsenic-antimony-in-soil anomalies.

Supreme Resources Ltd released results from fall 2008 drilling at the **Ample-Goldmax** property located 9 km southwest of Lillooet. Previous work has defined Mother Lode-style mineralization with quartz-carbonate-arsenopyrite-gold veins within greenstones and phyllites along a regional-scale fault zone. Visible gold is not uncommon at the property and was reported in press releases as the program completed. Hole AG 08-37 twinned a former Homestake drillhole and largely confirmed previous mineralization in intersecting 7.1 m of 6.6 g/t Au. Holes AG 08-37 and AG 08-39 are reported as discovery holes for new mineralization with the best intercepts being 6.1 m of 4.2 g/t Au and 8.5 m of 5.9 g/t Au respectively. Hole AG 08-39 intercepted mineralization very close to the surface and follow-up hole AG 08-40 attempted to test the new zone, but poor recoveries hampered characterization of the zone: the hole did produce a 1.1 m interval of 10.7 g/t Au.

Okanagan

Almaden Minerals Ltd continues to evaluate the **Elk** mesothermal gold-quartz vein project 45 km southeast of Merritt, and just 2 km south of Highway 97. In the 1990s, 1.6 million grams of gold were produced from 16 700 t of ore extracted from the B vein system in open pit and underground operations. The company has generated a new geological model for the deposit and incorporated

2007 drilling into a new resource estimate for the property. Both the B and WD veins are now better characterized as eight and four separate vein zones respectively which the company reports better represents the geology of the system. The company has reported cut-off grades at 1 g/t Au for a conceptual open pit shell and 5 g/t for underground resources. This has led to the global measured and indicated resources at the property to be 920 000 t at 8.4 g/t Au and inferred resources of 780 000 t at 11.0 g/t Au. The company is undertaking further scoping studies in support of advancing the project through to the resumption of mining. The company owns mill equipment which is being stored near the project which may aid in future developments.

Just 1100 m to the north of the former Brenda Mine and near Peachland, Bitterroot Resources Ltd was active on the **North Brenda** property where the company has most recently explored for porphyry copper-molybdenum mineralization. The company trenched gold and silver-in-soil anomalies in the vicinity of a linear magnetic low, thought to represent a structural feature. Trench TR09-01A uncovered a 0.3 m zone of fault gouge, quartz veins and pyrite that assayed 71.4 g/t Au and 24.4 g/t Ag. Some high-graded samples of vein material in this zone have assayed up to 187.5 g/t Au and 71.8 g/t Ag. The mineralized structure has been traced for 170 m and is thought to be geologically similar to the Elk property which lies 20 km to the southwest. Additional soil and geophysical sampling was undertaken in other prospective areas of the property. The company has signed a Memorandum of Understanding with the Westbank First Nation in support of establishing a positive long-term relationship founded on respect, consultation and accommodation of the Nation's Aboriginal rights.

Partners Molycor Gold Corp and Goldrea Resources Corp drilled the **Flap** gold project located 45 km northwest of Kelowna. Previous work on the property in the late 1980's yielded erratic grades of gold mineralization within a quartz stockwork hosted in agglomerates and tuffs of the Devonian to Triassic Harper Ranch Group. Some of the best previous results reported include up to 77 g/t Au over 1 m in drilling and up to 26 g/t Au from surface chip samples. The company hopes that the use of large diameter reverse circulation drilling will reduce some of the nugget effect that seems to accompany the mineralization at the property. Results for the program are pending as the program started late in the season.

Similkameen River

Southwest of the village of Tulameen, along the Tulameen River, Huldra Silver Inc is proposing a small mine at the **Treasure Mountain** vein silver-lead-zinc project. The company has made an application for a small mine permit based on a conceptual underground mine plan of 135 t per day, operating on a seasonal basis and on-site gravity concentration.

West of Princeton, Fox Resources Ltd has optioned the **Otter** property where it has completed more grassroots work at several areas where epithermal-style gold mineralization within the southern reaches of the Spences Bridge Group rocks is targeted.

SEDIMENT-HOSTED GOLD PROJECTS

South Cariboo-Chilcotin Plateau

Skygold Ventures Ltd drilled the **Spanish Creek** property again this year as part of its search for gold in similar geological settings to its flagship Spanish Mountain property. Located northeast of Canim Lake, the company has been essentially blind drilling within a 1500 m by 800 m wide gold-in-soil anomaly. With almost no outcrop to work with the company will also complete an airborne geophysical survey to help delineate and interpret targets. Late 2008 drilling at the Thunder Ridge zone yielded 45.49 g/t Au over 2.5 m in hole SC-005 and follow-up drilling this year has some equally encouraging results to date including hole SC-017 which intersected 8.84 g/t Au over 7.5 m and included a high grade interval of 39.5 g/t Au over 1.5 m. The company reports the gold mineralization is being encountered in various settings including quartz veins, structurally controlled environments and as disseminations in black shale sequences. The occurrence of gold mineralization in sediments found at this property is not well explained by existing British Columbia deposit models and remains in its own category, currently named "sediment-hosted gold" by the founding company.

Nearby, Happy Creek Minerals Ltd undertook grassroots level work at its **Art-DL** property where the underlying geology is similar to the Thunder Ridge zone and positive gold values are found in soil and silt samples over a 1.5 km trend. Historical workings at the property are reported to have returned assays up to 42.9 g/t Au.

MASSIVE SULPHIDE PROJECTS

Thompson Rivers and Shuswap Lake

Selkirk Metals Corp advanced its **Ruddock Creek** project located within the Script Ranges about 100 km north of Revelstoke starting with a late 2008 introduction of the project to the British Columbia Environmental Assessment process where it remains at an idle stage of review. At mid-year, and after several years of aggressive drilling of the E zone, the company released an updated indicated resource of 2.3 Mt of 7.8% Zn and 1.6% Pb and an inferred resource of 1.5 Mt of 6.5% Zn and 1.3% Pb, both at a cut-off of 4% combined Pb plus Zn. Whilst E zone resources will guide further evaluation of the deposit, they represent only a portion of the eight known

mineralized zones, most of which have not received sufficient drilling for resource estimation. This year's field work consisted of surface geophysics, geological and geochemical surveys. In July, the company announced it was merging with Imperial Metals Corporation, which was completed in November and Selkirk Metals is now delisted.

At the **Harper Creek** copper project located 10 km southwest of Vavenby, a private company Yellowhead Mining Inc has outlined an extensive volcanogenic sulphide system with an indicated resource of 538.4 Mt of 0.32% Cu at a 0.2% cut-off. The deposit is comprised of tabular shaped zones of volcanogenic sulphide mineralization hosted within highly deformed Late Devonian metavolcanic rocks of the Eagle Bay Assemblage. This year the company undertook office-based studies aimed organizing data and characterizing the deposit as well as gathering environmental baseline data in preparation for a feasibility study. The project is currently on hold in the British Columbia Environmental Assessment process.

Several other projects were active in the Adams Plateau with most exploring for volcanogenic massive sulphide mineralization within the highly prospective Eagle Bay Assemblage. On the **Moore** property near East Barriere Lake, Almo Capital Corp completed eight drillholes in search of mineralization within metamorphosed andesite and felsic volcanic rocks of the Eagle Bay Assemblage. Southeast of Barriere, Bitterroot Resources Ltd advanced its **SPN** project with further geochemical sampling and a gravity geophysical survey.

The richness of the Adams Plateau has attracted many prospectors who collectively control some very prospective land positions. Tom Robinson has been active on his **Midday** property east of Adams Lake and discovered mineralization at the Longspur showing where sample 9.Sr.R.6 assayed 9.6% Zn, 1.1% Pb, 0.14% Cu, 42.6 g/t Ag and 0.35 g/t Au (Figure 4.19). He has found numerous float samples elsewhere on the property that are not far travelled and contain similar levels of mineralization. Dave Piggin continues to advance his large holdings at the **Honeymoon** property west of Adams Lake and north of the former Samatosum mine, where the Mal 001 (copper-silver) and Spapilem (gold) showings provide hints to the potential of the region (Figure 4.20). Partners Tom McDonald and Alfie McKay continue to find elevated gold, copper and zinc levels at the Hammer zone on their **Stellar** property near North Barriere Lake. Just east of the former Samatosum Mine and near Adams Lake, Cleve Lowrey is exploring the **Poet** claims where stratabound, high-grade, zinc-bearing veins are hosted within silicified marble of the Eagle Bay Assemblage.

Columbia River

International Bethlehem Mining Corporation, through a wholly owned subsidiary, owns the **Goldstream**



Figure 4.19. An exciting high-grade zinc-lead-copper-silver-gold boulder from the Longspur showing arrives at the Ministry office. The showing is on the Midday property of prospector Tom Robinson and located east of Adams Lake.



Figure 4.20. Dave Piggin stands deservedly proud on the discovery showing at the Spapilem gold showing at his property west of Adams Lake.

copper-zinc mine-mill complex north of Revelstoke, which lies in the heart of this highly mineralized region. The Columbia River region is best known for its stratiform base-metal deposits hosted in cover sequences of the Monashee Complex. With a 1360 dry metric tonnes per day capacity, this custom mineral processing

plant is permitted to custom mill off-site ore feed. The company continues to evaluate re-processing mill tailings as well as reviewing other potential regional deposit opportunities in an effort to secure longer term production and re-start the mill.

Work at the **J&L** property of Merit Mining Corp, located 45 km north of Revelstoke, remains on hold as the company attempts to restructure its debt. At the property, the Main and Yellowjacket zones of silver-lead-zinc stratiform mineralization are hosted by highly deformed metasedimentary rocks of the Proterozoic-Paleozoic Hamill Group.

Armadillo Resources Ltd completed an eight hole program this year at the **Waverley-Tangier** property located 56 km northeast of Revelstoke. A deformed package of Lower Cambrian schist, phyllite, quartzite and marble, host replacement mineralization composed of calcite, minor quartz and a fine-grained mixture of pyrite, jamesonite, galena, sphalerite and minor amounts of tetrahedrite. Some underground work was completed in the late 19th century but most of the workings are reportedly caved in or reclaimed. With the late season finish, assay results are not yet reported.

MAGMATIC PROJECTS

Thompson Rivers and Shuswap Lake

At the **Blue River** tantalum and niobium project, Commerce Resources Corp spent the year infilling geological and mineralogical gaps after a substantial 2008 program that saw over 26 000 m of drilling and collection of a 2000 t bulk sample. The property is 30 km north of Blue River and well located near infrastructure. A new resource estimate was reported for the Upper Fir carbonatite which gave an indicated resource of 11.31 Mt at 198 g/t Ta₂O₅ and 1 170 g/t Nb₂O₅ and inferred resource of 26.24 Mt of 194 g/t Ta₂O₅ and 1182 g/t Nb₂O₅ at a 150 g/t Ta₂O₅ cut-off. At the Upper Fir carbonatite, 22 holes were drilled, and another resource update is anticipated reflecting this year's work. The company reports it is progressing on a preliminary economic evaluation and undertaking further engineering investigations and metallurgical test work.

Similkameen River

Near Tulameen, a private company, Magnetite Ridge Metals & Mining Ltd, continues to attract attention at its **Magnetite Ridge** property. The company is seeking partners to evaluate its magnetite resources for potential use as iron smelter feed and as a coal cleaning medium.

South Cariboo-Chilcotin Plateau

Cobre Exploration Ltd was active at the **Iron Lake** property near Canim Lake and northeast of Lac La Hache.

The property covers mafic through ultramafic phases of intrusive rock related to the Triassic to Jurassic Takomkane batholith. The area features a prominent magnetic high which measures 5 by 7 km in size, much of which is unexplored to date. Previous work at the property discovered mineralized olivine-pyroxenite boulders that graded between 0.50 to 0.75% Cu, 0.40 to 0.75 g/t Au and 0.30 to 0.60 g/t PGEs. Several large copper-platinum-palladium-in-soil anomalies have been outlined in this area and were trenched this year in search of bedrock.

OUTLOOK FOR 2010

In the south-central region of BC, opening a mine within a mature mining district has a lot of advantages with regard to permitting and capitalizing on existing infrastructure. This is the obvious story for the New Afton and Copper Mountain projects, both former mines with significant histories yet bright futures. These projects are expected to continue to attract explorationists to this region and this style of deposit: especially since their gold-rich character complements what is expected to be a lengthy period of heightened precious metals prices.

The Highland Valley mine has shown itself to be a solid producer during the recent period of volatile commodity prices and economic instability. Expansion plans underway prove that the company is confident that the mine will anchor their future for some time – not too many years ago it was thought that the mine would cease operations in 2009. This stability will spur on other regional plays that may provide additional resources to the mine or as stand-alone ventures.

Projects with non-porphyry gold resources such as higher-grade veins or near-surface bulk-mineable targets should continue to be attractive since the high precious metal prices have created a wide spectrum of opportunity. Companies will be quick to complete economic studies of their deposits, but modeling must accommodate volatility of precious metal prices to avoid becoming a “swing” producer as the markets respond to the complicated dynamics of supply and demand. Smaller deposits that can be easily exploited and directly shipped to custom mills for short term but high cash flow to the operator will be in vogue as is already seen in a few examples.

Projects exploring for volcanogenic-hosted zinc, lead and copper seem to have been more affected by the economic downturn than other deposit types. The prices for those metals have increased through the year, and perhaps a rebounding automotive or galvanized steel industry will help zinc in particular. If a movement to galvanized reinforcing steel for concrete structures takes a foothold in Asia, as is being contemplated, this could have significant implications for this region's zinc projects. With a smelter in the province, and the overall high value of multi-commodity deposits, these should be attractive targets to the industry.



Figure 4.21. Stk'emlupsemc Enterprises Inc employee Jo-Anne Mosterd at a kekuli (winter pit house) as part of a joint effort with MEMPR to characterize exploration and mining opportunities in the Stk'emlupsemc territory and beyond.

culture and conversely about the culture of the Secwepemc people. Jo-Anne has graduated from the program and looks forward to an exciting career in natural resource management.

The high-technology sector consumes significant amounts of often under-supplied exotic metals such as the rare earth elements. While this is not familiar territory for many explorationists, the geology of the province does support these deposit types. Securing a stable and reliable supply appears to be a challenge for the consumers of these metals and this region has some potential to perhaps meet that need. Again, Asia's involvement in the rare earth element market will be a key to the supply, demand and pricing of this metal group.

Junior companies, who continue to rely upon financing from various stock exchanges, will continue to be challenged as investors cautiously return to the market after a period of volatility erased several years of gains.

