



# BRITISH COLUMBIA MINES & MINERAL EXPLORATION OVERVIEW 2010



# BRITISH COLUMBIA MINES AND MINERAL EXPLORATION OVERVIEW 2010

Ministry of Forests, Mines and Lands and Ministry of Natural Resource Operations  
*Kirk Hancock, PGeo; Bruce Northcote, PGeo; Dave Grieve, PGeo;  
Bruce Madu, PGeo; and Paul Wojdak, PGeo*

## INTRODUCTION

British Columbia is Canada's largest producer of copper, its only producer of molybdenum and the largest exporter of coal. A broad variety of mines produce these and other commodities, including gold, silver, lead and zinc; as well as over 30 industrial minerals, including gypsum, magnesite, limestone and dimension stone for both local and international markets. Numerous quarries supply either sand and gravel or crushed aggregate. This is a reflection of the province's complex geological history and wealth of varied geological/mineralogical environments.

British Columbia actively supports mining and mineral development. This includes providing public geoscience that is readily available to all through web accessible datasets and information specialists and geologists. British Columbia is well serviced with transportation infrastructure with ready access to world markets through its ports, rail system and highways. The province also boasts very attractive industrial electrical power rates. Commitments to expand British Columbia's power grid to the northwest of the province have the potential to increase mine development and exploration in one of the most geologically prospective areas of the province.

The total value of solid mineral production for British Columbia in 2010 is estimated at \$7 billion (Figure 1). Riding the current metals 'super cycle', producers are taking advantage of the opportunity to expand and/or improve operations. Metal mines production continued steadily from eight major producers. The MAX molybdenum mine, the province's ninth metal mine producer, temporarily suspended operations in the fall to rectify some geotechnical difficulties, but development for expansion is ongoing. Coal mining continues with all ten operations expanding or working near capacity to meet an increasingly strong world demand.

Mineral exploration spending was \$322 million, more than double the previous year's expenditures (Figure 2). This shows a strong rebound from the recent worldwide financial collapse and also reflects the attractiveness for minerals investment in British Columbia. It is important to note that while the metals sector showed a marked drop in activity in 2009 and now has rebounded, coal exploration and development remained strong.

Additionally, last year an estimated \$1.3 billion was spent on new mine development and expansion projects at

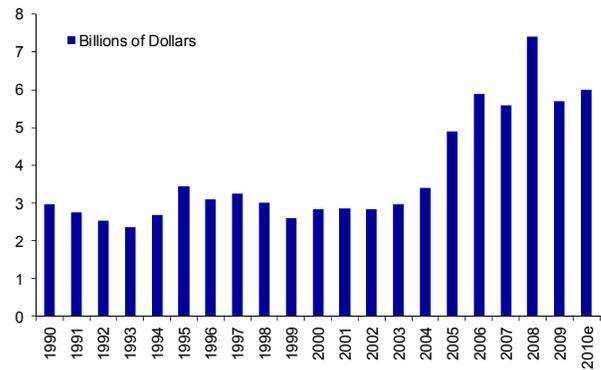


Figure 1. Solid mineral production in British Columbia, 1990 to 2010.

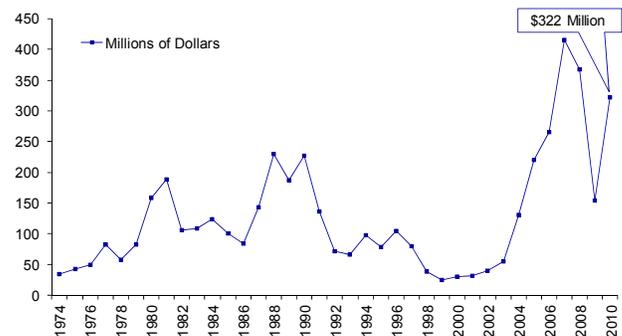


Figure 2. Mineral exploration expenditures in British Columbia, 1974 to 2010.

existing operations. Exploration activity is largely balanced across all commodity sectors and reflects the coincident strength of product prices. The sustained elevated price of copper, molybdenum and gold has driven most metals projects in British Columbia. Coal prices remain high and demand is not expected to slacken. For industrial minerals, demand is strong and production remains steady.

Mine development shows continued strength with 23 Environmental Assessment Office mine proposals in process. They break down as follows: three projects are under review, 20 are in the pre-application stage with three new pre-applications submitted in 2010. The new applications are for one metal (Kitsault), one coal (Central South) and one aggregate (McNabb Creek) mine development. No new mine permits were issued in 2010;

however, both the Red Chris (Imperial Metals Inc) and Barkerville Ledge (Barkerville Gold Mines Ltd) projects have submitted applications that are under review. Permission to proceed with several significant mine expansions has also been requested. These expansions include the Willow Creek Mine (Western Coal), Endako Mine (Thompson Creek Metals), Mount Polley (Imperial Metals) and Huckleberry Mine (Huckleberry Mines, Imperial Metals). Several other major development projects are approaching the mine permitting stage and are expected to advance over the next few years.

People employed in British Columbia's mineral industry (mine and mill workers, engineers and geoscientists, managers and technical experts in many fields) are highly skilled and productive and are in demand throughout the world. Vancouver is a major financial centre providing capital for mineral exploration and mine development, both within the province and internationally. British Columbia is internationally recognized as a centre of excellence in mining and related fields, such as metallurgy, environmental engineering, mine safety and the geosciences.

More than half of the Canadian exploration and mining companies are based in British Columbia, which has the world's largest concentration of exploration companies and mining professionals. British Columbia based companies have raised billions of dollars in equity capital on the TSX and TSX Venture Exchanges in recent years. This economic activity was carried out by more than 800 publicly-listed British Columbia companies. The British Columbia government supports mining as a key part of the provincial economy. One of the advantages of exploring and mining in British Columbia is attractive tax rates and programs. The Mining Exploration Tax Credit Program and Exploration Investment Tax Credit for flow-through investors, provide additional incentives to attract risk capital to the province. The British Columbia and federal non-refundable tax credits, when added to the regular 100% deductions are equivalent to a 141% exploration expense deduction for income tax purposes. In addition, the Mining Exploration Tax Credit has been increased to 30% for qualified mineral exploration undertaken in prescribed Mountain Pine Beetle affected areas of the province.