SPECIAL PROJECTS

The MEMPR south-central regional office and Stk'emlupsemc Enterprises Inc jointly pursued a project this year aimed at examining exploration and mining opportunities in the Stk'emlupsemc territory and beyond. Stk'emlupsemc Enterprises was created by Tk'emlups and Skeetchestn Indian Bands to manage the business affairs related to the New Afton Participation Agreement. This year's project involved the creation of a mineral inventory report of the lands of the respective bands as well a natural resource guide to give band members a brief overview of the traditional and contemporary uses of their natural resources. The company employed Jo-Anne Mosterd, a student in the Thompson Rivers University Bachelor of Natural Resource Science degree program and a Tk'emlups Band member, to work in the Ministry's office on the project (Figure 4.21). She spent almost six months working on the project and the products are coming together very well. This project has been valuable for the individuals and organizations involved; much was learned about government and mining industry

SOUTHWEST REGION

By Bruce Northcote, PGeo,
Regional Geologist, Vancouver

SUMMARY AND TRENDS

The southwestern region has one major metal mine, a thermal coal mine and approximately 20 large industrial minerals and aggregate quarries that typically produce more than a quarter million tonnes per year. Most of the largest mines, including the region's metal and coal mines, take advantage of their proximity to tidewater or major rivers to transport their commodities to markets with attractive shipping costs. In addition to these major producers, there are a number of smaller industrial minerals operations and building/landscaping stone producers. Smaller aggregate operations in the region number in the hundreds.

The region's metal mine, **Myra Falls Operations**, produces zinc, copper, silver and gold. The nearby **Quinsam** coal mine is an underground thermal coal operation. Production is projected to be lower at both mines as compared to 2008 (Table 5.1).

For a number of industrial minerals producers and aggregate operations, demand was sharply lower in 2009. Aggregate producers report demand decreased by 25-45% (typically about 40%) and prices were down by 15-20% in early 2009 through mid-year. Trucking costs have also fallen in 2009. There were some signs of stabilization by the end of the year, and some producers had called back, or were planning to call back, some laid-off employees. Lower Mainland construction activity was expected to be light during the Winter Olympic period and producers were looking to Spring 2010 for improving sales.

Two significant projects entered the mine evaluation stage in 2009, **Raven Coal** and the **Texada South** proposed limestone quarry.

Exploration statistics for the southwest tend to be dominated by a few large projects in any year (Figures 5.1 to 5.5). The largest five projects (of the approximately 30 tracked) accounted for more than 80% of exploration spending in 2009. The largest project in the region this year was Raven coal, operated by the Comox Joint Venture, led by Compliance Energy Corporation. Other large projects were the Mineral Creek gold project, Pearson iron project, and a peripheral drill program at Myra Falls. Some of the smaller-scale but significant projects in the region this year were the Rogers Creek copper porphyry project, Ladner gold project, Bonanza-Sitka gold project and construction of an access road at Catface Copper.

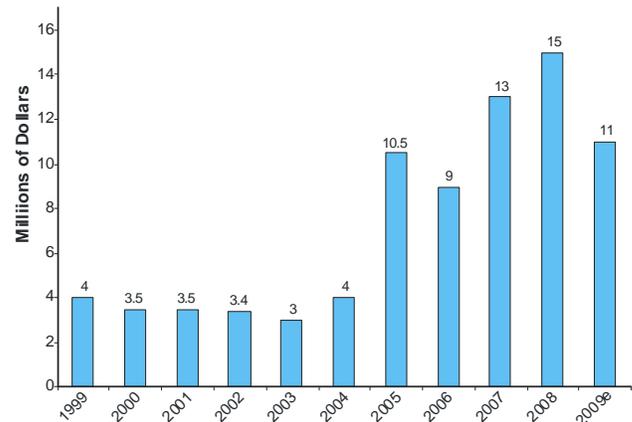


Figure 5.1. Exploration spending estimates 1999-2009. Spending in the southwest in 2009 exceeded early expectations.

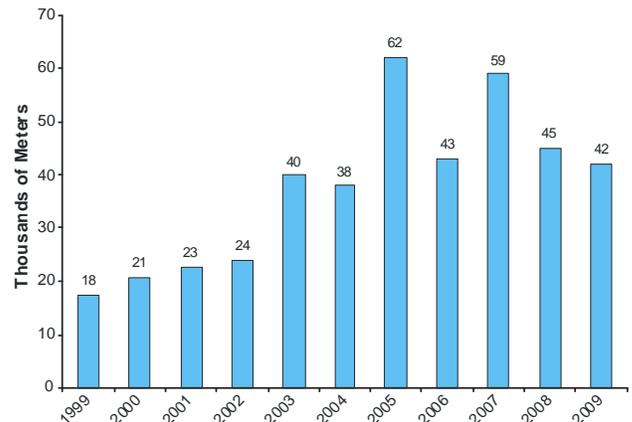


Figure 5.2. Exploration drilling in the southwestern region 1999-2009.

At approximately \$11 million, overall exploration spending in 2009 was 20-30% higher than anticipated early in the year (Figure 5.1). Less surprising, there was a notable shift toward gold exploration in addition to the large coal project that dominated the 2009 statistics (Figure 5.5, Table 5.2). Some proposed exploration programs were deferred, often due to the unattractiveness of raising funds in the depressed financial market that continued into 2009. Those unable or unwilling to mount drill campaigns have in some cases opted for less expensive prospecting, mapping and sampling projects. Unexpectedly, the proportion of exploration expenditures

Operating Mines and Selected Major Exploration Projects in South West British Columbia 2010

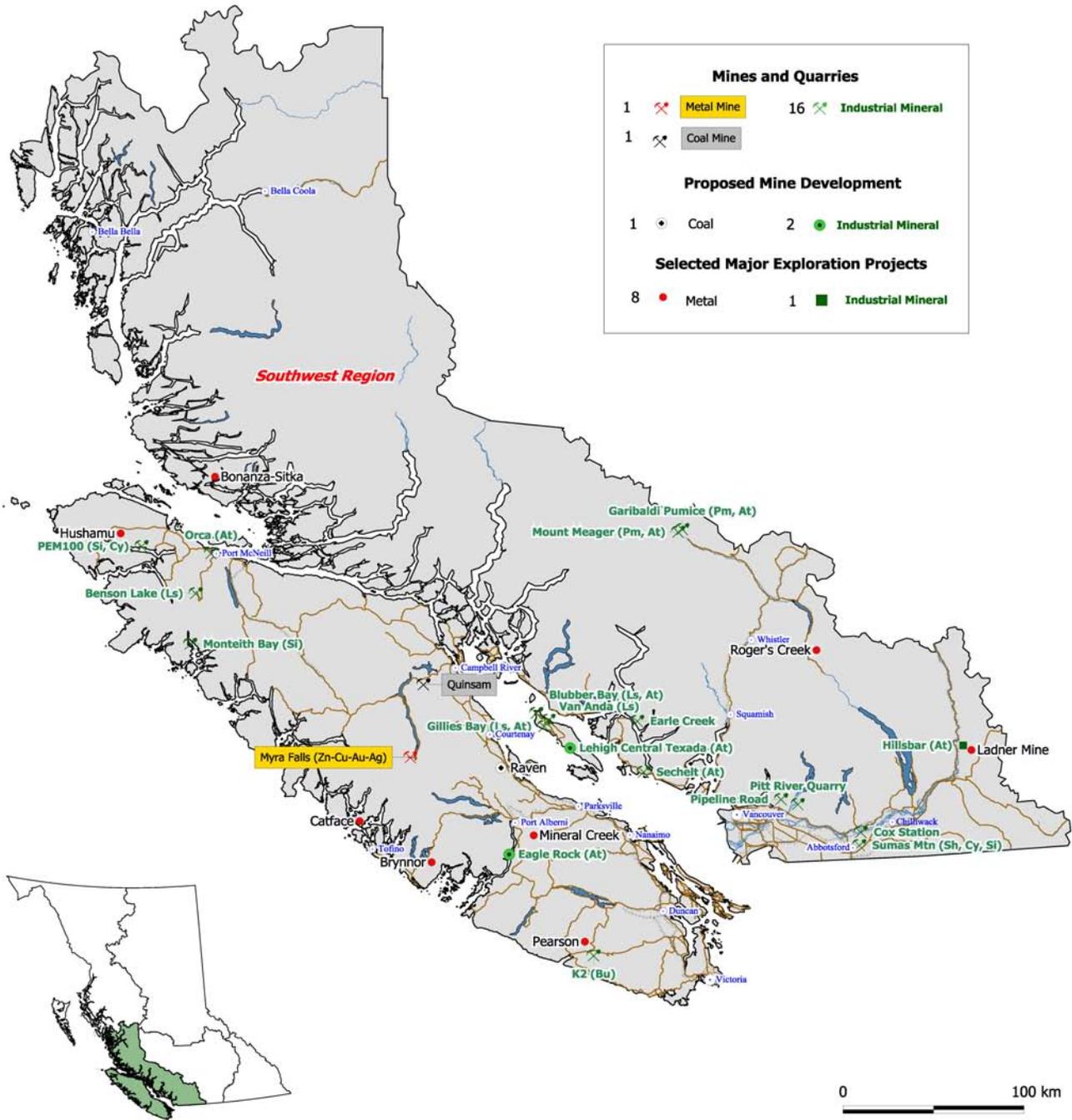


Figure 5.3. Operating Mines and Selected Exploration Projects in the Southwest Region, 2009.

TABLE 5.1. MINE PRODUCTION AND RESERVES, SOUTHWEST REGION*.

Mine	Operator	Commodities	Mine Workforce	Forecast Production 2009	Production 2008	Reserves as of Dec 31, 2008
METALS						
Myra Falls Operations	NVI Mining Ltd (Breakwater Resources Ltd)	Zn-Cu-Au-Ag	217	31 500 t Zn 3 500 t Cu 441.7 kg Au 17 325 kg Ag (metal in concentrate)	35 762 t Zn 5 024 t Cu 435.3 kg 20 566.5 kg (metal in concentrate)	6 298 000 t 5.2% Zn 0.5% Pb 0.9% Cu 1.3 g/t Au 44 g/t Ag (proven and probable)
COAL						
Quinsam	Quinsam Coal Corp (Hillsborough Resources Ltd)	Thermal coal	130	390 000 t clean coal	431 500 t clean coal	22.073 Mt (proven and probable in situ reserves)
INDUSTRIAL MINERALS						
Apple Bay (PEM 100)	Electra Gold Ltd	Chalky geyserite	8	101 000 t	100 000 t	~5 million t
Benson Lake	Imasco Minerals Inc	White marble	4	26 000 t	38 400 t	100+ years
Blubber Bay	Ash Grove Cement Company	Limestone aggregate, dolomitic limestone	10-12	221 000 t (incl. 13 000 t dolomite)	610 000 t	100+ years
Garibaldi Pumice	Garibaldi Pumice Ltd	Pumice	4	20 000 m3	(bulk sample)	100+ years
Gillies Bay	Texada Quarrying Ltd (Lafarge North America Inc)	Limestone, aggregate	40	3.4 Mt	6.0 Mt	100+ years
Monteith Bay	Lehigh Northwest Cement Limited	Geyserite	Care and Maintenance 2008-2009			
Mount Meager	Great Pacific Pumice Ltd	Pumice	2	3000 m3	Care & maint.	100+ years
Sumas Mountain	Sumas Shale Ltd (Clayburn Industrial Group and cement manufacturer partners)	Shale and clay	10	285 000 t	510 000 t	~70 years
Van Anda	Imperial Limestone Company Ltd (JA Jack & Sons Inc)	Limestone	10	209 000 t	280 000 t	~50 years

*Mine and industrial mineral production in the southwestern region, 2008-2009 exclusive of aggregate-only operations. See text for partial coverage of the aggregate industry.

MINES AND QUARRIES

METAL

NVI Mining Ltd, a subsidiary of Breakwater Resources Ltd, runs the **Myra Falls Operations** at Buttle Lake on Vancouver Island (Figure 5.6). It is a bimodal felsic or Kuroko-type volcanogenic massive sulphide deposit that produces zinc and copper with significant gold and silver contents. Zinc accounts for much of the revenue. A lead circuit also exists at the mill, but was not in regular operation in 2009. Concentrates are shipped from Breakwater's port facility near Campbell River (Figure 5.7).

The mine currently operates with just over 200 employees and early in the year was expected to process approximately 480 000 tonnes of ore in 2009. Mill throughput was somewhat lower than projected at the end of the third quarter. The 2009 production projection as of the end of the third quarter was for 31 500 t Zn, 3500 t Cu and 557 000 ounces (17 325 kg) Ag as metals in concentrate. In addition gold in concentrate was earlier projected at 14 200 ounces (441.7 kg).

As of December 31 2008, proven and probable reserves stood at:

6.298 Mt of 5.2% Zn, 0.5% Pb, 0.9% Cu, 44 g/t Ag, 1.3 g/t Au.

Measured and Indicated resources (including proven and probable reserves) were:

6.799 Mt of 6.9% Zn, 0.6% Pb, 1.2% Cu, 57 g/t Ag, 1.7 g/t Au.

An additional inferred resource was:

3.196 Mt of 8.2% Zn, 0.9% Pb, 1.1% Cu, 110 g/t Ag, 2.3% Au.

Late in 2008 and in early 2009, with zinc prices below the cost of production, the operation was in some jeopardy of closure along with numbers of other zinc mines worldwide. Discovery of the South Flank lens came at a crucial time, late in 2008 as plans were being made to temporarily suspend operations. Mining of that zone began in the first half of 2009. The roughly 200 000 t resource will provide a significant source of high grade mill feed into 2010. Zinc is found throughout, but the lens is vertically zoned, with higher copper values found toward the base and highest precious metal contents toward the top. It is located southeast of the H-W zone close to existing development, but on the opposite side of the Myra-Price fault, which crosses the trend of the H-W zone and was originally interpreted as having several hundred meters offset. The new zone is only slightly higher than H-W suggesting (if it is a continuation of the H-W) that offset on the fault is not as great as previously thought. An alternative interpretation

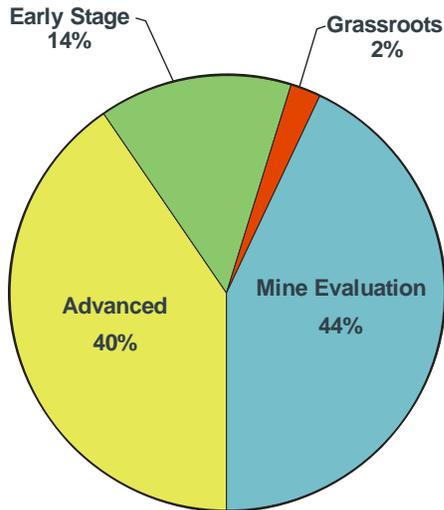


Figure 5.4. Southwestern region exploration spending in 2009 broken down by project exploration stage. Mine evaluation is notable this year, largely representing the Raven coal project. Spending on grassroots projects is similar to 2008.