Enhancing British Columbia's resource potential and modern infrastructure is the government's geoscience database and modern, web-based mineral tenure system. Two of the main pillars of the system are MapPlace and Mineral Titles Online. MapPlace is an online application that provides easy, interactive map access to information related to British Columbia's geology, mineral exploration, mining and energy resources. Mineral Titles Online allows people to acquire and maintain mineral titles by establishing mineral dispositions on a seamless digital geographic information system.

Throughout this report, the descriptions of mines, mine development projects and exploration properties are presented by region. This overview article describes only

the larger exploration projects. The overview is linked to the map of Operating Mines and Selected Major Exploration Projects in British Columbia 2010 (Open File 2011-1), a version of which is included as the centre piece of this document. Readers are encouraged to refer to the more detailed regional overviews presented in Exploration and Mining in British Columbia 2010 volume for additional information. See <http://www.empr.gov.bc.ca/Mining/Geoscience/PublicationsCatalogue/ExplorationinBC/Documents/2010/BCEX-Mining2010.pdf>.

## MINING HIGHLIGHTS

Coal (\$4 billion), copper (\$1.5 billion) and molybdenum (\$0.3 billion) are expected to remain British Columbia's first, second and third most important solid mineral products by value, with coal continuing to lead in overall value. Table 1 shows the estimated value of mineral production by dollar amount and percentage for British Columbia in 2010. The relative proportions are shown graphically in Figure 3. Nearly all this production is exported. Production and reserve estimates for the individual mines are listed in Table 2.

**TABLE 1. ESTIMATED VALUES OF MINERAL PRODUCTION, RANKED BY COMMODITY IN BRITISH COLUMBIA FOR 2010**

Commodity	Value (millions)	Percent Value
Metallurgical Coal	\$4214	60.21
Copper	\$1526	21.81
Molybdenum	\$304	4.35
Aggregate	\$269	3.84
Industrial Minerals	\$249	3.56
Gold	\$245	3.50
Zinc	\$72	1.02
Thermal Coal	\$62	0.89
Silver	\$53	0.75
Lead	\$6	0.08
<b>Total Value</b>	<b>\$7 billion</b>	

Coal production in British Columbia is forecast to be approximately 27 Mt in 2010. Coal prices remained strong, and exploration and development spending is increasing significantly. The large majority of coal produced in British Columbia is metallurgical, specifically hard coking coal. In recent years, most of the coal from the southeast coalfields has gone to Asia, while a smaller portion is shipped to Europe. The northeast coalfields ship to these destinations and also South America. There are three major coal terminals at British Columbia's ports. The largest bulk terminal on the western coast of the Americas is Westshore Terminals at

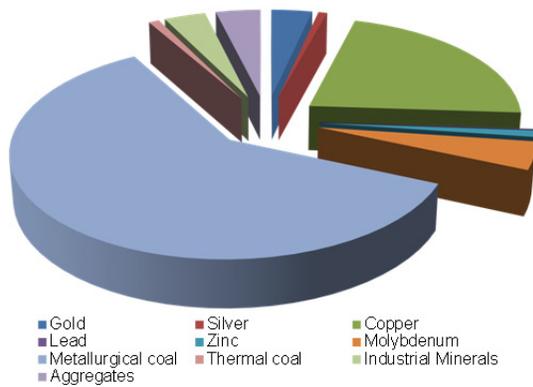


Figure 3. Pie chart showing the relative values of mineral production by commodity in British Columbia for 2010.

Roberts Bank near Vancouver with a capacity of approximately 24 Mt per year. An expansion to 29 Mt per year was completed in 2010. Neptune Bulk Terminals in North Vancouver has a capacity of 8 Mt per year (also expandable) and Ridley Island Terminal at Prince Rupert is operating close to its current capacity of 12 Mt, but considering expansion. There are other ice free, deep-water ports including Stewart and Kitimat.

Copper producers are continuing with strong sales as copper prices remain at historic highs. Highland Valley Copper, Gibraltar and Huckleberry, are expanding, or planning to expand operations, to extend mine life as well as exploring for more ore on site. Similarly, molybdenum producer Endako is expanding its processing facilities and pit size to increase both production and mine life. The Kemess South copper mine is scheduled to close in 2011. Fortunately, the Copper Mountain mine is scheduled to reopen in 2011, the New Afton underground copper mine, located under the former Afton open pit, is slated to open in 2012, and the large Mount Milligan porphyry copper open-pit mine is under construction and slated to open in 2013.

The contribution of industrial mineral and aggregate production is also significant, estimated at approximately 7.4% of total mineral value. Over 40 industrial minerals products are mined and processed in British Columbia, with cement production holding the lion's share of value. Construction aggregates represent the next largest value product. Large volumes of aggregate are exported from the coastal quarries, California being the most significant market. In the last two years, with the downturn in the United States economy, aggregate exporters are diversifying their market locations within the United States and looking elsewhere overseas as well.

An interesting addition to the industrial minerals portfolio is a surge in exploration for rare earth metals/elements (REE). Until recently China has been the world leader in REE supply, with 95% of the world market. China recently stated that it will be significantly curtailing exports over the next several years as internal demand has increased sharply. This has caused prices for

rare metals to rise significantly and created repercussions worldwide. British Columbia is well positioned having many known REE occurrences and notable potential for developing a mine combined with excellent infrastructure to access world markets. Over the last year, several companies have been re-evaluating and expanding the knowledge of these occurrences and creating an exploration boom in the field.

There were more than 30 active industrial minerals quarries in 2010 and well over 1000 aggregate operations varying from large quarries operating continuously to small borrow pits used infrequently.