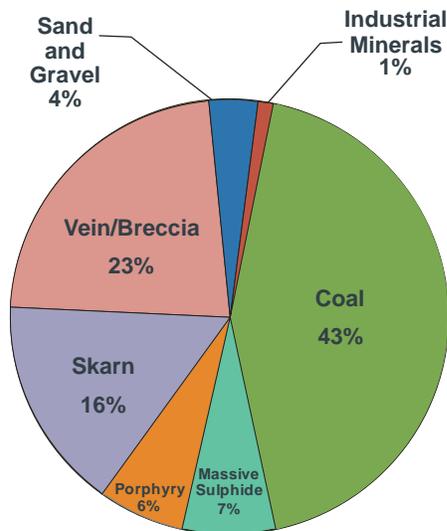


Figure 5.5. Southwestern region exploration spending in 2009 broken down by primary target type.

allocated to grassroots properties was similar to the previous year at about 2-3% (Figure 5.4). While there appeared to be more grass roots work reported in 2009, some basic mapping, sampling and prospecting occurred on and around relatively advanced properties. This type of work apparently continues to be effective (and cost effective) in the region: there were several prospecting discoveries reported in 2009. Some of these are expected to generate larger projects in 2010.



Figure 5.6. A truck in the underground maintenance area at Myra Falls.



Figure 5.7. A freighter at Campbell River, loading Myra Falls zinc and copper concentrates bound for Asia.

is that the new zone represents a previously unrecognized ore horizon.

There were clues pointing to the existence of this new zone as early as 2004, when a drillhole from the Price horizon designed to obtain a section to the H-W stopped in a fault containing ground sphalerite. Subsequent drilling from the H-W encountered pyrite stringers and sericite+silica alteration. A hole from the 20 level encountered mineralization.

Success in this near-field type of exploration has continued through 2009 (see exploration section below).

COAL

Quinsam thermal coal mine, an underground retreat room and pillar mining operation, has in recent years produced roughly half a million tonnes of thermal coal per year from seams in the Upper Cretaceous Comox Formation (Figure 5.8). The mine is expected to produce 390 000 t of clean coal in 2009. The mine supplies Lower Mainland and US Pacific Northwest cement plants as well as the international thermal coal market through an off-take agreement with the Vitol Group. At the time of

writing, Hillsborough and Vitol Anker International B.V. had entered into an agreement providing for the acquisition of Hillsborough by Vitol. The Vitol Group is an international group of trading companies with a focus on energy. It entered the coal sector in 2006 and has since become a significant trader of thermal and anthracite coal.

Total proven and probable in-situ reserves at the Quinsam mine as of December 31 2008 were 22 073 000 t.

The focus of mining at Quinsam has shifted to the 5 South Phase I area and is expected to proceed with 5 South Phase II and 7 South. An application for 5 South Phase II has been submitted. A detailed mine plan has now been completed for 7 South and a Mine Permit application is in preparation at the time of writing. Re-commencement of mining in 4 South and the 242 block is being considered. Development at 1 Mains has been suspended due to low mining recoveries and washplant recoveries.

As mining progresses into the 7 South area, a higher sulphur coal will be mined (1.5-2% vs. 0.5% at present). Development work in 2009 also consists of plans for subaqueous disposal of potentially acid generating coarse coal rejects in the 2 North Pit Sump as well as the existing 3 South Pit disposal facility. There is a longer range plan for the creation of a subaqueous disposal facility at the 2 South Pit.

A 2009 estimate of Quinsam North resources identified 18.341 Mt measured, 5.456 Mt indicated and 1.498 Mt inferred resources of medium to high sulphur coal. The corporation is investigating the potential for blending this medium to higher sulphur coal with low sulphur coal from other mines.

PLACER GOLD

There was a notable increase in placer activity in 2009. In 2009 there were 8 placer notices of work filed compared to 2 in the previous year. These notices were in the Leech River, Fraser River and Chemainus River areas. Other placer activity occurs in the region but much is below permitting thresholds and not tracked.

Gold was discovered on Leech River, southern Vancouver Island in 1864 and activity continues in the



Figure 5.8. The portals at Quinsam coal mine.

area to this day. This year there has been some renewed interest in placer gold on the Fraser River and its tributaries north of Hope. Hills Bar near Yale was the site of BC's first gold rush in 1858.

INDUSTRIAL MINERALS AND AGGREGATES

Limestone

Texada Quarrying Ltd, a subsidiary of Lafarge North America, operates BC's largest industrial minerals and aggregate operation near **Gillies Bay** on Texada Island. Approximately 80% of its product is limestone cement feed for Lower Mainland and US Pacific Northwest plants. The other 20% of its product is used as aggregate, including dikes cutting the limestone. The operation produces virtually no waste. As with most construction materials operations, production and shipments were down sharply in 2009, with approximately 3.4 Mt mined and shipped. At its peak, the operation produced roughly 7 Mt. The quarry's deep water loadout facility can accommodate Panamax freighters and the quarry is capable of serving western North America and Hawaii in addition to more local markets. Quinsam coal's international shipments are also loaded at this site.

Blubber Bay Quarry, a producer of limestone aggregate and dolomite is owned by Ashgrove Cement Company. At the end of the third quarter it had produced just over 207 000 t of limestone aggregate and expected to ship over 200 000 t in 2009. The quarry also produces dolomite, approximately 13 340 t in 2009. Dolomite is shipped to Ashgrove's Rivergate lime plant in Portland, Oregon.

Imperial Limestone Company Ltd operates another quarry on Texada Island, near **Van Anda** (Figure 5.9). The majority of its product goes into building materials, specifically glass and fillers in roofing and plastics as well as agricultural products. They expect to produce approximately 209 000 t in 2009. Parent company J.A. Jack & Sons Inc processes and distributes the product out of Seattle.

Imasco Mineral Inc continues to operate its **Benson Lake** white marble quarry on northern Vancouver Island. It produced approximately 26 000 t in 2009. The marble is barged to the Lower Mainland and sold as fine-ground bright white calcium carbonate filler and extender suitable for a number of industrial applications.

Clay, Silica and Alumina

Sumas Shale Ltd is expected to produce approximately 285 000 t at **Sumas Mountain** in 2009. As in previous years, the large majority of the product (shale) goes to local cement plants as a source of alumina. A smaller amount of clay, approximately 3-4%, is used in the manufacture of bricks.



Figure 5.9. A drill rig at the Imperial Limestone quarry on Texada Island.

Se:math Industries is a re-launch of Sumas Clay Products, operator of the historic **Kilgard** brick plant and clay quarry. There was no 2009 production as they reduced inventory and began to focus on restoring the plant and building markets for specialty products including brick murals (Figure 5.10).

Electra Gold Ltd's **PEM 100** quarry near Apple Bay produces chalky geysersites, a silica-alumina cement feed product. The quarry is expected to produce 101 000 t in 2009. Electra has started crushing and screening its product on site. They have added Lafarge Canada as a customer and now ship to them as well as Ashgrove Cement in Washington. Electra currently trucks to a load out facility at Port Hardy, but is considering an alternative shipping route down the west coast of Vancouver Island.

The Lehigh Hanson Materials Ltd's **Monteith Bay** quarry, another silica producer, remained on care and maintenance in 2009.



Figure 5.10. Sumas Clay Industries is being re-launched as Se:math Clay industries with a focus on specialty and value-added brick products, including murals. From left to right are Ray Silver Sr., Brad Boyes and Ray Silver Jr.

Cosmetic and Medical Clay

Coastal BC has resources of glacial clay typically found in glacial marine or lacustrine deposits along the coast. Clay has been mined periodically from sites near Bella Coola and in the Comox Valley. The largest supplier, Ironwood Clay Company, collects its material at De Cosmos Lagoon on Hunter Island. The quantities of raw material extracted are relatively small. The clays are processed and sold as value-added cosmetic and medical products. Precision Laboratories, Ironwood Clay Company and Glacial Marine Clay Inc are among those supplying products consisting of, or containing, glacial clays from coastal BC. Glacial Marine Clay Inc reports they have recently stopped producing clay in the Comox Valley, but are investigating a potential new source in cooperation with Pacific Iron Ore Corporation on southern Vancouver Island.

Aggregate-Only Operations

The aggregate sector is an important part of BC's mining industry, particularly in the southwest, with its relatively high population and access to navigable rivers and tidewater which allow economical shipping. The Ministry of Energy, Mines and Petroleum Resources and Natural Resources Canada estimated BC's 2008 annual production at 47 Mt. The large majority of this production and consumption occurs in the southwestern region.

All of the aggregate producers surveyed reported significantly lower sales in 2009. Several noted steadier demand in the last few months of the year. Several of those interviewed expect the first month of 2010 to remain slow, with strengthening markets in the spring.

The two highest-volume aggregate producers in southwestern BC are Lafarge North America and Lehigh Hanson Materials Ltd, both large international construction materials companies. The number three producer in the Lower Mainland is a local company, Mainland Sand and Gravel Ltd. Smaller sand and gravel producers number in the hundreds and activity is not tracked for the purposes of this report. There are more than 800 sand and gravel permits designated as "active" in the southwest, although most are only intermittent producers.

The largest sand and gravel operation in BC is the

Sechelt Mine of Lehigh Hanson Materials Ltd (Construction Aggregates Ltd). In recent peak years production has been in the region of 5 Mt/y. In 2009 production and sales are forecast at 2.9 Mt. Approximately 75% has gone to Lower Mainland, Vancouver and Victoria, 22% to California and 3% to the local market. The main uses have been construction materials, road bases, sub-bases and blended products. The operation has a deep water loadout facility capable of accommodating Panamax freighters. A number of projects went ahead at the mine in 2009, including replacement of a stone scrubber, rock dewatering screen, a 6.5 cubic yard excavator and a 6.0 cubic yard loader. Approximately 5 ha of disturbed land was reclaimed in 2009.

Lehigh operates a number of other quarries in the region. Among the larger ones are the **Steelhead-Shxwhá:y** sand and gravel operation near Chilliwack and the **Gilley's** quarry on the Pit River, a producer of crushed quartz diorite. These each produce several hundred thousand tonnes per year.

Lafarge also operates a number of aggregate quarries in the southwestern region. The three largest are the operation at **Gillies Bay** (see above), which produces aggregate in addition to cement feed, the sand and gravel operation at **Earl Creek** near Egmont and the crushed rock producer **Pitt River Quarry**. Earl Creek is expected to produce 970 000 t in 2009, a 26% decrease from 2008 volumes. The quarry is expected to be the major aggregate supplier for the Port Mann Bridge upgrade, having secured a contract with Peter Kiewit Sons Inc, one of the joint venture partners contracted to design and build the project. Earl Creek's product is shipped by barge.

Volume at the other large Lafarge operation, Pitt River Quarries is expected to be approximately 930 000 t in 2009. This is a reduction of 28% from 2008. There were signs of improvement in the latter part of the year, as demand was supported by the completion of the Pitt River Bridge and asphalt aggregate sales. Approximately 60% of the product was shipped by barge in 2009, up from approximately 50% most years.

Mainland Sand and Gravel Ltd's **Cox Station** quarry has produced as much as 2.5 Mt of crushed aggregate in recent years. About 94% of the product is shipped by barge, 5% by truck and 1% by rail (Figure 5.11). Most of



Figure 5.11. Loading a barge at Mainland Sand and Gravel's Cox Station quarry.

the product is consumed in the Lower Mainland. Cox Station is the largest operation of Mainland Sand and Gravel. Unlike the region's two large international construction materials companies, Mainland is not vertically-integrated; the focus is on aggregate production and Cox Station is its biggest operation. Production and shipments are expected to be roughly 1.5 Mt in 2009. Mainland operates another smaller crushed aggregate quarry on Sumas Mountain and markets much of the sand dredged by Fraser River Pile and Dredge Ltd. Dredged material is a significant source of clean sand particularly suitable for fill, including construction pre-loading.

Polaris Minerals Corporation experienced a 40% reduction in demand for **Orca** quarry's products in the first nine months of 2009, roughly in line with the other southwestern BC producers surveyed. The operation's primary market remains California, but Orca continues to serve the BC Lower Mainland and Hawaii. Polaris had not published a current 2009 production estimate at the time of writing, but if the fourth quarter production is similar to the third, a figure of 1.2 to 1.3 Mt is likely. Positive news from Polaris was the company's progress toward establishing two new receiving terminals, one in Long Beach California and the other in San Diego. These will allow Polaris to enter the Los Angeles and San Diego markets. It currently ships to San Francisco Bay.

The **Pipeline Road** operations of Allard Contractors Ltd, Jack Cewe Ltd and Lafarge may exceed a million tonnes in 2009 combined. Product is trucked from these sites. Another large quarry operated by Jack Cewe on Jervis Inlet will probably exceed 500 000 t. The Jervis Inlet operation produces both natural sand and gravel and a crushed rock product. Material is barged to the Lower Mainland market.

Fraser Valley Aggregates Ltd is another of the major sand and gravel producers active in the Fraser Valley. Their **Bradner Road** operations were expected to produce roughly 500 000 t in 2009. Their Sylvester Road operation produced roughly 200 000 t.

Pumice

Pumice is mined at two quarries in the **Mount Meager** area, by Great Pacific Pumice Inc and at another nearby location by Garibaldi Pumice Ltd (Figure 5.12). Production by Great Pacific resumed this year under new ownership with an output of approximately 3000 m³. Garibaldi Pumice acquired their mining lease and quarry permit in 2009. They produced approximately 20 000 m³ and washed approximately 12 500 m³ of its product. Both operations supplied mainly light weight aggregate in 2009, although Mount Meager pumice has a number of other potential uses such as lightweight concrete products, fillers, filter mediums, polishing compounds, pozzolans and cosmetic applications. Both producers foresee entering some of these markets in addition to light weight aggregates. When sold as aggregate in the Lower



Figure 5.12. Garibaldi Pumice Inc's quarry near Mount Meager.

Mainland, transportation represents nearly two-thirds of the cost of the product.

Building and Landscaping Stone

Matrix Marble and Stone continues to quarry and fabricate marble products on Vancouver Island. They produced 120 t from their quarry near Tahsis and 70 t from a quarry near Jordan River. Products include slabs cut to size and other custom work. In addition to imported stone, they supply local marble in three colours: Black Carmanah, Tlupana Blue and Island White.

The historic quarry on **Haddington Island** produced approximately 1700 t of dimension stone in 2009, equivalent to the previous year (Figure 5.13). In addition, 5000 t of waste rock at the quarry was employed as rip rap for construction of a jetty at Port McNeill. The Provincial Parliament buildings are perhaps the best known use of this strong, durable andesite. More recently it was incorporated in the Air India memorial in Stanley Park.



Figure 5.13. Haddington Island Quarry – photo courtesy of Haddington Island Stoneworks Ltd.

Hardy Island Granite Quarries Ltd operates another historic quarry on **Hardy Island** in Jervis Inlet, originally active in the early part of the 20th century. It re-opened in 1999. In 2009 it is expected to produce approximately 4000 t of granodiorite dimension stone.