### Northwest British Columbia – Major Mines

The **Endako** open pit molybdenum mine (MINFILE 093K 006) is 75% owned and operated by Thompson Creek Metals Company (Figure 4). Sojitz Corporation holds a 25% interest. In 2009, the mine produced 4504 tonnes of molybdenum from 9 759 000 tonnes of ore with an average grade of 0.059% Mo. Molybdenum recovery was 78.4%. In situ and stockpile ore reserves on the property at the beginning of 2010 were 280.1 Mt grading 0.047% Mo at a cutoff grade of 0.02% Mo. Thompson Creek forecasts Endako production in 2010 will be 4230 tonnes of molybdenum. Cost of molybdenum production is estimated at \$9 in 2010.

Construction is underway to modernize and expand capacity of the Endako mill from 28 000 to 52 000 tonnes of ore per day. The company estimates capital expenditure in 2010 to be \$240 million. Completion of the \$498 million expansion and modernization project will enable treatment of lower grade ore and to lower the operating cost on a per tonne basis. New semi-autogenous (SAG) and ball mills, a modern flotation circuit and an upgrade of the roaster circuit are included. A workforce of 500 is building the project; completion is scheduled for late 2011. Output in 2011 is estimated to be about 5000 tonnes Mo, increasing to 6800 tonnes in 2012 when benefits of the expansion and modernization are realized.



Figure 4. Endako molybdenum mine, mining in the West Denak pit, June 2010.

**TABLE 2. PRODUCTION AND RESERVE ESTIMATES FOR MINERAL PRODUCERS  
IN BRITISH COLUMBIA, 2010**

<b>Mine</b>	<b>Operator</b>	<b>Deposit Type/Commodity</b>	<b>Forecast 2010 Production</b>	<b>Proven and Probable Reserves (on Dec. 31, 2009 / Jan. 1, 2010 or as indicated)</b>
<b>Metals</b>				
Endako	Thompson Creek Metals Company	Porphyry Mo	5000 t Mo	280.1 Mt at 0.047% Mo (includes low-grade stockpile)
Gibraltar	Taseko Mines Limited / Cariboo Copper Corp	Sub-alkalic porphyry / Cu-Mo	41 900 t Cu, 427 t Mo	459 Mt at 0.35% Cu and 0.008% Mo
Highland Valley Copper	Teck Cominco Ltd/ Highmont Mining Company Ltd	Calcalkalic porphyry / Cu-Mo	100 000 t Cu, 2950 t Mo, minor Au and Ag	440 Mt at 0.35% Cu and 0.008% Mo
Huckleberry	Huckleberry Mines Ltd (50% Imperial Metals Corp)	Porphyry Cu-Mo	29 000 t Cu	14 010 000 t at 0.362% Cu, 0.005% Mo (on May 11, 2010)
Kemess South	Northgate Minerals Corp	Calcalkalic porphyry / Au-Cu	3170 kg Au, 20 400 t Cu	22.66 Mt at 0.28 g/t Au and 0.14% Cu
MAX	Roca Mines Inc	Porphyry Mo	456 t Mo	Measured and indicated resource of 1.7 Mt at 0.73% Mo (December 2009)
Mount Polley	Imperial Metals Corp	Alkalic porphyry / Cu-Au-Ag	16 150 t Cu, 1516 kg Au, 5897 kg Ag	40.5 Mt at 0.32% Cu, 0.28 g/t Au, 0.61 g/t Ag
Myra Falls	NVI Mining Ltd (Breakwater Resources Ltd)	VMS / Zn-Cu-Au-Ag	32 686 t Zn, 4769 t Cu, 622.2 kg Au, 22 792.5 kg Ag (metal in concentrate)	6.2 Mt at 5.1% Zn, 0.5% Pb, 0.9% Cu, 44 g/t Ag, 1.3 g/t Au
QR	Barkerville Gold Mines Ltd	Skarn / Au		197 470 t at 4.84 g/t Au (West zone)
<b>Coal</b>				
Basin	Compliance Energy Corp	Thermal coal	0 (on care and maintenance)	
Brule	Western Coal Corp	PCI coal	1.2 Mt	20.1 Mt (March 2010)
Coal Mountain	Teck Coal Limited	Metallurgical coal	2.21 Mt clean coal	22.0 Mt
Elkview	Teck Coal Limited	Metallurgical coal	5.42 Mt	231.7 Mt
Fording River	Teck Coal Limited	Metallurgical coal	8.0 Mt	249.9 Mt
Greenhills	Teck Coal Limited	Metallurgical coal	4.2 Mt	84.9 Mt
Line Creek	Teck Coal Limited	Metallurgical and thermal coal	2.6 Mt	20.2 Mt
Quinsam	Quinsam Coal Corp (Hillsborough Resources Ltd)	Thermal coal	445 000 t clean coal	22.073 Mt (in situ 2008)
Trend	Peace River Coal Inc	Metallurgical coal	1 Mt	23.0 Mt
Willow Creek	Western Coal Corp	Metallurgical coal	0.5 Mt	29.6 Mt (March 2010)
Wolverine (Perry Creek)	Western Coal Corp	Metallurgical coal	1.7 Mt	26.6 Mt (March 2010)
<b>Industrial Minerals (selected)</b>				
4J	Georgia-Pacific Canada Inc	Gypsum		
Ashcroft	IG Machine and Fiber Ltd (IKO Industries Ltd)	Basalt (roofing granules)		
Apple Bay (PEM 100)	Electra Gold Ltd	Chalky geyserite		
Benson Lake	Imasco Minerals Inc	White marble		
Blubber Bay	Ash Grove Cement Company	Limestone aggregate, dolomitic limestone		
Bud	Absorbent Products Ltd	Bentonite		