K2 Stone Quarries Inc mines meta-mudstone or meta-siltstone with slaty partings from the **K2 Quarry** in the Leech River Formation near Port Renfrew. K2 has increased sales in 2009 and a significant expansion of the existing quarry is underway. In 2009 they hauled approximately 14 000 t and produced approximately 2000 t of finished product. The company has added new distributors in Canada and has entered the US market, exporting as far as Los Angeles and Virginia. K2's success was recognized at the 2009 BC Export Awards with the "New Exporter" award, given for most notable success entering an export market. Their aggressive movement into the new market was in part driven by concerns that sales would fall in 2009 in response to market conditions.

Van Isle Slate Ltd is a smaller quarry located near Port Renfrew which has also seen improved sales in 2009. Van Isle Slate's fourth year was its best so far. They produce hand split landscaping stone, flagstone, slabs, steps and facing stone mainly for the local market, with some shipments to the Lower Mainland, Alberta and Washington. Their new tumbled stone products are selling well. Total 2009 production is expected to be between 500 and 700 t. There are several other small scale producers in the area.

Stone is quarried in the Sea-to-Sky corridor, mainly for landscaping purposes. Quaternary volcanic columns and slabs have been of most interest in recent years. There are intermittent granite quarries as well. The largest landscaping stone producer is Huckleberry Stone Supply, operator of the **Spumoni** quarry as well as smaller operations.

MINE DEVELOPMENT AND MINE EVALUATION PROJECTS

One southwestern project entered the environmental assessment process in 2009, the **Raven** coal project located approximately 20 km south of Courtenay. The operator, Comox Joint Venture, consists of majority partner Compliance Energy Corporation, Itochu Corporation and LG International Corp. They have received an order under section 10 of the Environmental Assessment Act to proceed with an assessment.

Concurrent with infill drilling to upgrade resources were initiation of environmental baseline monitoring and initiation of a full feasibility study. The feasibility study will consider several options for transporting coal from the site to local port facilities. Coal may be trucked to facilities in Campbell River (Middlepoint), Nanaimo

(Duke Point) or Port Alberni. The latter port can accommodate Cape size freighters which could transport over 80 000 t. There is also a potential rail option to Port Alberni, which would require upgrading of the rail line and the port's handling facilities.

A 2007 preliminary economic assessment contemplated an operation producing 823 000 clean tonnes per year of high volatile hard coking coal. Thermal coal production was considered as an alternative. The thermal coal option would have better coal processing plant recovery but is projected to be less profitable. Should the mine develop as a metallurgical coal producer, some thermal coal may also be sold.

Lehigh Hanson Materials Ltd submitted an application to quarry limestone at its **Texada South** property. The proposed quarry is designed with an annual production of 240 000 t. It is intended to allow Lehigh to maintain a presence in the limestone aggregate market alongside Texada Island neighbours Lafarge and Ashgrove. Unlike the Texada Quarrying (Lafarge) operation, production of cement feed stock is not planned. Lehigh's Richmond cement plant is supplied by Texada Quarrying Ltd. The Texada South product would be shipped by barge from an adjacent loadout facility to target markets in Vancouver, Vancouver Island and possibly the US Pacific Northwest. In part, the quarry would replace production from the recently-closed Producer's Pit near Victoria. As designed, the operation would employ 8-10 people and have a 100 year life.

Three other southwestern mine development projects, **Sechelt Carbonate**, **Cogburn Magnesium** and **Hillsbar Aggregate** are on the Environmental Assessment Office's current projects list. Lehigh Hanson's current exploration program at Hillsbar is unrelated to the earlier project which entered the EA pre-application process.

Polaris Minerals Corporation was issued an EA certificate for the proposed **Eagle Rock Quarry** on Alberni Inlet in 2003. This is a proposed crushed aggregate producer which would utilize bulk freighters to supply the west coast of North America. Polaris has placed development of the quarry on hold as it focuses on its producing **Orca** quarry. A feasibility study begun in 2003 is also on hold. The environmental assessment certificate is valid until 2013.

An industrial minerals operation below the Environmental Assessment threshold, Garibaldi Pumice Ltd, obtained a mining lease in 2009, as well as a quarry permit for its operation near **Mt. Meager**. Mining and development continued in 2009.

EXPLORATION HIGHLIGHTS

COPPER PORPHYRY

Northern Vancouver Island

No field work was reported at **Hushamu** and **Northwest Expo** this year, however results of a Fall-Winter 2008 program were announced in February. Most of the 2008 work occurred on the NW Expo, extending known mineralization to the north and west. Highlights of drilling were reported as follows:

- 238m @ 0.61 g/t Au, 0.08% Cu, 0.010% Mo and 0.26 g/t Re (EC08-254)
- 102m @ 0.12 g/t Au, 0.01% Cu, 0.020% Mo and 0.75 g/t Re (EC08-252)
- 124m @ 0.30 g/t Au, 0.05% Cu, 0.017% Mo and 0.36 g/t Re (EC08-252)
- 92m @ 0.22 g/t Au, 0.02% Cu, 0.030% Mo and 2.21 g/t Re (EC08-250)

Two holes drilled in the Hushamu deposit confirmed molybdenum (not included in the existing resource estimate) and identified significant rhenium values.

- 179.3m @ 0.47 g/t Au, 0.42% Cu, 0.011% Mo and 0.44 g/t Re (EC08-03)
- 164m @ 0.51 g/t Au, 0.30% Cu, 0.007% Mo and 0.42 g/t Re (EC08-08)

Western Copper Corporation optioned the property to IMA Exploration Inc, which subsequently merged with Kobex Resources Ltd and International Barytex Resources Ltd to form Kobex Minerals Inc. The new company has indicated an intention to proceed with the option and is undertaking a scoping study, described as an order of magnitude engineering study. Kobex's plans for Hushamu will be guided by its findings.

Central West Coast Vancouver Island

New work at **Catface** in 2009 consisted of access road construction. Selkirk Metals Corp published a new resource estimate and indicated an intention to proceed with a permitted drill program following the rehabilitation of road access. The existing resource is contained within the Cliff zone, one of three mineralized zones for which further testing is proposed.

Copper at the Cliff zone consists of both sulphide and oxide mineralogy. The August 2009 open pit resource estimate included sulphide and mixed ore types. Copper in oxides (>66% CuO/Cu) is thought not to be economically recoverable given the relatively low tonnages identified.

Ore Type	Indicated tonnes (000's)	Cu%	Inferred tonnes (000's)	Cu%
Sulphide	43 968	0.41	230 063	0.38
Mixed	12 895	0.38	32 386	0.40
Total	56 863	0.40	262 448	0.38

The estimate is based on historical drill results and an 8-hole 2008 drill program designed to test the historical results. To the extent of the 2008 program, results were consistent with historical values. In addition, the 2008 results included potentially significant silver values. The possibility of modest precious metal and molybdenum contributions to the resource exists, but historical data were insufficient to prepare those estimates.

The Technical Research Committee on Reclamation, a committee consisting of BC government, industry and academic representatives recognized Selkirk's Catface reclamation effort in 2008 with its annual award in 2009.

Selkirk shareholders approved a proposed merger with Imperial Metals Corporation in the fall of 2009.

Lillooet River

Wallbridge Mining Limited continued exploration work on its **Rogers Creek** property in 2009 with a large induced polarization (IP) survey, mapping, prospecting and rock sampling. Their involvement in the property began in 2007 following a discovery of potential porphyry style alteration and mineralization on a recent logging road (Figure 5.14). The evidence for a porphyry environment continued to grow with further work and Wallbridge carried out an initial 3-hole drill program in late 2009. The target is a large IP anomaly. Copper-gold-silver mineralization and alteration zones are consistent with a porphyry environment.

The company discovered an additional Cu-Mo showing on the southwestern part of its extensive property, in the Fire Mountain area approximately 18 km from the focus of current drilling.

VOLCANOGENIC MASSIVE SULPHIDE

Central Vancouver Island

Exploration at Myra Falls in the latter part of 2008 and through 2009 was curtailed, however successful exploration work did occur close to existing mine infrastructure, in a peripheral drill program that occurred from existing platforms. Exploration of the Marshall zone, which will occur from a drift west of the 24 level, remains on hold.

TABLE 5.2. SIGNIFICANT EXPLORATION PROJECTS SOUTHWEST REGION, 2009.

Property	Operator	MINFILE (NTS ref.)	Commodity	Deposit Type	Work Program	Meters Drilled
Bonanza-Sitka	Solomon Resources Limited	092L 292	Au	veins	G; GC; GP; TR	n/a
Brynnor	Logan Resources Ltd	092F 001	Fe (magnetite)	Fe skarn	G; MG; DD (1 hole)	n/a
Catface	Imperial Metals Corporation	092F 120, 092F 231, 092F 251	Cu, Ag	porphyry Cu	A (approx 8 km)	n/a
Hillsbar	Lehigh Hanson Materials Ltd / Yale First Nation	(092H.053)	Aggregate	sedimentary	A; PD	1200
Ladner	Module Resources Incorporated	092HNW007, 092HNW003, 092HNW018	Au	veins	A; MS; DD	800
Mineral Creek	Bitterroot Resources Ltd / Mineral Creek Ventures Inc	092F 079, 092F 331	Au	veins	DD (68 holes); UG-BU	8642
Myra Falls	NVI Mining Ltd (Breakwater Resources Ltd)	092F 330	Zn, Cu, Pb, Au, Ag	VMS	DD	~10 000
Pearson	Pacific Iron Ore Corporation	092C 091, 092C 022	Fe (magnetite)	Fe skarn	DD; G; GP	8337
Raven	Comox Joint Venture (Compliance Energy Corporation, Itochu Corporation, LG International Corp)	092F 333	Coal	sedimentary	DD/PD (42 holes); PF; CQ; EN; FS	9899
Rogers Creek	Wallbridge Mining Company Limited	(092J.008, 092J.009)	Cu, Au, Ag, Mo	porphyry Cu	IP (41 km); G; GC; DD (3 holes)	2122

Work Program Abbreviations:

A = access (trail, road construction on claims); AB-EM = airborne electromagnetics; AB-MG = airborne magnetics; AB-RD = airborne radiometrics; BU (X tonnes) = bulk sample (weight in tonnes if known); CD = condemnation drilling; CQ = coal quality testing; CT = carbonization test (coal); DD (Xm) = diamond drilling totalling X metres; EN = environmental baseline studies/monitoring, remediation work; FS = feasibility studies; G = geology, mapping etc.; GC = geochemical sampling (rock, soil, silt etc.); GD = geotech drilling; GP = geophysics (general); IP = Induced Polarization; 3D-IP; MG = magnetics; MK = marketing (primarily for industrial mineral products); MS = metallurgical studies; OB = overburden drilling; OP-BU = open-pit bulk sample; P = prospecting; PD = percussion drilling; PF = pre-feasibility studies; R = reclamation; RC = reverse circulation drilling; TR = trenching; UG (Xm) = X metres of underground development; UG-BU = underground bulk sample; UT = UTEM; VLF; WT = washability test (coal)

The peripheral drill program in the latter part of 2009 had three targets west of the Battle lens: the West Gap, West Gopher down drop and a new zone, the RE-108 lens, which remains open to the west. The latter is defined to an extent that it is being developed and brought into the mine plan. The south Flank drill program continued in 2009, delineating the Main and East lenses. As noted above, the South Flank is in production.

GOLD-SILVER VEINS

Central West Coast Vancouver Island

Selkirk Metals Corp carried out a program of prospecting, mapping, contour soil and regional stream geochemical sampling on the **Fandora** gold property northeast of Tofino. Underground workings were located and inspected. The Fandora vein system is within a



Figure 5.14. Wallbridge Mining Inc Project Geologist Kay Hofmann by the discovery outcrop along a logging road at the Rogers Creek project.

steeply dipping shear hosted in Sicker Group andesites and basalts. There are two additional mineralized structures identified on the property, the Free Gold, and Gold Flake veins. All three are sub-parallel.

To the south, G4G Resources Ltd also carried out a small program on its **Kennedy River** area gold property.

Port Alberni

Processing of the bulk sample and a significant drill program continued on the **Mineral Creek** property. A 5000 tonne bulk sample has been permitted and mining began in the Linda vein in late 2007. Bitterroot Resources Ltd and Mineral Creek Ventures Inc share the costs and proceeds of this portion of the program, however Bitterroot has now increased its ownership in the overall project to 100%.

Early in 2009 a new 10 tonne-per-day ball mill was installed underground and processing the bulk sample continues at a rate of approximately 3-5 tonnes per day (Figure 5.15). In August 2009, a dore bar weighing 30.9 troy ounces (24 oz Au, 5.7 oz Ag) was poured. A second containing 36 troy ounces Au and 8.3 troy ounces Ag was poured on November. A second gravity concentrating table was recently purchased to improve throughput.

Drilling at Mineral Creek in 2009 concentrated on close-spaced definition drilling of the Ember vein (Figure 5.16), now defined over a 150 m strike length and elevation range of 90 m. In the course of this work, another vein was discovered, the HW-1, the sixth gold-bearing vein known on the property. The 2009 diamond drill program consisted of 68 holes which demonstrated good continuity of veins. A goal of the current program is to facilitate a preliminary resource estimate. Both the Ember and the HW-1 remain open along strike and down dip. These veins and the Linda veins appear to represent a series of roughly east-west trending en-echelon veins located on the east side of the roughly north-south



Figure 5.15. The ball mill and gravity table used to process a bulk sample at the Mineral Creek project.



Figure 5.16. Visible gold in drill core from the Ember vein, Mineral Creek project.

Mineral Creek fault, a large but lower grade gold zone. Two more zones, the 900 and 1050, are located roughly 300 m and 1100 m west of the fault, respectively. No work was reported on the adjacent Big Southeaster property in 2009.

Mount Washington

Clibetre Exploration Ltd extracted a 100 tonne bulk sample at their **Mount Washington** property. The sample is believed to contain high grade gold with high arsenic values. The company is seeking a custom miller to process the sample.

Southern Vancouver Island

Mill Bay Ventures Inc undertook a geochemical sampling and prospecting program at its Valentine Mountain property in 2009. In addition there was a comprehensive data compilation and digitizing project. A drill program at the Log Dam zone had commenced at the

time of writing. Surface samples at the zone have returned up to 94.7 g/t Au over a 0.4 m quartz vein.

Central Coast

Solomon Resources Limited conducted an 8 week program of mapping, rock and soil sampling, geophysics (VLF-EM) and re-testing of historical trenching on the **Bonanza-Sitka** property. A single quartz vein shear has been exposed over a strike length of 280 m. The mean width is 1.55 m and average grade 3.39 g/t Au. A focus of the 2009 work was to explore the extension of this structure for possible multiple vein systems as are known at the Nugget Queen past producer to the northwest. Bonanza-Sitka and Nugget Queen are hosted by the same sedimentary-volcanic pendant in the Coast Plutonic Complex.