TABLE 2. CONTINUED

Mine	Operator	Deposit Type/Commodity	Forecast 2010 Production	Proven and Probable Reserves (on Dec. 31, 2009 / Jan. 1, 2010 or as indicated)
<b>Industrial Minerals (selected)</b>				
Buse Lake	Lafarge Canada Inc	Volcanic ash (alumina-silica)		
Craigmont	Craigmont Mines Joint Venture	Magnetite tailings		
Crawford Bay	Imasco Minerals Inc	Dolomite		
Decor	Pacific Bentonite Ltd	Alumina, landscape rock		
Elkhorn	CertainTeed Gypsum Canada	Gypsum		
Falkland	Lafarge Canada Inc	Gypsum		
Fireside	Fireside Minerals Inc	Barite		
Garibaldi Pumice	Garibaldi Pumice Ltd	Pumice		
Gillies Bay	Lafarge North America Inc	Limestone, aggregate		
Giscome	Graymont Western Canada Inc	Limestone		
Harper Ranch	Lafarge Canada Inc	Limestone		
Kettle Valley quarries	Kettle Valley Stone Company	Ashlar, flagstone, thin veneer		
K2	K2 Stone Quarries Inc	Building stone		
Lime Creek	Imasco Minerals Inc	Limestone		
Moberly	HCA Mountain Minerals (Moberly) Ltd	Silica sand		
Monteith Bay	Lehigh Northwest Cement Ltd	Geyserite		
Mount Brussilof	Baymag Inc	Magnesite		
Mount Meager	Great Pacific Pumice Inc	Pumice		
Nazko	Lightweight Advanced Volcanic Aggregates Inc	Lava rock		
Pavilion	Graymont Western Canada Inc	Limestone		
Red Lake	Absorbent Products Ltd	Diatomaceous earth		
Sumas Mountain	Sumas Shale Ltd (Clayburn Industrial Group and cement manufacturer partners)	Shale and clay		
Van Anda	Imperial Limestone Company Ltd (JA Jack and Sons Inc)	Limestone		
Winner	Roxul (West) Inc	Gabbro (mineral wool)		
Zeotech Bromley Creek	Heemskirk Canada Ltd	Zeolite		

Endako is a porphyry molybdenum deposit mined in the Endako, East Denak and West Denak pits. In the long-term mine plan these will merge into a large 'Super-Pit'. Exploration took place 2 to 3 km northwest of West Denak pit, comprising 12 000 m of drilling. The Endako ore vein system was found to continue and an increase in the molybdenum resource is expected. Further drilling is anticipated in 2011.

The **Huckleberry** copper mine (MINFILE 093E 037) is operated by Huckleberry Mines Ltd (Figure 5). It is

owned 50% by Imperial Metals Corp and 32% by Mitsubishi Material Corporation with the remaining 18% shared equally among Dowa Mining Ltd, Furakawa Company Ltd and Marubeni Corporation. In 2009, Huckleberry milled 6 133 700 tonnes of ore from the Main Zone Extension (MZX) pit grading 0.377% Cu and 0.006% Mo. Metal production amounted to 20 834 tonnes of copper, 6.56 tonnes of molybdenum and 10.8 kg of gold. Copper recovery was 90.2% but molybdenum recovery was 1.87%. Proven and probable reserves on



Figure 5. Huckleberry copper mine; mining in the MZX pit in September 2010, low-grade stockpile and mill in the background.

May 11, 2010 were 14 010 000 tonnes at a grade of 0.362% Cu and 0.005% Mo and a strip ratio of 0.56:1. Forecast 2010 production is 29 000 tonnes of copper.

The future of Huckleberry lies in development of the Saddle zone and Main zone ‘Super pit’ which could provide ore to 2013 and 2025 respectively. The Super pit resource comprises material below and peripheral to the Main zone. The measured and indicated resource in the two zones is 182.9 Mt at a grade of 0.321% Cu. The inferred resource is 45.4 Mt at a grade of 0.288% Cu. There is also 6 Mt of stockpile material grading 0.20% to 0.26% Cu.

### **Industrial Mineral Quarries**

Fireside Minerals Ltd made steady improvements to its summer-seasonal **Fireside** barite operation (MINFILE 094M 003). Mining of 22 000 tonnes of rock from the Bear Pit yielded 16 000 tonnes of barite recovered from jigs at the mine site. There was also a pre-season stockpile of 6000 to 8000 tonnes of barite. All the barite was trucked to the company’s grinding and bagging plant in Watson Lake. To the end of November, over 18 000 tonnes of pre-sold barite was shipped and the plant continued to operate with orders to fill in early 2011. The Bear pit resource, as of November 2010, is 165 400 tonnes of barite rock which requires removal of 419 300 tonnes of waste rock down to 710 m elevation, a 2.54:1 waste-to-ore strip ratio. The resource, though not NI 43-101 compliant, is considered adequate to plan a 5-year mine life producing 30 000 tonnes of barite per year.

Jade in northwest British Columbia is mined chiefly by Cassiar Jade Contracting. Total production in 2010 is estimated at 150 tonnes of high-value gemstone from three localities: **Provencher Lake** produced about 85 tonnes (MINFILE 104I 073, 092), **Kutcho** about 60 tonnes (MINFILE 104I 078) and **Cassiar** about 5 tonnes (MINFILE 104P 005). At both Provencher and Kutcho

the jade that is recovered occurs equally as “placer” boulders in glacial till and as lenses in bedrock. The Kutcho site is worked under an agreement with The Continental Jade Ltd and the Provencher site is under an agreement with Jade Guys Inc.

### **Northeast British Columbia – Major Mines**

The **Willow Creek** mine (MINFILE 093O 008) reopened in early June, 2010. Now owned by Western Coal Corp, the mine hopes in 2010 to produce approximately 0.5 Mt of primarily pulverized coal injection (PCI) product with some metallurgical coal (Figure 6). In September, 2010 the mine made amendment applications to expand the mine and increase production to 1.7 Mt of coal per year. There was exploration drilling south of the mine in 2010.

At Western Coal’s **Brule** mine (MINFILE 093P 007) PCI coal production is anticipated to be approximately 1.2 Mt in 2010. The PCI coal produced at Brule is exported primarily to Korea. The Falling Creek Connector gravel haul route, that will connect the Brule mine to the Willow Creek mine, was near completion at the end of 2010. This will be a shorter haul route that does not use local highways and will eliminate the need to use the Bullmoose coal loadout facility. Once complete, facilities for washing some of the Brule coal are expected to be operational at Willow Creek. The Willow Creek mine is on the CN rail line and has coal loading facilities.

The **Wolverine** mine (MINFILE 093P 025) of Western Coal Corp is located just west of the town of Tumbler Ridge. The mine has a life expectancy of 15-20 years and, this year, Wolverine operations are expected to produce approximately 1.7 Mt of hard coking coal. The company is considering doing some underground mining in the Perry Creek area. Western Coal Corp has the EB and Hermann properties with a total of 40 Mt of proven coal reserves near the Wolverine mine. The EB pit was included in the original Environmental Assessment (EA)



Figure 6. Metallurgical coal awaiting shipment at the Willow Creek mine near the rail loadout. Willow Creek reopened in June 2010.

Certificate approval, while the Hermann property is subject to further approvals. Late in 2010, Western Coal Corp agreed to a merger proposal whereby Walter Energy acquires all of the outstanding common shares of Western Coal. The transaction represents a total enterprise value of \$3.3 billion, net of cash on the balance sheet for Western Coal, and is expected to be completed by the second quarter of 2011.

Peace River Coal's **Trend** mine (MINFILE 0931 030) will produce approximately 1 Mt of mostly metallurgical coal with a small amount of thermal coal in 2010 (Figure 7). Coking tests performed on the coal extracted from seams in the associated Gething Formation yielded positive results and the company is considering options to extend the pit to mine them. The nearby Roman Mountain project is in the provincial Environmental Assessment Review process and Peace River Coal is planning to complete a feasibility study on the deposit.

### ***North-Central British Columbia – Major Mines***

The **Kemess South** copper-gold mine (MINFILE 094E 094) is 100% owned by Northgate Minerals Corporation. Kemess South gold-copper mine is scheduled to close in the first quarter of 2011 (Figure 8). Northgate Minerals Corp reactivated work on the **Kemess North** deposit (MINFILE 094E 021) to evaluate potential for a block-cave underground mine. The mine operated at 52 000 t/d. Production in 2010 is forecast at 3170 kg Au (102 000 oz) and 20 400 tonnes Cu. Proven reserves at the beginning of 2010 stood at 22.66 Mt grading 0.28 g/t Au and 0.14% Cu. Metal recoveries were 66% for gold and 81% for copper. The net cash cost of production was \$348 per ounce of gold. Cutoff grade (in August 2010) was 0.09% Cu and 0.19 g/t Au. Mining of Kemess South is scheduled to end in January 2011. Milling of stockpile ore will continue through February with closure to follow in March.

Kemess South was a very successful mine after



Figure 7. Trend mine – looking southeast from approximately the centre point of the pit towards the Horizon deposit in the background.



Figure 8. Kemess South mine showing failures on the north wall that result from graphite-bearing Asitka Group sedimentary rocks. A basement “high” of Takla rocks separates tailings in the West pit from active mining in the East pit.

overcoming construction shortcomings, low metal prices and a change of ownership in its early years. Kemess South produced 91 248 kg (2 933 638 oz) of gold and 349 043 tonnes of copper between October 1998 and September 2010, from 208 218 000 tonnes of ore.

The **Shasta** gold mine (MINFILE 094E 050) is owned by Sable Resources Ltd. Ore is trucked 11 km to a gravity mill at the former Baker mine. Upgrade work continued throughout the year toward maintaining a mining and milling rate of 180 t/d, but production was only reported for two months (September and October) totalling 1450 gold-equivalent ounces. No other production data was available and there is no statement of ore reserves or mineral resources.

### ***South-Central British Columbia – Major Mines***

#### ***Metal Mines***

**Highland Valley Copper** (MINFILE 092ISW012), a partnership of Teck (97.5%) and Highmont Mining Company Ltd (2.5%), continues to execute a two-phase mine life extension to facilitate mining until 2025, including expansion of the Lornex pit. This includes push backs of the east and west walls of the Valley pit. The mine has encountered slope stability issues on the east wall as they exposed the apparent trace of the Lornex fault. The potential slope stability issues have led to production constraints as the company has not been able to fully access the ore in the east wall. Extensive work including waste stripping, installation of a dewatering system and emplacement of a buttress is expected to finalize these efforts and allow the mining of higher grade ore from this zone later in 2011 (Figure 9).

Average mill throughput is estimated to be slightly less than 2009 levels at 115 000 t/d or approximately 42 Mt for the year. Copper production is estimated at 100 000 tonnes compared to an actual production of



Figure 9. Break time for a 240 tonne haul truck driver at Canada's largest metal mine, the Highland Valley copper mine near Logan Lake.

118 200 tonnes for 2009. Molybdenum production is forecast at around 2950 tonnes which roughly equals the actual production of 2993 tonnes in 2009. The company forecasts a similar production level for copper and an increase of up to 4000 tonnes of molybdenum in 2011.

The **Gibraltar** mine (MINFILE 093B 012) of Taseko Mines Limited and Cariboo Copper Corp is nearing completion of a \$300 million modernization that has occurred over the last five years and will boost production

levels by 50% over historical levels. Aggressive exploration has increased the mine's resources significantly and given the operation a mine life of 25 years. The companies sold a 25% interest in the mine to a Japanese consortium (Sojitz Corporation, Dowa Metals & Mining Co. Ltd and Furukawa Co. Ltd) for approximately \$187 million.

Average mill throughput for 2010 is roughly estimated to be 40 000 t/d or approximately 15 Mt for the year. Copper concentrate and cathode production is estimated at 42 000 tonnes compared to an actual production of 31 888 tonnes for 2009. Molybdenum production is forecast at around 400 tonnes, substantially greater than the actual production of 285 tonnes in 2009. The company has forecasted continued increases in output for 2011 with annual production levels for copper to approach 52 000 tonnes and molybdenum 635 tonnes. Mill throughput levels are expected to approach 55 000 t/d.