Alouette Lake

Chai Cha Na Mining Inc reported the discovery of a gold vein southeast of Alouette Lake on its new **Mission North** property approximately 5.5 km north-northeast of the **Oro**, a past producer active in the 1930's. Exploration occurred at and around the Oro in the 1980's and 90's, however the area of this new showing is not known to have been explored. The vein is exposed along a recent logging road. A highlight of initial sampling included 185 g/t over 0.33 m in the centre of the vein which is approximately 1.5 m wide, subvertical and consists mainly of quartz hosted by a diorite to granodiorite intrusive. Work in 2009 consisted of preliminary mapping and sampling. Additional high grade results were reported off strike of the discovery vein.

Harrison Lake

Near Harrison, a developed gold prospect, the **Abo** has not seen new work since 2006. Copper Canyon Resources Ltd has applied for a permit to drill and seeks a partner to advance the property. There is a 2002 National Instrument 43-101 compliant indicated resource estimate of 1.845 million tonnes 2.79 g/t Au and a further 0.6 million tonnes grading 2.8 g/t Au in the inferred category.

Hope-Coquihalla

Module Resources Incorporated, holder of an option on the **Ladner Gold** property near Hope, began its exploration program in 2009, with improvement of access and rehabilitation of underground workings, including re-opening of the 800 and 900 levels of the former Carolin Mine and re-timbering of the portal (Figure 5.17). The objective is an underground mapping and drilling project. They have also begun testing of the mine tailings in cooperation with DryVac Services Canada Ltd for possible gold recovery. A non-43-101 compliant estimate



Figure 5.17. The portal at the former Carolin Mine was re-timbered as part of the underground rehabilitation at the Ladner project. Photo courtesy Module Resources Incorporated.

by Athabaska Resources in 2000 identified a “diluted mineable reserve in all categories” of 597 000 t grading 1.74 g/t gold within the tailings. The Carolin Mine itself has a historic estimate (non 43-101 compliant) of 1.35 Mt grading 4.41 g/t Au. Underground exploration had not begun at time of writing.

Drilling began on surface at the McMaster zone with a five hole, 800 m program designed to confirm 1996 results and test for possible extensions. The McMaster zone is being investigated as a potential open pit resource. It has a historical (non 43-101 compliant) resource estimate of 186 000 t grading 1.88 g/t Au.

The Ladner Gold property occupies a significant portion of the Coquihalla gold belt. Within the property's boundaries are five past producing mines. Most historically exploited epigenetic, mesothermal gold mineralization occurs within a few hundred meters east of the Hozameen fault and the Coquihalla serpentine belt. The orebodies in the Carolin Mine are hosted by turbidites of the Jurassic Ladner Group, but subsequent exploration in the 1990's identified vein mineralization in Spider Peak volcanics west of the historic production area.

Late in 2009, Homegold Resources Ltd began a program at its **Silver Peak** property, the historic Eureka Victoria silver mine near Hope. At the time of writing, improvements to access were underway. A 900 t underground bulk sample is planned. A historic (non-43-101 compliant) resource estimate exists for the Eureka vein: 48 900 t at 449.15 g/t Ag.

COAL

Northern Vancouver Island

Electra Gold Ltd published a measured and indicated resource estimate of 4.823 Mt for the **Suquash** No. 2 bed in the Upper Cretaceous Suquash Formation (Nanaimo Group). The Suquash coal basin is a sub basin within the Georgia Basin. Sediments generally dip 5-10° to the northeast. The target of a 4-hole drill program in 2008, the resource would have to be mined as an underground operation. Waste rock might be blended with high alumina material from Electra's nearby **PEM 100** quarry to produce a cement feedstock. Further exploration is planned.

Campbell River

As noted above, new work was largely focused on development at **Quinsam** coal in 2009. There was one drillhole at the 7 South area. There is exploration potential in the eastern part of Hillsborough Resources Ltd's property suggested by historical drill intercepts.

Comox Valley

At the **Raven** coal project, operated by the Comox Joint Venture, the objective of a large drill program in 2009 was largely to upgrade the 59 Mt inferred resource to measured and indicated categories (Figure 5.18). This would allow the current feasibility study to be based on a larger resource than the 39 Mt (measured and indicated) estimated in 2007. Drill intersections released to date encountered coal in all but one hole with the large majority of Seam 1 intersections exceeding 1.5 m thickness. Two of five known seams in the Tsable River area have been identified as of economic importance: Seam 1 (the lowermost) and Seam 3. Results of coal quality analysis and washability testing are anticipated at the end of 2009. Environmental baseline studies are ongoing.

Coal seams in the Comox Basin are Cretaceous, occurring in the Nanaimo Group, Comox Formation. Dips of the seams range from 24° at the western margins of the basin to less than 10° in the eastern extent of the resource area. An underground operation is contemplated.

TUNGSTEN SKARN

Inside Coast

Dentonia Resources Ltd reported a 2009 tungsten discovery in the Knight Inlet area near Stafford Lake (Figure 5.19). Chip and panel samples returned promising results including a series of 25 panel samples averaging 1.59% W (equivalent to 2.01% WO₃). The scheelite-



Figure 5.18. Driving in casing for a drill hole on the Raven coal project.



Figure 5.19. Jim Turner and Bob Culbert channel sampling the recent W-skarn discovery near Stafford Lake. This material returned up to 6.5% WO₃. Photo courtesy of Dentonia Resources Ltd.

bearing skarn occurs in an area not known to have seen previous exploration and dominated by granodiorite and quartz diorite of the Coast Plutonic Complex. The discovery exposure occurs along a logging road. Dentonia has published a NI 43-101 report identifying the discovery as a property of merit, and is considering a program to follow-up, including airborne geophysics. A regional government airborne survey missed a portion of the property.

IRON SKARNS

Central West Coast Vancouver Island

In late 2008, Logan Resources Ltd carried out a 20 hole drill program on the **Brynnor**, a magnetite iron skarn located on the company's Redford property. Following this, they published an updated 2009 resource estimate (Table 5.3).

TABLE 5.3. RESOURCE ESTIMATE FOR THE BRYNNOR IRON SKARN, 2009.

Resource Category	Resource tonnes	Grade % iron	Iron Concentrate tonnes	Grade % Iron
Measured	7 610 000	39.20%	4 070 000	63.70%
Indicated	4 590 000	35.00%	2 200 000	63.70%
Measured plus Indicated	12 070 000	37.60%	6 270 000	63.70%
Inferred	12 680 000	39.50%	7 120 000	63.70%

Exploration in 2009 consisted of one additional drillhole, geology, and a ground magnetometer survey to better define the limits of the deposit. Processing of the data, including an inversion, was underway at the time of writing.

Noranda operated an open pit iron mine at the site from 1961-1968. At that time, ore was crushed, concentrated and shipped directly to Japan from a nearby dock facility in Toquart Inlet (Figure 5.20). The customer was a consortium of steel mills.

Southern Vancouver Island

Pacific Iron Ore Corporation continued its large scale exploration program at the **Pearson** project in 2009, following a major program in 2008. Prior to the 2009 drill program, they published a NI 43-101 compliant resource estimate for the Bugaboo iron skarn deposit (Figure 5.21) based primarily on 2008 results. The inferred resource is 7.8 million tonnes grading 63% magnetite at a cutoff of 20% magnetite. Part of the 2009 drill program was designed to expand this resource.

The Pearson project is located on a large land package containing other prospects, some of which emerged from the previous year's geophysical survey.



Figure 5.20. Pilings at the former Brynnor Mine's outloading facility in Toquart Inlet. Magnetite iron ore was shipped to Japanese steel mills from this site in the 1960's.

Several of these were followed up in the 2009 program, which included geological mapping and ground-based geophysics as well as drilling. Among the targets followed up were another skarn and occurrences of mafic-ultramafic rocks (Figure 5.22) found within the West Coast Crystalline Complex, some of which yielded anomalous nickel, copper and platinum group element values in float and soil samples. There are also extensive deposits of glacial clay on the property.



Figure 5.21. White marble in contact with massive magnetite at Pacific Iron Ore Corporation's Pearson project.



Figure 5.22. In addition to the iron skarns, West Coast Crystalline Complex ultramafic rocks at the Pearson project are being evaluated for their nickel and platinum group element potential.

INDUSTRIAL MINERALS

Northern Vancouver Island

Electra Gold Ltd reported a program at **Harvey Cove** where the target is geysirite, clay deposits produced by intense advanced argillic alteration. Of particular interest are high alumina zones, which may contain material marketable to cement producers. The 2009 program consisted of mapping, soil sampling, re-evaluation of historical drill core and specifically following-up high alumina zones.

Southern Vancouver Island

Pacific Iron Ore's Port Renfrew area property, currently the focus of a magnetite iron project, also hosts a large deposit of glacial clay. Pacific Iron Ore and Glacial Marine Clay Inc are investigating this as a source of material for cosmetic and medical applications. They have drilled a 600 m x 150 m area with positive results, not yet published.

Fraser Canyon

Lehigh Hanson Materials Ltd, in partnership with the Yale First Nation, drilled a sand and gravel deposit at **Hillsbar**, near the town of Yale. Results were not available at the time of writing.

OUTLOOK FOR 2010

Financing remains a challenge for most junior companies at the end of 2009 and as always, 2010 exploration plans will be subject to market conditions and changing priorities. A number of major projects appear positioned to move ahead in 2010.

Work by Kobex Minerals Inc at **Hushamu-NW Expo** will depend on the outcome of an internal engineering study.

Construction of access and receipt of a Mines Act permit for **Catface** in 2009 has set the stage for further exploration in 2010. A drill program is planned.

The first three drillholes at **Rogers Creek** encountered porphyry style mineralization, and late in the year Wallbridge Mining extended their land position considerably to include other Cascades porphyry targets.

Work is also expected to continue at Bitterroot's **Mineral Creek** gold project. Another of the region's

active gold projects, Module Resources Incorporated's **Ladner** project, is expected to proceed with an underground exploration program.

Further work is anticipated at Pacific Iron Ore Corporation's **Pearson** project and a larger ground based magnetometer survey is planned by Logan Resources at **Brynnor**.

The Comox Joint Venture will continue the **Raven Coal** feasibility and environmental studies into 2010.

At **Myra Falls**, development and production are expected to continue at recently-discovered South Flank and RE-108 lenses.

Quinsam coal is expected to progress into phase II at the 5 South area. The mine is expected to pass the production landmark of 10 Mt clean coal in 2010. The proposed takeover of Hillsborough Resources by Vitol appears to be proceeding.

Smaller projects with plans to proceed in 2010 are numerous. While categorized as "small" in 2009, larger projects may well evolve. A few of those brought to the authors attention are listed here.

On Northern Vancouver Island, Electra Gold Ltd expects to conduct further work at **Suquash** coal. West of Cowichan Lake, Nitinat Minerals Corporation plans a program at the **Jasper**, which has volcanogenic massive sulphide and porphyry targets and Mill Bay Ventures Inc expects to drill at **Valentine Mountain**. Dentonia Resources Ltd is in the process of raising funds to explore its recent tungsten discovery near **Knight Inlet**. Nomad Ventures Inc is permitted to drill the **Krof**, a volcanogenic massive sulphide target east of Harrison Lake. Also east of Harrison, International Millennium Mining Corp plans to drill the **Jason** property, a nickel-copper-platinum-palladium prospect. Chai-Cha-Na Mining Inc plans further exploration at the new **Mission North** gold prospect.

ACKNOWLEDGMENTS

Thanks to all who provided information on their mines, quarries and exploration projects and to everyone who offered access to their properties and projects. Thanks also to Dave Lefebure, Jay Fredericks and Tania Demchuk for editing, to Patrick Saunders for producing the map and to Garry Payie and George Owsiaci for their work in preparing the proofs. All errors and omissions remain the author's responsibility.

SOUTHEAST REGION

By David Grieve, PGeo
Regional Geologist, Cranbrook

SUMMARY AND TRENDS

Activity levels for exploration, development and mining in the Southeast Region of British Columbia were generally affected by the global economic downturn which began in late 2008. In particular, difficulty in raising investment funds had a negative impact on all levels of exploration for various mineral commodities.

Significant events in 2009 included:

- a large fill-in drill program on the Mount Michael coal property in the Elk valley;
- entry of Teck Coal Limited's Line Creek Operations Phase II Expansion Project, encompassing Mount Michael and Burnt Ridge North, into the Environmental Assessment Process;
- increased coal sales to China for Teck Coal Limited;
- application for expansion at Roca Mines Inc's MAX molybdenum mine;
- strong gold intersections on Valterra Resource Corporation's Star project near Nelson;
- strong gold intersections on MAX Resource Corp's Crownest project in the Flathead valley south of Fernie;
- underground drilling programs at the Silvana mine, part of Klondike Silver Corp's Slocan Silver project, and at the Kenville Gold Mine property of Anglo Swiss Resources Inc; and
- strong tungsten intersections on outlying portions of Sultan Minerals Inc's Jersey-Emerald property near Salmo, and the acquisition of the adjacent HB mine property.

As in previous years, past-producing metal mines and camps were actively explored. These included programs in the Slocan, Greenwood, Nelson, Ymir, Salmo and Rossland areas. The Nelson area in particular is witnessing resurgence in exploration activity.

Exploration expenditures in 2009 are projected to be about \$14 million, down significantly from the high levels of the previous two years (Figure 6.1). This total was divided between metals (about 67%), coal (28%) and industrial minerals (5%).

Exploration expenditures in 2009 may be roughly broken down as follows (see Figure 6.2):

- grassroots exploration – 1%
- early-stage exploration – 49%
- advanced exploration – 32%
- mine lease exploration – 6%
- mine evaluation – 12%

An estimated 43 000 m of exploration drilling was carried out in the Southeast Region in 2009 (Figure 6.3). Of this total, roughly 63% represents drilling for metals, 32% for coal (not including mine in-pit and development drilling) and 5% for industrial minerals.

In addition to the exploration expenditures, approximately \$8.8 million was spent on mine development projects in the Southeast Region in 2009.

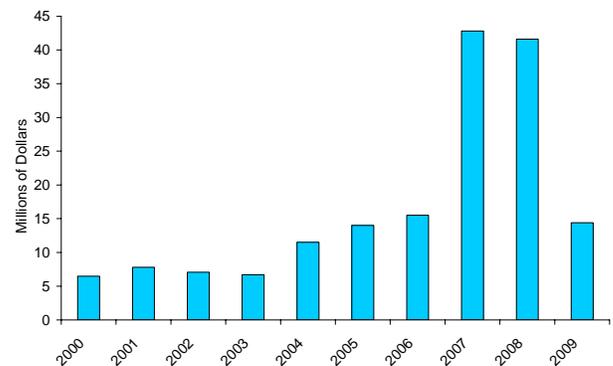


Figure 6.1. Annual exploration spending in millions of dollars, 2000 to 2009, Southeast Region.

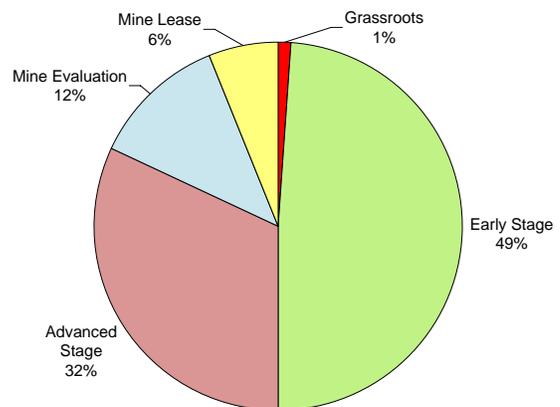


Figure 6.2. Proportions of 2009 exploration expenditures by category.

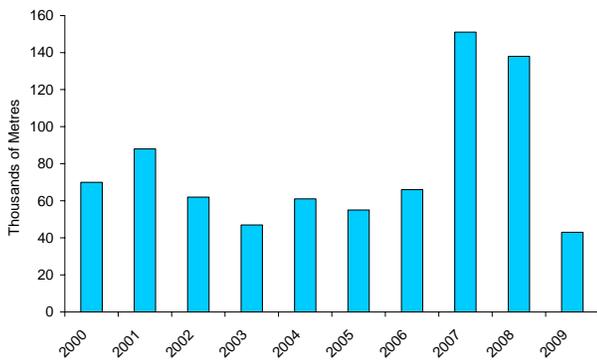


Figure 6.3. Annual exploration drilling in thousands of metres, 2000 to 2009. Note that prior to 2004 in-pit drilling at operating coal mines was included in the total.

MINES AND QUARRIES

Current major producing mine and quarry locations in the Southeast Region are shown on Figure 6.4 and basic data concerning these operations are listed in Table 6.1 and outlined below.

COAL

Teck Coal Limited, the world's second-largest supplier of seaborne metallurgical coal, operates five large open-pit coal mines in the Elk Valley area. Projected total 2009 coal production at the company's **Coal Mountain, Elkview, Line Creek, Greenhills** (Figure 6.5) and **Fording River** operations is approximately 18.3 Mt of clean coal (predominantly metallurgical). This compares with an actual production total of 22.3 Mt in 2008. The mines employ 2872 people and make a major contribution to the Elk Valley and East Kootenay economies.



Figure 6.5. Rail loadout silo at Teck Coal Limited's Greenhills Operations. The coal preparation facilities are on the opposite side of the highway to the silo. The wash plant is on the sky line in the distance, and the dryer is immediately opposite the silo in the middle distance.

Commercially mineable coals in southeast BC belong to the Jurassic-Cretaceous Mist Mountain Formation (Kootenay Group), and are contained in three structurally distinct coalfields in the Front Ranges of the Rocky Mountains, known collectively as the East Kootenay coalfields. The more northerly Fording River, Greenhills and Line Creek operations (Figure 6.4) are in the Elk Valley coalfield, which is formed by the Alexander Creek and Greenhills synclines. The Elkview and Coal Mountain operations are in the Crowsnest coalfield, which occupies the Fernie basin, a broad synclinorium that has hosted coal mining since before the turn of the twentieth century. There are no mines or active coal exploration projects in the Flathead coalfield.

Proven and probable raw coal reserves at the five mines are listed in Table 6.1; in addition there is a very large resource base in the southeast British Columbia coalfields. With the exception of Coal Mountain Operations, all of the mines produce from multiple seams. Currently productive coal seams are typically medium-volatile bituminous in rank, and are low in sulphur. Clean metallurgical product coal ash contents are typically in the 8.6 to 9.5% range; thermal coal ash contents are higher.

METALS

Roca Mines Inc's **MAX** molybdenum mine (MINFILE 082KNW087) at Trout Lake began shipping concentrate in November 2007 and achieved full commercial production in April 2008. MAX is an underground mine with a production rate of 500 tonnes-per-day on a campaign basis, for a permitted annual production rate of 72 000 t. In December 2009 Roca submitted an application to expand the MAX operation to 1000 tonnes-per-day and to extend the mine life beyond the initial permit limits (sub-Environmental Assessment).

The MAX deposit contains measured plus indicated resources of 42.9 Mt grading 0.20% MoS₂ using a 0.10% cut-off. The first phase of production is focusing on a high-grade zone which at start-up contained 280 000 t of measured plus indicated resources grading 1.95% MoS₂ using a 1.00% cut-off. The proposed expansion will make a greater proportion of the known resource economic at current prices. Roca did not carry out any exploration in 2009, but analysis of recent data has identified target zones of potential additional high-grade material as well as a potential larger-scale porphyry deposit at depth.

Metasediments of the Lower Cambrian to Middle Devonian Lardeau Group at the MAX property are intruded by the Cretaceous Trout Lake stock. The deposit is a pipe-like quartz vein stockwork that extends from surface to a depth of at least 1000 m, in which molybdenite occurs mainly along margins of veins (Figure 6.6). The vein stockwork is best developed in close proximity to the margins of the intrusive body and its associated offshoots.

Operating Mines and Selected Major Exploration Projects in South East British Columbia, 2010

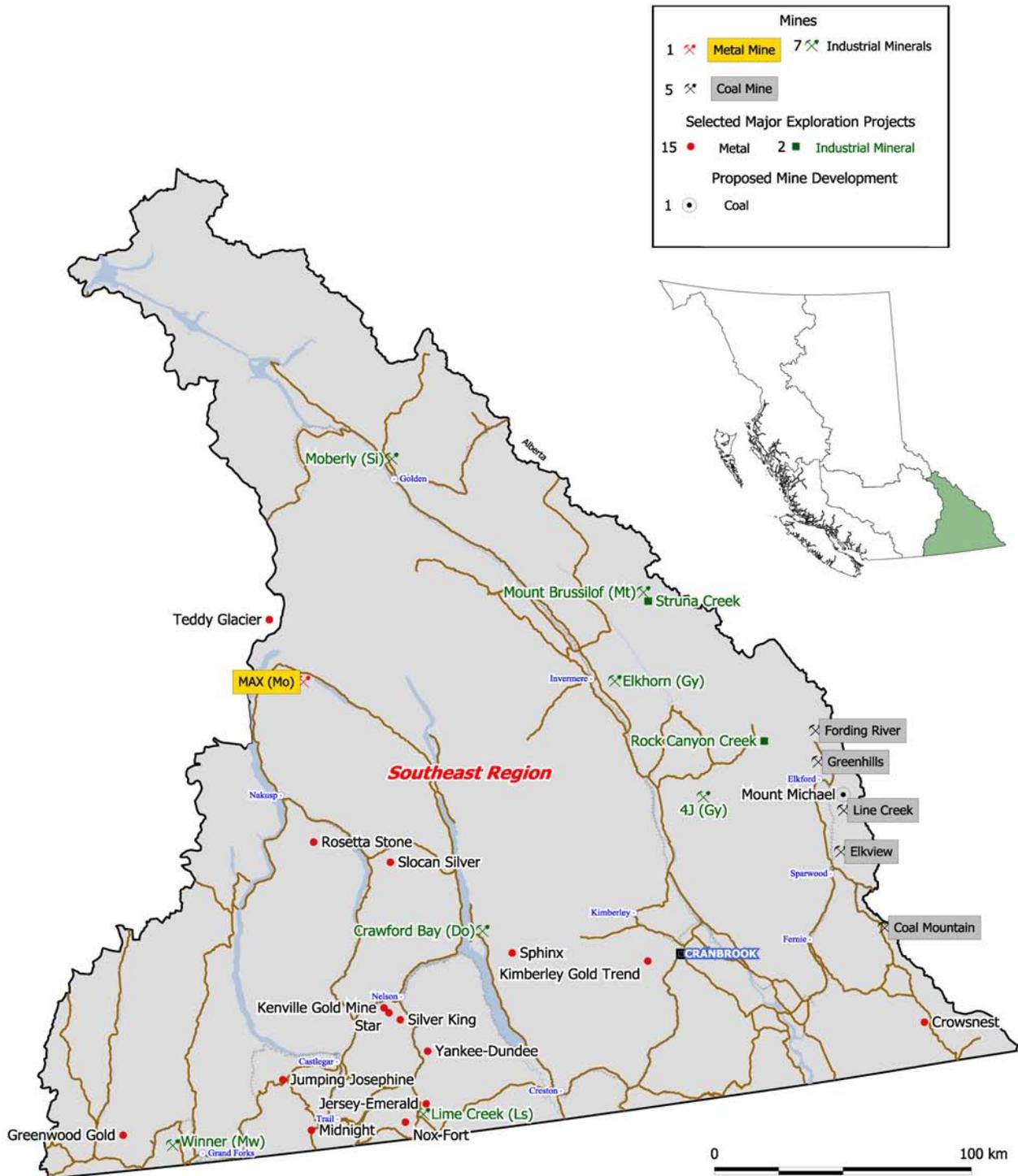


Figure 6.4. Mines, quarries and selected exploration projects, Southeast Region, 2009.

TABLE 6.1. PRODUCING MINES AND QUARRIES, SOUTHEAST REGION, 2009

Mine	Operator	Commodity	Employment	Production (2008)	Proven and Probable Reserves as of December 31, 2008 or as indicated	Reference for Reserves
Coal						
Coal Mountain	Teck Coal Limited	Metallurgical coal	209	2.52 Mt	27.9 Mt	Annual Information Form
Elkview	Teck Coal Limited	Metallurgical coal	800	4.67 Mt	232.6 Mt	Annual Information Form
Fording River	Teck Coal Limited	Metallurgical coal	1036	8.09 Mt	256.5 Mt	Annual Information Form
Greenhills	Teck Coal Limited	Metallurgical coal	480	4.60 Mt	81.3 Mt	Annual Information Form
Line Creek	Teck Coal Limited	Metallurgical and thermal coal	347	2.37 Mt	14.9 Mt	Annual Information Form
Metals						
MAX	Roca Mines Inc	Mo	74	744 738 kg Mo	Measured and indicated resource of 1.7 Mt at 0.73% Mo (December 2009)	Application to amend permit (expansion)
Industrial Minerals (selected)						
4J	Georgia-Pacific Canada Inc	Gypsum				
Crawford Bay	Imasco Minerals Inc	Dolomite				
Elkhorn	CertainTeed Gypsum Canada	Gypsum	17	513 000 t		
Lime Creek	Imasco Minerals Inc	Limestone				
Moberly	HCA Mountain Minerals (Moberly) Ltd	Silica sand	6	100 000 t		
Mount Brussilof	Baymag Inc	Magnesite	30	108 000 t		
Winner	Roxul (West) Inc	Gabbro (mineral wool)				



Figure 6.6. Molybdenite-bearing quartz vein stockworks underground at the Roca Mines Inc MAX molybdenum mine.

INDUSTRIAL MINERALS

The Southeast Region continues to be an important source of a variety of industrial minerals, including magnesite, gypsum, silica sand, dolomite, limestone, tufa, flagstone, aggregate and smelter slag. The larger operations are described below, listed in Table 6.1 and shown on Figure 6.4.

Baymag Inc produces high-quality magnesite from its open pit mine near **Mount Brussilof** (MINFILE 082JNW001), northeast of Radium. Magnesite is transported by truck to the company’s processing facilities in Exshaw, Alberta for production of magnesia (MgO), used as a refractory material. Production in 2009 is projected to be approximately 136 000 t. This is a significant increase over 2008, and indicates that the Mount Brussilof mine output continued to be in demand through the recent difficult economic times. The deposit, a large alteration zone, occurs in Cambrian carbonates. The company carried out an exploration drilling program in 2009 at nearby Struna Creek (see below), and this is

expected to extend the life of the mine, which has been in operation since 1982.

There are two gypsum mines in the Kootenay region, both producing from Devonian evaporate units. CertainTeed Gypsum Canada operates the **Elkhorn** mine (MINFILE 082JSW021) east of Windermere (Figure 6.7). The Elkhorn West Extension pit is now in production. 2009 production is projected to be approximately 375 000 t. The company holds other properties with potential for future expansion in the area.

Georgia-Pacific Canada Inc operates the **4J** gypsum mine (MINFILE 082JSW009) southeast of Canal Flats.

Silica sand is produced from a friable Ordovician quartzite by HCA Mountain Minerals (Moberly) Ltd at the **Moberly** mine (MINFILE 082N001) and plant, north of Golden. Mine production in 2009 decreased relative to 2008.

Imasco Minerals Inc produces a variety of crushed and ground rock products at its Creston Operations Plant at **Sirdar**; rock types include limestone, dolomite, granite and quartzite. Raw sources for these products include an underground dolomite mine at **Crawford Bay** (MINFILE 082FNE113), a limestone quarry at **Lime Creek** (MINFILE 082FSW307) east of Salmo, and a granite quarry at **Sirdar** (MINFILE 082FSE072).

The **Winner** gabbro quarry (MINFILE 082ESE265) west of Grand Forks supplies feed for the Roxul (West) Inc mineral wool insulation manufacturing plant in Grand Forks. There was no production at the Winner quarry in 2009, as only stock-piled material was shipped to the plant.



Figure 6.7. Handling and loadout facilities at the CertainTeed Gypsum Canada Elkhorn gypsum mine.

MINE DEVELOPMENT PROJECTS

At the Line Creek Operations 26 km northeast of Sparwood Teck Coal Limited constructed benches and drilled in the new MSA West Extension pit. At the MAX

molybdenum mine Roca Mines Inc carried out underground development and drilling.

MINE EVALUATION PROJECTS

Teck Coal Limited carried out baseline environmental and other studies at Line Creek Operations' Phase II Expansion Project. The expansion, which encompasses Mount Michael and Burnt Ridge North, will extend Line Creek's production activities to the north of current active pits. Mount Michael was also the site of a large fill-in rotary exploration drilling program (see below).

EXPLORATION HIGHLIGHTS

Selected 2009 mineral and coal exploration projects in the Southeast Region are listed in Table 6.2, and their locations are shown on Figure 6.4. Generally the selected exploration programs involved expenditures in excess of \$250,000 on work that included mechanized ground disturbance, for example, drilling, trenching or bulk sampling. However, some projects of particular interest whose expenditures were below the expenditure threshold are included. The information in this section was mainly derived from discussions with exploration project staff, site visits, company reports, presentations, press releases and websites. All resource estimation numbers are compliant with NI 43-101.

COAL PROJECTS

EAST KOOTENAY COALFIELDS

Teck Coal Limited Line Creek Operations drilled the **Mount Michael** property (MINFILE 082JSE008), 3 km north of the **Line Creek mine** and roughly 9 km southeast of Elkford (Figures 6.8 and 6.9) in the Elk Valley coalfield. The coal-bearing Mist Mountain Formation of the Jurassic-Cretaceous Kootenay Group occurs on the east limb of the Alexander Creek syncline and in the hanging-wall of the Ewin Pass thrust fault, which repeats almost the entire coal-bearing section. The 500 m-thick section contains about 10 major coal seams with a cumulative total representing roughly 10% of the section. Strata dip moderately to steeply westward and are partially in a dip-slope situation.