At the **Mount Polley** mine (MINFILE 093A 008), Imperial Metals Corporation produced copper, gold and silver from a porphyry orebody (Figure 10). The operation is forecast to produce 16 150 tonnes of copper in 2010 compared to an actual production figure of 15 358 tonnes in 2009. Production levels for gold are estimated to be 1516 kg compared to 1537 kg for the previous year while silver levels will be down somewhat at an estimated 5897 kg compared to 6314 kg. Mill throughput is likely to average almost 22 000 t/d at the operation with an annual milled total of almost 8 Mt. Most of the production comes from the Springer pit which is currently under consideration for an expansion. Minor amounts are also mined from the Southeast and Pond zones, a more skarn-like area of the operation, where recoveries are hampered by additional sulphides in the ore.

Barkerville Gold Mines Ltd re-started the **QR** mine (MINFILE 093A 121) in the middle of the year after it acquired the operation in early 2010. The company moved quickly to resume mining operations and poured



Figure 10. The Springer pit at the Mount Polley copper-gold mine east of Williams Lake produces most of the mine's current ore and is under review for a significant expansion.

the first gold bar on September 8<sup>th</sup>. Current production levels are at about two-thirds of the mill capacity of 900 t/d with ore being delivered from various headings, including the West zone and North zone. The company has been drilling the North zone to delineate more ore and plan to bring the operation closer to full production. The company has also applied for a Mines Act permit to develop an open pit at the company's **Bonanza Ledge** project (MINFILE 093H 140). Ore would be trucked around 100 km to the QR mill for processing. The company envisions a four year supply of ore from Bonanza Ledge at a mining rate of 70 000 tonnes per year.

### *Industrial Mineral Quarries and Aggregates*

The **Kamloops** cement plant and **Harper Ranch** limestone quarry (MINFILE 092INE001) of Lafarge Canada Inc continue to supply cement to meet demand in western Canada. Lafarge also draws materials from the **Falkland** (MINFILE 082LNW001) and **Buse Lake** (MINFILE 092INE123) quarries, which provide gypsum and alumina-silica rock respectively.

The **Decor** (MINFILE 09INW084) 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 manufacturing applications.

Also near Cache Creek, Graymont Western Canada Inc operates the **Pavilion** (MINFILE 092INW081) limestone quarry and lime plant on the Pavilion Indian Reserve. Graymont has a 40-year lease with the Ts'kw'aylaxw First Nation who form the bulk of the employees at the mine.

East of Ashcroft, IG Machine and Fiber Ltd, a subsidiary of IKO Industries Ltd, operates the **Ashcroft** basalt quarry (MINFILE 09INW104) 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.

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 (MINFILE 09INE081) northwest of Kamloops, and bentonite mined from the **Bud** quarry (MINFILE 092HSE162) at Princeton.

Heemskirk Canada Ltd continues to market agricultural and absorbent products, produced from a stockpile at the **Zeo-Tech/Bromley Creek** zeolite quarry

(MINFILE 092HSE243) near Princeton. The material is transported to its plant in Lethbridge.

Opal Resources Canada Inc produces attractive fire opal gemstones and jewellery from the **Klinker** property (MINFILE 082LSW125), located west of Vernon. Presently, the gemstone jewellery is marketed from a retail store in Vernon and is aimed at the British Columbia tourist market.

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** (MINFILE 082ENW109), **Kettle Valley, Canyon** (MINFILE 082ENW111) and **Gemini** (MINFILE 082ENW112) 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.

## *Southeast British Columbia – Major Mines*

### *Metal Mines*

Roca Mines Inc's **MAX** underground molybdenum mine at Trout Lake began shipping concentrate in November 2007 and achieved full commercial production in April 2008 at a rate of 72 000 tonnes per year (Figure 11). In April 2010, Roca received approval to expand its production rate to 1000 t/d (Phase 2 Expansion). At the time of writing, the MAX operation had been temporarily shut down due to underground sill pillar stability problems since late September, 2010. The MAX deposit (MINFILE 082KNW087) contains measured plus indicated resources of 42.9 Mt grading 0.20% MoS<sub>2</sub> using a 0.10% MoS<sub>2</sub> cutoff. The mine has been producing from



Figure 11. Adit #2 at Roca Mines Inc's MAX molybdenum mine near Trout Lake.

the HG zone, with an initial resource of 280 000 tonnes (measured and indicated) grading 1.95% MoS<sub>2</sub> at a 1.00% cutoff. The Phase 2 expansion is based on a measured plus indicated resource of 1.7 Mt at 0.73% Mo. Underground exploration drilling was carried out in 2010 to evaluate the Ethyl and East zones, to the southwest and northeast of the existing workings, respectively. Both are potentially high-grade zones in close proximity to the active mining area. Roca also carried out underground development at the MAX mine in support of its approved Phase 2 expansion.

### Coal Mines

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 combined total 2010 coal production at the company's **Coal Mountain** (MINFILE 082GNE001), **Elkview** (MINFILE 082GNE017), **Line Creek** (MINFILE 082GNE020), **Greenhills** (MINFILE 082JSE007, 010) and **Fording River** (MINFILE 082JSE012) operations is approximately 22.4 Mt of clean coal (predominantly metallurgical) (Figure 12). This compares with an actual production total of 18.0 Mt in 2009.

Proven and probable raw coal reserves at the five mines total 608.7 Mt; 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. Other attractive quality parameters include favourable ash chemistry, which contributes to a high Coke Strength after Reaction.

### Industrial Mineral Mines

Baymag Inc produces high-quality magnesite from its open-pit mine near **Mount Brussilof** (MINFILE



Figure 12. Burnt Ridge South pit at Teck Coal Limited's Line Creek mine.

082JNW001), in the Rocky Mountains northeast of Radium. The operation has been in production since 1982. Ore is transported by truck to the company's processing facilities in Exshaw, Alberta for production of magnesium oxide (magnesia or MgO) and magnesium hydroxide (MgOH). Production in 2010 is projected to be approximately 155 000 tonnes, an increase over 2009.

CertainTeed Gypsum Canada operates the **Elkhorn** mine (MINFILE 082JSW021), where production is mainly from the Elkhorn West Extension pit. Production is projected to be approximately 450 000 tonnes in 2010, a 15% increase over 2009. Georgia-Pacific Canada Inc operates the **4J** gypsum mine (MINFILE 082JSW009).