Together with **Burnt Ridge North**, which is immediately to the west on the west limb of the Alexander Creek syncline, Mount Michael has entered the Environmental Assessment Process as part of the Line Creek Operations Phase II Expansion Project. Mount

GOLD PROJECTS

BOUNDARY DISTRICT



Figure 6.8. View southwest from Mount Michael to two of Line Creek Operations' active mine areas, Burnt Ridge South and North Line Creek.



Figure 6.9. View looking north of rotary drilling at the north end of Teck Coal Limited's Mount Michael property.

Michael and Burnt Ridge North are intended to provide new reserves to replace Line Creek Operations' current pits. Drilling in 2009 was mainly of a fill-in nature and was targeted at delineating mineable reserves.

Teck Coal Limited Elkview Operations carried out rotary drilling on **Baldy Ridge**, **Natal Ridge** and **Adit Ridge** in the immediate area of the current mine. The Mist Mountain Formation at Elkview is at the north end of the Crowsnest coalfield. This work is intended to extend known mineable reserves. In addition, two large-diameter reverse-flood holes were drilled on Natal Ridge. This is a relatively inexpensive technique for obtaining bulk samples for carbonization testing. Baldy Ridge is anticipated to be the next expansion area for Elkview Operations, and an application (sub-Environmental Assessment) is anticipated in 2010.

These proposed expansions at Line Creek and Elkview operations, along with the significant drilling program at each site, represent the first of a number of mine expansion applications anticipated in the coming years and confirm Teck Coal's faith in the future of the East Kootenay coal industry.

Grizzly Diamonds Ltd's extensive **Greenwood Gold** Project was active for the second year. Grizzly Diamonds has assembled what it claims is the largest-ever land position in the Boundary District. Their holdings extend from west of Grand Forks to west of Anarchist Summit, and include the **Motherlode** (MINFILE 082ESE034) and **Copper Mountain** areas to the west of Greenwood, the **Sappho** (MINFILE 082ESE147) and **Overlander** (MINFILE 082ESE174) areas south and east of Greenwood, and the **Rock Creek** and **Sidley-Dayton** properties in the Rock Creek area. There are many mineral occurrences and varying types of known mineralization within the overall project area, including gold-quartz veins, polymetallic veins, skarns and intrusion-related precious metals. The common target for Grizzly Diamonds Ltd is gold. The proximity to Kinross' Buckhorn Mine in Washington state is helping drive exploration interest north of the border. The project area is underlain by the Paleozoic Knob Hill Group and Triassic Brooklyn Formation which are intruded by Jurassic, Cretaceous and Eocene igneous rocks.

Work in 2009 included an AeroTEM III survey of the Rock Creek and Sidley-Dayton properties in the west, to follow on from a successful airborne geophysical program of the Greenwood area in 2008. Ground geophysics and initial drilling were concentrated mainly on the **Lawless** (MINFILE 082ESW231) and **Ket 28** (MINFILE 082ESW210) showings in the Rock Creek area.

West High Yield (W.H.Y.) Resources Ltd carried out diamond drilling on its **Rossland** project on the western outskirts of the town of Rossland. Past gold producers on the company's property include the **Midnight**, **OK** and **IXL** (MINFILE 082FSW119, 116 and 117). Gold mineralization is associated with ultramafic contacts and a regional tectonic boundary, and consists of gold-bearing quartz-carbonate veins in contrast to the more typical Rossland-style sulphide-rich veins. The property is also being evaluated for its potential for magnesium and nickel associated with ultramafics. The major effort in 2009 was focused on the **Midnight** Crown-granted mineral claim, specifically 3000 m of close-spaced (10 m) diamond drilling in preparation for a gold resource estimate.

Activities at the **Jumping Josephine** or **JJ** property, 22 km west of Castlegar and just north of Highway 3, undertaken by joint venture partners Astral Mining Corporation (60% owner) and Kootenay Gold Inc have been centred on a 2003 discovery of high-grade gold mineralization known as the **JJ Main** zone (MINFILE 082ESE275). Mineralization in this zone is hosted by Jurassic intrusive rocks of the Nelson plutonic suite, and may be related to a later-phase Jurassic intrusion that does not reach surface. Occurrences of Eocene Coryell syenite

TABLE 6.2. SELECTED EXPLORATION PROJECTS, SOUTHEAST REGION, 2009

Property	Operator	MINFILE	NTS	Commodities	Target Type	Work program	Metres of drilling (estimated in some cases)
Crowsnest	MAX Resource Corp	082GSE070	82G/2E	Au	intrusion-related	TR, RC	799
Elkview (Baldy and Natal ridges)	Teck Coal Limited (Elkview Operations)	082GNE013, 016, 017	82G/15W	coal	sedimentary	RC, RC-BU, CT	7191
Greenwood Gold	Grizzly Diamonds Ltd	082ESE/034, 147, 174, 082ESW231	82E/2W, 3E	Au, Ag, Cu, Mo, Zn, Pt	vein	P, G, GC, MG, EM, AB-EM	2000
Jersey-Emerald	Sultan Minerals Inc	082FSW009, 010, 011, 059, 218	82F/3E	W, Zn, Pb, Mo	skarn (W), replacement (Pb, Zn), porphyry (Mo),	GC, MG, DD	1422
Jumping Josephine (JJ)	Astral Mining Corp and Kootenay Gold Inc	082ESE275	82E/8E, 82F/5W	Au	vein	TR, GC	0
Kenville Gold Mine	Anglo Swiss Resources Inc	082FSW086	82F/6W	Au, Cu	vein, porphyry	AB-EM, DD, GC	5300
Kimberley Gold Trend (KAT)	Ruby Red Resources Inc	082FSE116, 122	82F/E, 82G/W	Au, Cu, Ag, Pb	vein	G, GC TR	0
Mount Michael	Teck Coal Limited (Line Creek Operations)	082GNE022	82G/15W	coal	sedimentary	A, G, RC, EN	6811
Midnight	West High Yield (W.H.Y.) Resources Ltd	082FSW119, 116, 117	82F/4W	Au, Mg, Ni	vein, ultramafic	VLF, G, DD	3000
Nox Fort	Jaxon Minerals Inc	082FSW002	82F/3W	Au, Bi, Te, Pb, Zn, W, Mo	intrusion-related	A, GC, DD, MG	2717
Rock Canyon Creek	Spectrum Mining Corporation	082JSW018	82J/3E	fluorite, REEs, Nb	carbonatite	DD	1200
Silver King	Excalibur Resources Ltd	082FSW176	82F/6W	Ag, Cu, Au, Pb, Zn	vein	DD	2100
Slocan Silver	Klondike Silver Corp	082FNW013, 043, 050	82F/14W	Ag, Pb, Zn	vein	G, GC, TR, DD, UG (100m)	1240
Sphinx	Touchdown Capital Inc/Eagle Plains Resources Ltd	082FNE004, 094, 095, 166	82F/10E	Mo, W	porphyry	IP, DD	650
Star	Valterra Resource Corporation	082FSW083, 084, 294	82F/6W	Au, Ag, Cu	vein	P, DD	478
Struna Creek	Baymag Inc	082JNW006	82J/13E	magnesite	sedimentary	G, GC, DD	817
Teddy Glacier	Jazz Resources Inc	082KNW069	82K/13	Ag, Pb, Zn, Au, Cu	vein	A, U-BU	0
Yankee –Dundee	Dundee Mines Ltd	082FSW067, 068	82F/6E	Au, Ag, Pb, Zn	vein	DD	2832

Work Program Abbreviations:

A = access; trail, road construction on claims; AB-EM = airborne electromagnetics; AB-MG = airborne magnetics; AB-RD = airborne radiometrics; BU (X tonnes) = bulk sample (weight in tonnes if known); CD = condemnation drilling; CQ = coal quality testing; CT = carbonization test (coal); DD (Xm) = diamond drilling totaling X metres; EN = environmental baseline studies/monitoring, remediation work; FS = feasibility studies; G = geology, mapping, etc; GC = geochemical sampling (rock, soil, silt, etc); GD = geotech drilling; GP = geophysics (general); IP = Induced Polarization; 3D-IP; MG = magnetics; MK = marketing-primarily for industrial mineral products; MS = metallurgical studies; OB = overburden drilling; OP-BU = open-pit bulk sample; P = prospecting; PD = percussion drilling; PF = pre-feasibility studies; PP = Pilot plant, R = reclamation; RC = reverse circulation drilling; TR = trenching, UG (X m) = X metres of underground development; UG-BU = underground bulk sample; UT = UTEM; VLF; WT = washability test (coal)

are also widespread. Mineralization (chiefly pyrite and arsenopyrite) occurs with quartz in stockworks, vein-breccias, ladder veins and sheeted veins and is associated with a prominent northeast-trending shear zone. The JJ Main zone has been intersected in trenching and drilling over 900 m along strike and at up to 240 m vertical depth in drillholes. Geology, geophysics and geochemistry suggest that the host structure may extend for over 2.5 km. The possibility of more deep-seated porphyry-style mineralization is also being considered.

Exploration in 2009 was scaled back compared with previous years but included trenching and a large soil geochemical survey. An application for a 10 000 t bulk sample at the JJ Main zone, proposed for 2010, has been submitted.

WEST KOOTENAYS

Jaxon Minerals Inc's **Nox Fort** property is an intrusion-related gold prospect with bismuth and tellurium located about 15 km southwest of Salmo (Figures 6.10 and 6.11). Known mineralization on the property includes the Bunker Hill mine (MINFILE 082FSW002), a minor past-producer of gold with tungsten, silver, molybdenum and zinc prior to 1942.

Mineralization on the Nox Fort property occurs with quartz veins and skarns and is closely associated with the Bunker Hill intrusion, a possible sill related to the Cretaceous Wallack Creek stock. A significant portion of the known mineralization is associated with the north-trending western contact of the Bunker Hill intrusion, which intrudes metasediments of the lower Cambrian Laib Formation at the south end of the Kootenay Arc. Rosslund Group volcanics and sediments on the hanging wall of the Waneta thrust fault occupy the northwest portion of the property. Two bodies of ultramafic rock of unknown affinity also occur on the property.

The company believes that mineralization on the property, particularly in the vicinity of the Bunker Hill mine, represents a reduced, intrusion-related gold system, perhaps analogous to deposits in the Tintina gold belt including the Fort Knox mine in Alaska. Thin, low-sulphide veins are characteristic of this type of system, and may occur in swarms and skarn zones and other settings. Pyrrhotite is the most common sulphide mineral, with lesser pyrite, galena and chalcopyrite.

Drilling in 2009 (2700 m) was focused on the intrusive contact.

Anglo Swiss Resources Inc was very active on its **Kenville Gold Mine** property, roughly 6 km west of Nelson (Figures 6.12 and 6.13). The Kenville (MINFILE 082FSW086), also known as the Granite-Poorman, operated intermittently between 1890 and 1954, with the bulk of production prior to 1912. More than 180 000 t of ore was mined, yielding over 2 million g Au and 861 000 g Ag. Production averaged more than 17 g/t Au, from a



Figure 6.10. View looking west of the Pend D'Oreille River from the Bunker Hill mine area on Jaxon Minerals Inc's Nox Fort property.



Figure 6.11. Sheeted quartz veins in the Bitel Hill area on Jaxon Minerals Inc's Nox Fort property.



Figure 6.12. Mineralized quartz veining underground in Anglo Swiss Resources Inc's Kenville Gold Mine.



Figure 6.13. Sulphide minerals in quartz vein material in drill core at the Kenville Gold Mine property. Eagle Creek intrusive material is visible adjacent to the scale card.

series of northeast-dipping quartz veins.

Mineralized veins occur in two groups, one being the system that was mined in the past on the east or Kenville Mine side of the property, and the other a system of more recently-discovered veins on the west side of the property referred to collectively as the Eagle vein. Surface drilling in 2009 was directed at evaluating both groups of veins. In addition, a significant copper-bearing shear zone with possible porphyry affinities on the west side of the property has been outlined through drilling.

The company's objectives have been to explore for extensions of known ore-grade material and new mineralization. Anglo Swiss intends to embark on an underground bulk sample program, and also proposes to assess the viability of processing old mine waste dumps and to develop a known sand-and-gravel resource. The upgraded pilot plant mill was expected to be ready before the end of the year.

2009 work by Anglo Swiss focused on underground rehabilitation, mapping, sampling and diamond drilling on the 257 level, as well as surface diamond drilling. New zones of underground gold-silver mineralization were identified. A metallurgical study was completed in 2009, as well as a resource estimate of the 257 level of the old workings. The latter outlined 24 624 t grading 20.58 g/t Au in the measured and indicated categories, and 522 000 t grading 23.01 g/t Au in the inferred category.

Anglo Swiss has recently optioned the **Ron** and **Referendum** (MINFILE 082FSW177) properties to the south of the Kenville and along the trend of the Silver King shear zone. It now holds what it claims is the largest contiguous property in the history of the Nelson Mining Camp. Late in the year the company embarked on an airborne VTEM survey of its overall holdings. These developments represent a shift in focus from relatively locally-developed vein systems to broader, more-disseminated zones of potential mineralization, perhaps analogous to porphyry-style deposits.

Hostrocks at the Kenville are within the lower Jurassic Eagle Creek plutonic complex which is intruded into, and may be the intrusive equivalent of, basalts of the Early Jurassic Elise Formation of the Rossland Group.

Middle Jurassic (Nelson suite) and Tertiary intrusive rocks are also common in the immediate area.

Valterra Resource Corporation's gold-silver-copper **Star** property is 7 km southwest of Nelson (Figure 6.14). It includes the past-producing Star (MINFILE 082FSW083) and Eureka (MINFILE 082FSW084) occurrences, as well as the Alma N Zone (immediately to the south of the Star) and the newly-acquired Toughnut property (MINFILE 082FSW294) to the southeast. The property contains five gold zones within the Silver King shear zone. Mineralization is associated with felsic alteration and is hosted by both the lower Jurassic Elise Formation volcanics (Rossland Group) and the lower Jurassic Eagle Creek pluton. Production from the Eureka Mine between 1905 and 1954 totalled about 9000 t of ore averaging over 2 g/t Au, 125 g/t Ag and 1.77% Cu. Mineralization, consisting primarily of pyrite with or without chalcopyrite, appears to be both vein-type and disseminated and may have affinities to both alkaline porphyry deposits and vein-hosted deposits and camps in southeast British Columbia. Drilling in 2009 was focused on the Alma N zone. All of the 2009 drillholes intersected anomalous gold and silver with or without copper mineralization to a maximum depth of 135 m, and demonstrated approximately 250 m of mineralized strike length.