Silica sand is produced from a friable Ordovician quartzite in the Rocky Mountains by HCA Mountain Minerals (Moberly) Ltd at the **Moberly** mine (MINFILE 082N 001) and plant, north of Golden. Stockpiled material was shipped to several markets in 2010.

Imasco Minerals Inc produces a variety of crushed and ground rock products at its Creston Operations Plant at **Sirdar** (MINFILE 082FSE072) from limestone, dolomite, granite and quartzite rock types. Raw sources for these products include an underground dolomite mine at **Crawford Bay** (MINFILE 082FNE113), a limestone quarry at **Lime Creek** (MINFILE 082FSW307), 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. Production at the Winner quarry in 2010 totalled 80 000 tonnes.

### Southwest British Columbia – Major Mines

Breakwater Resources Ltd, through its subsidiary NVI Mining owns and operates the underground **Myra Falls** (MINFILE 092F 330) polymetallic mine on central Vancouver Island (Figure 13). By the end of the third quarter, Myra Falls Operations had milled 380 192 tonnes of 7.6% Zn, 1.3% Cu, 1.8 g/t Au, 58 g/t Ag. This equated to 25 842 tonnes Zn, 3947 tonnes Cu, 15 638 oz Au, 548 873 oz Ag in concentrate. The mine is on track to mill roughly half a million tonnes in 2010. Work is ongoing to improve metallurgical recoveries in the mill. Total cash costs per pound of zinc were reported at 31 cents, net of byproduct credits. This is down from 56 cents in 2009 and a dollar in 2008. Proven and probable reserves as of December 31, 2009 were 6.2 Mt of 5.1% Zn, 0.5% Pb, 0.9% Cu, 44 g/t Ag and 1.3 g/t Au.

**Quinsam** coal mine (MINFILE 092F 319) is expected to produce approximately 445 000 tonnes of clean coal in 2010. This is up from 390 000 tonnes in 2009. Quinsam is an underground room and pillar operation, producing thermal coal since 1986. Operator Hillsborough Resources Limited is now a part of the privately owned Vitol Group, and as such they no longer



Figure 13. Mill improvements accounted for part of the capital expenditures at Myra Falls in 2010.

release current reserve estimates. Vitol is an international energy trading company that entered the coal market in 2006. International markets (North and South America and around the Pacific Rim) now account for approximately two thirds of Quinsam's shipments, with approximately one third going to local cement plants. An application to mine a new area, the 7-South, remains under review. This is a higher sulphur coal (1.5-2% as compared to 0.5% mined to present) and storage of potentially acid generating rejects is a key consideration in the mine plan.

### ***Aggregates and Industrial Minerals***

Industrial minerals and aggregates are major components of the mining industry in the Coast Area and are for the most part linked to the construction industry. They experienced a marked decrease in demand beginning in the last quarter of 2008 which continued through 2010 with monthly variations. While there are modest improvements over 2009, a major producer reports demand is 15-20% below normalized volumes for recent years. Those depending on the western United States market have definitely felt the effects of the decline in the housing market there.

Numerous large **aggregate** operations are active in the southwest, mostly in the Fraser Valley and some along the mainland coast or on Vancouver Island. They supply material primarily to the Lower Mainland/Fraser Valley construction market where demand has been steady. Operations that had a significant focus on American markets, specifically California, have seen demand drop precipitously in the last two years. Recently, American demand has firmed up and these producers expect to have an improvement in sales. Also, as a result of the recent demand drop, these producers have marketed their products elsewhere and have met with some success. Production from government-run gravel pits is used for some infrastructure projects and has a small but significant impact on the market. Dredged river sand is

also used for some applications such as construction pre-loading. Quarries with active permits number in the hundreds.

Glacial marine clay is found in several locations on the central coast. Ironwood Clay Company Inc has a permitted quarry at **DeCosmos Lagoon** (MINFILE 092M 019) on Hunter Island. There was no mining at the quarry in 2010; however, they expect to resume early in 2011. Ironwood did extract a bulk sample from **Hvidsten Inlet** (MINFILE 092M 007) in 2010. The clay is used in the manufacture of cosmetics and skin care products. The company has manufacturing facilities in Richmond.

The **Apple Bay** chalky geysirite quarry (MINFILE 092L 150) on northern Vancouver Island is expected to produce and ship volumes similar to the previous year (80 000 to 90 000 tonnes). The silica-alumina products are sold to Ash Grove and Lafarge cement plants in Seattle and Richmond.

Imasco Minerals Inc mines a high-brightness, white calcium carbonate at its **Benson Lake** mine (MINFILE 092L 295). A typical analysis is 95% CaCO<sub>3</sub>, 4.4% MgCO<sub>3</sub>, 0.1% Fe<sub>2</sub>O<sub>3</sub>. Most of the product finds application as high-brightness white filler in paints, coating and PVC. They expected to produce approximately 29 000 tonnes in 2010 and shipped 32 000 tonnes. The quarry has been in operation for over 25 years.

Two quarries produce pumice in the **Mount Meager** (MINFILE 092JW 040) area. Great Pacific Pumice Inc was active, with 5500 cubic metres mined and 2500 cubic metres trucked. The product is sold as lightweight aggregate. Garibaldi Pumice Ltd mined approximately 30 000 cubic metres, with the majority also sold as lightweight aggregate.

The **Sumas Shale** quarry on Sumas Mountain (MINFILE 092GSE024, 092GSE004) is owned by Clayburn Industrial Group Ltd, operated by contractor Fraser Pacific Enterprises Inc and delivers most of its sandstone and shale product to cement plants in Richmond and Seattle through a joint venture with Lafarge North America (Sumas Shale Ltd). The quarry is on track to produce approximately 365 000 tonnes in 2010. Approximately 3 to 4% of the material mined is used to manufacture brick and refractory products at Clayburn's plant in Abbotsford.