Excalibur Resources Ltd's **Silver King** property is located about 9 km south of Nelson and is southeast of both the Kenville and Star properties along of the trend of the Silver King shear zone. It includes the past-producing Silver King mine (MINFILE 082FSW176), which produced over 200 000 t, mainly between 1896 and 1914, grading 672 g/t Ag, 0.5 g/t Au and 3.2% Cu. Mineralization, predominantly pyrite, chalcopyrite and galena, is confined to three vein systems that are contained within and are parallel to the Silver King shear zone. Hostrocks are volcanics of the lower Jurassic Elise Formation (Rossland Group). The Jurassic Silver King Porphyry occurs in close proximity. Excalibur is currently drill-testing one kilometre strike length along the shear



Figure 6.14. Mineralized quartz-veined breccia from Valterra Resource Corp's Star project.

zone and is evaluating both open pit and underground mining potential. The company reported the discovery of a new mineralized vein system in 2009.

EAST KOOTENAYS

The **Kimberley Gold Trend**, or KAT, is a newly-developed geological concept (Thompson, 2009) intended to encompass a number of gold showings and prospects held mainly by Ruby Red Resources Inc occurring both east and west of the Rocky Mountain Trench in the Cranbrook-Kimberley area. The KAT represents a belt 30 km wide by more than 100 km long that cross-cuts the southern Purcell Mountains and terminates in the Rocky Mountains to the east. It includes more than one hundred mineralized occurrences, most containing gold, as well as placer gold. It includes individual mineral properties such as Eddy (MINFILE 082FSE116), Zeus, Gar, Lov, Zinger (MINFILE 082FSE122) in the Purcell Mountains and Spirit Dream in the Rocky Mountains.

In the Purcell Mountains the KAT is bounded by the Moyie Fault to the south and the St. Mary's and Kimberley fault system to the north. Eastward these faults cross the Rocky Mountain Trench to the Rockies where they bend sharply northward parallel to typical Rocky Mountain structures. Hence the overall shape of the KAT is an arc concave to the north. Known occurrences in the KAT have been classified as a variety of types including gold-quartz veins, polymetallic veins and iron oxide copper-gold, and have been variously described as shear-hosted, fissure-hosted, stockwork-hosted and intrusion-related. Hostrocks range from Proterozoic to Paleozoic in age. Relationship to Cretaceous igneous activity is often implied, although repeated episodes of mineralization (in concert with repeated episodes of fault movement) are strongly suggested. Alteration, which can be intense, may include silica, iron oxide, iron carbonate, chlorite, sericite and talc.

The main effort with respect to the Kimberley Gold Trend in 2009 was on the **Spirit Dream** gold property in the Wildhorse River area 30 km northeast of Cranbrook, where Ruby Red Resources carried out a trenching and detailed mapping program. Gold values at the Spirit Dream property are associated with quartz veins and stockworks hosted by a Proterozoic quartzite unit.

At the **Crowsnest** property (MINFILE 082GSE070), on Trachyte Ridge approximately 50 km southeast of Fernie in the Flathead River valley, MAX Resource Corp carried out a trenching, sampling and reverse-circulation drill program (Figure 6.15). The focus was on the so-called discovery trench area, and the objective was to outline the known high-grade mineralization and to define the mineralized structure. New trenches have extended the mineralized zone 200 m to the west of the discovery trench. The Crowsnest property is underlain by Pennsylvanian and Mississippian sedimentary rocks, chiefly carbonates, intruded by Cretaceous sills, dykes and plugs of alkalic affinity. Mineralization is related to



Figure 6.15. View to the northwest of Trachyte Ridge on MAX Resource Corp's Crowsnest property.

the intrusions and occurs in limestone, siltstone and syenite. Analogies to the Cripple Creek deposit have been made; the similarities include the association with alkalic intrusions and the occurrence of tellurium. Positive 2009 drill results were reported.

BASE METALS PROJECTS

WEST KOOTENAYS

The **Slocan Silver** project, east of New Denver, is in a rich past-producing district of vein-style silver-lead-zinc mineralization (Figure 6.16). Major progress was made in 2009 by Klondike Silver Corp. Klondike's holdings are divided into six areas, each of which encompasses several past producers. These include Sandon, Hewitt-Van Roi, Silverton Creek, Cody Creek, Payne and Jackson Basin. The company's Silvana mill at Sandon, a 100 tonnes-per-day concentrator, is operational and processes ore-grade material from this project and another project in western Canada. Concentrates from the mill are shipped to a smelter for refining.

Klondike Silver activities on the Slocan Silver project included prospecting, geological mapping, geophysics, rock and soil geochemistry, trenching, drilling, and underground development, drilling and test mining. The company's overall objective is to discover new lodes or extensions of the known occurrences.

Underground work in 2009 took place at the **Silvana** (MINFILE 082FNW050) and **Wonderful** (MINFILE 082FNW043) mines, both past-producers in the Sandon area. The focus was on rehabilitation, development, drilling and small-scale test mining. A major achievement was the demonstration of the probable westward extension of the Silvana mine lode structure (Figure 6.17). The so-called "Main Lode" was historically a major source of ore in the Slocan Camp. Another objective was to outline and recover bodies of mineralized rock in the range of thousands to tens of thousands of tonnes.



Figure 6.16. Entrance to Klondike Silver Corp's Silvana Mine, Slovan Silver project.



Figure 6.17. The Silvana lode structure underground in the Silvana Mine.

Surface work was partly focused on following up on anomalies and mineralization identified in 2008, as well as undertaking new surface geophysics and soil geochemistry programs. Highlights included trenching in the **Jackson Basin** (Figure 6.18; MINFILE 082KSW015) and **Payne** (MINFILE 082KSW006) areas, and trenching and drilling at the **Hewitt-Van Roi** (MINFILE 082FNW065). Positive results were reported from the Jackson Basin area, and the company intends to explore this area aggressively in 2010.

Vein-related mineral occurrences in the Slovan are hosted by sheared and brecciated argillite and slate of the Triassic Slovan Group, which are intruded by granodiorite and quartz monzonite dikes.

POLYMETALLIC PROJECTS

WEST KOOTENAYS

The large **Jersey-Emerald** property 10 km south of Salmo was the site of significant work by Sultan Minerals



Figure 6.18. Entrance to the Jackson Mine in the Jackson Basin camp, part of Klondike Silver Corp's Slovan Silver project.

Inc again in 2009. It is a polymetallic project in the sense that it is host to a variety of different types and styles of mineralization. It is situated near the south end of the Kootenay Arc. Tungsten is associated with skarn near the contact between Paleozoic sedimentary carbonate rocks and Cretaceous intrusions. Stratabound zinc-lead mineralization is associated with Paleozoic carbonates. Molybdenum-bearing, granitic intrusion-hosted quartz stockworks lie beneath some of the old tungsten mine workings and in some cases molybdenum is also associated with tungsten.

The underground **Jersey** lead-zinc and **Emerald** tungsten mines (MINFILE 082FSW009, 010, 011 and 218) closed in 1973. The Jersey mine was British Columbia's second largest lead-zinc producer, and the Emerald was Canada's second-largest tungsten producer. Work in 2009 included surface diamond drilling programs designed to test new acquisitions and recent discoveries of tungsten and zinc.

An updated resource calculation released early this year outlined 2.719 Mt measured-plus-indicated resources averaging 0.341% WO₃, at a 0.15% WO₃ cut-off, mainly in the area of the old workings. Six unmined tungsten targets were reported by the operator at the time of the closure of the Emerald mine. These targets occur as broad linear bands trending for more than 1500 m to the north and south of the old mine workings. Drilling for tungsten in 2009 focused on the **Lost Creek** valley, 1.5 km south of the Emerald mine (site of 2008 zinc and tungsten discoveries), and the newly-acquired **Victory** (MINFILE 082FSW059) property, approximately 3.5 km to the north. Results suggest there is a tungsten-mineralized corridor up to 7 km in length, as well as the potential for a high-grade tungsten resource on the Victory.

Sultan Minerals has recently announced that it has acquired the rights to the **HB** (MINFILE 082FSW004) and **Garnet** (MINFILE 082FSW249) lead-zinc mines, which closed in 1978. With this addition, Sultan now holds British Columbia's second and third-largest (HB) lead-zinc past producers. Soil geochemistry and

geophysical surveys were carried out on the new holdings.

Duncastle Gold Corp carried out a third diamond drilling program on the **Yankee-Dundee** property near Ymir (Figure 6.19). The property includes several past producers, including the **Yankee Girl** (MINFILE 082FSW068), **Dundee** (MINFILE 082FSW067) and **Goodenough** mines, which produced gold, silver, lead and zinc from polymetallic veins. The objective of the current exploration program is to identify extensions of the high-grade material in past workings. In particular, the Yankee Girl and Goodenough vein systems were targeted. The Yukon ore shoot, an enriched lens within the Yankee Girl structure and the thickest and most continuous portion of the vein, was a major focus in 2009, along with other zones primarily to the west of the Yankee Girl. Drill results extended known mineralization in the Yukon ore shoot to 90 m strike length and over 280 m downdip. Overall results indicate potential for resources readily accessible to underground mining.

Mineralized veins are mainly hosted by argillites and quartzites of the Jurassic Ymir Group, which were intruded by granodiorites of the Jurassic Nelson plutonic suite. Veins are typically composed of quartz, pyrite, galena and sphalerite.

At the **Teddy Glacier** property (MINFILE 082KNW069) 16 km north of Beaton, Jazz Resources Inc extracted a 2000-tonne underground bulk sample. The Teddy Glacier occurrence was a very minor past-producer of 5 t in 1929. It is a polymetallic vein occurrence containing silver, lead, zinc, gold and copper. The property is underlain by folded and sheared Paleozoic sedimentary rocks of the Lardeau Group and is situated near the north end of the Kootenay Arc. Mineralization, chiefly galena, pyrite, sphalerite and lesser chalcopyrite and tetrahedrite, is mainly associated with two quartz veins in separate fracture zones that cut across the structural grain. A new showing in the adjacent **Vimy Ridge** area (MINFILE 082KNW070) was uncovered during blasting for a road upgrade.



Figure 6.19. View to the south along the Salmo River valley from Duncastle Gold Corp's Yankee-Dundee property.

MOLYBDENUM PROJECTS

EAST KOOTENAYS

At the **Sphinx** molybdenum property (MINFILE 082FNE004, 094, 095 and 166), 45 km west of Kimberley near Gray Creek Pass, Touchdown Capital Inc and Eagle Plains Resources Ltd carried out a geophysical and diamond drilling program. The Sphinx property is underlain by sedimentary strata of the upper part of the Purcell Supergroup, which have been intruded by Cretaceous quartz monzonite. Molybdenum (and associated tungsten) mineralization is hosted by quartz-pyrite stockwork veins and fractures within a pervasive alteration zone associated with both the sedimentary and igneous rocks. An indicated resource estimate of 41.45 Mt grading 0.041% Mo, using a cut-off grade of 0.03% Mo, was calculated in 2009. Earlier resource calculations were described as being open in two directions and at depth, and the potential deposit has been described as a bulk-tonnage target.

INDUSTRIAL MINERALS PROJECTS

EAST KOOTENAYS

Spectrum Mining Corporation carried out a diamond-drilling program on the **Rock Canyon Creek** fluorite-rare earth element niobium prospect (MINFILE 082JSW018) 48 km east of Canal Flats in the White River drainage (Figure 6.20). Mineralization, which occurs in an extensive brecciated alteration zone, is believed to be related to a carbonatite intrusion that does not reach the surface. Fluorite mineralization is known to occur within a Paleozoic carbonate sequence over a length of more than 4 km parallel to strike. The predominant form of mineralization consists of disseminations and veinlets in a dolomitic matrix (Pell, 1987). Mineralized rock tends to be high in fluorine, rare earth elements and barium, and enriched in strontium, yttrium, phosphorus and niobium. In 2009 mineralized material was cored over a strike length of greater than one kilometre and all holes were mineralized to the drill limit of 125 m.

Baymag Inc carried out a close-spaced drilling program at the **Struna Creek** magnesite occurrence (close to MINFILE 082JNW006), roughly 3 km south of the company's **Mount Brussilof** mine. In the Mount Brussilof and adjacent areas sparry magnesite generally occurs as irregular alteration bodies in dolomite and limestones of the Cambrian Cathedral Formation east of the Cathedral escarpment. The objective of the program was to delineate ore reserves to replace those at the current mine.



Figure 6.20. Diamond drilling on Spectrum Mining Corporation's Rock Canyon Creek project.

OUTLOOK FOR 2010

By the end of 2009 some junior mineral exploration companies were attracting investment funding and were undertaking late-season programs and/or beginning to develop plans for significant programs in 2010. In addition, companies and prospectors in the region were able to option properties, particularly in the Nelson area. This bodes well for 2010.

We can safely expect some of the 2008 highlight projects that were dormant or scaled back in 2009 to be revived next year. These may include the Jumping Josephine gold (now Astral Mining Corporation), Swift Katie gold-copper (with its new owner, JRTL Capital Corp) and Thor polymetallic (Taranis Resources Inc) projects. Successful 2009 programs such as the Star gold-silver-copper (Valterra Resource Corporation) and Jersey-Emerald tungsten (Sultan Minerals Inc) projects are expected to continue and expand. Activity levels in the Nelson, Rossland, Beavertell and Lardeau areas are expected to increase significantly, and in the busy Salmo and Greenwood areas levels are expected to at least be maintained. The Nelson area, in particular, is anticipated to be a major hub of mineral exploration in 2010, with companies holding properties along the Silver King shear zone, including Anglo Swiss Resources Inc, Valterra Resource Corporation, Excalibur Resources Ltd and Sultan Minerals Inc, all active.

The main exploration focus for the Southeast Region in 2010 will undoubtedly continue to be gold. The fact that recent gold discoveries in the West Kootenays and Boundary District, such as the Jumping Josephine and Rosetta Stone, are yielding positive results bodes well for grassroots gold properties in the region (Kootenay Gold Inc and others). Assessment of gold potential in the Cranbrook area, including the Kimberley Gold Trend, is anticipated to ramp up in 2010 (Ruby Red Resources Inc and others). Continuing favourable silver prices will

probably benefit the West Kootenays, including the Slocan and Kootenay Lake areas (Klondike Silver Corp, Goldcliff Resource Corporation and others). Lead-zinc (with lesser silver) should also be a factor, and we may see some resurgence in exploration for sedex mineralization in the East Kootenays (Klondike Gold Corp and others).

2010 should be a strong year for the coal mining industry, as the economic recovery strengthens worldwide and the steel industry rebounds. Coal exploration is expected to increase, with Teck Coal Limited active on projects that were dormant in 2009 such as Coal Mountain Operations' Marten-Wheeler property and the Greenhills Range side of the Fording River Operations.

ACKNOWLEDGMENTS

I would like to extend my gratitude to the exploration and mine company staff and consultants, as well as the independent prospectors and geologists, who were active in the Southeast Region in 2009. Without the willingness of these many individuals to provide access to work sites and drill core, and to share their expertise and insight, the Regional Geologist job would not be possible. Earlier versions of this article were reviewed by Dave Lefebure, Tania Demchuk and Jay Fredericks.

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