Dimension stone and decorative aggregate production has been steady in the Southwest. Adera Natural Stone Supply Ltd supplies **Haddington Island** andesite (MINFILE 092L 146) from a historic quarry that re-opened in 2004 and is used in both new construction and restoration projects. **Matrix Marble and Stone** quarries (MINFILE 092E 020, 070) marble on Vancouver Island from three sites to produce numerous value-added stone products (Figure 14). The **K2 Quarry** near Port Renfrew on Vancouver Island produces a fine slate for use as building stone and as landscaping stone. **Hardy Island Granite** (MINFILE 092F 425), like Haddington, is a



Figure 14. Matrix Marble and Stone's Hisnet marble quarry.

historic quarry that was reopened in 1999. The stone is used mainly for residential and commercial construction and is distributed through Bedrock Granite Sales Ltd. Northwest Landscape and Stone Supply Ltd continues to quarry Garibaldi volcanic rock for landscaping stone at several locations, including the **Spumoni** (MINFILE 092GNW100) quarry in the Squamish-Whistler Corridor.

## MAJOR MINE DEVELOPMENT PROJECTS

### *Northwest British Columbia – Major Mine Development Projects*

The **Tulsequah Chief** development project (MINFILE 104K 002) was purchased out of receivership by Chieftain Metals Inc; the company filed a prospectus in late 2010 seeking a listing on the Toronto Stock Exchange. The previous owner, Redfern Resources Ltd, spent \$170.8 million on development of the Tulsequah Chief copper-zinc-lead-silver-gold mine during 2007 and 2008, in addition to monies spent exploring the property over the preceding 15 years. Transfer of the Environmental Assessment certificate and other permits to Chieftain is in progress. Chieftain plans to bring the interim water treatment back to the site and commence resource up-grade drilling in 2011.

Metal Mountain Resources Inc began development of the **Dome Mountain** underground gold mine (MINFILE 093L 276) through its wholly-owned subsidiary Gavin Mines Inc. A \$12 million staged financing agreement was struck with Minex Minerals Ltd. Gavin Mines has a Mines Act permit to operate at a rate of 205 t/d; ore will be shipped off-site for milling. The mine will be developed as a mechanized cut-and-fill operation with access from the existing 1290 and 1370-metre levels. Capital expenditure is estimated at \$4.3 million and start-up of underground development is scheduled for mid-2011.

The probable mineral reserve (including dilution) in the Boulder and Boulder footwall veins is 135 131 tonnes grading 11.2 g/t Au at a diluted cutoff grade of 7.9 g/t Au. The undiluted indicated resource is 144 144 tonnes

grading 17.7 g/t Au at the same cutoff. The mine operated during 1991-92 and produced 361.4 kg of gold (11 621 oz) from 30 890 tonnes of ore.

Eagle Plains Resources Ltd purchased 100% interest in 2010 in the **Yellowjacket** gold property (MINFILE 104N 043), facilitating a resumption of work in September. The project has a Mines Act permit for an open pit gold mine and onsite gravity concentrator to process up to 75 000 tonnes of ore per year. In order to define a resource for the next phase of mining, 64 reverse circulation holes were drilled in a 40 by 100 m area, to an average depth of 35 m.

### *Northwest British Columbia – Mine Evaluation Projects*

At the **Red Chris** (MINFILE 104H 005) copper-gold project, a 55 000 m program of deep exploration drilling (Figure 15) continued throughout the year while Imperial Metals Corporation developed the details of its mine plan for regulatory authorizations. A new resource estimate was announced in May that incorporated results of the first 22 holes drilled by Imperial, and a feasibility study followed in November. Reserves and resources at a 0.2% Cu cutoff are:

- Proven and Probable Reserves – 301.549 Mt at 0.359% Cu and 0.274 g/t Au;
- Measured and Indicated Resource – 489.151 Mt at 0.43% Cu and 0.42 g/t Au;
- Inferred Resource – 437.939 Mt at 0.36% Cu and 0.39 g/t Au.

Capital costs are estimated at \$443 million to develop a 30 000 t/d open-pit mine and mill and to construct a 115 km power line to connect to the proposed Northwest Transmission Line from Bob Quinn.

Redesign of the **Galore Creek** copper-gold project (MINFILE 104G 090, 092, 095) by partners Teck Corporation and NovaGold Resources Inc continued. The revised plan will involve locating the mill and tailings impoundment near Round Lake at about kilometre 75 of the access road. Geotechnical holes were drilled at either end of the proposed 14 km tunnel to link the mine to the proposed mill site. Other geotechnical, metallurgical and hydrological work was done at the proposed plant site and in Galore valley. Reactivation of mine development depends on the results of a new feasibility study and involvement with the Environmental Assessment Process. Galore Creek is a porphyry copper deposit. Measured and indicated resources total 785.7 Mt grading 0.52% Cu, 0.29 g/t Au and 4.87 g/t Ag.

Seabridge Gold Inc completed a preliminary feasibility study on its **KSM (Kerr-Sulphurets-Mitchell)** (MINFILE 104B 182) gold-copper project and anticipates submitting a joint application under the British Columbia Environmental and Canadian Environmental assessment acts in 2011. Of the 28 000 m drilled at KSM in 2010



Figure 15. Red Chris copper-gold project; looking south, deep drilling beneath the East zone.

more than half (15 400 m in 41 holes) were dedicated to the new Iron Cap deposit. Mineralization at Iron Cap (MINFILE 104B 173) was known from work by previous operators but the current work will result in a resource estimation and lead to modification of the proposed mine development. Seabridge contemplates a 120 000 to 180 000 t/d open-pit mine at an estimated capital cost of \$3.4 billion.

The measured and indicated resources of the combined Kerr, Sulphurets and Mitchell deposits are 2137 Mt grading 0.57 g/t Au and 0.21% Cu, as determined in January 2010, plus an additional 758.5 Mt of inferred resources at slightly lower grades. Ore reserves in the three deposits total more than 1600 Mt grading 0.59 g/t Au and 0.20% Cu with byproduct values in silver and molybdenum.

There was a major program at the **Schaft Creek** copper-gold-molybdenum project (MINFILE 104G 015) by Copper Fox Metals Inc to gather information required for a feasibility study and to submit a project application to the British Columbia Environmental Assessment Office. Work comprised geologic modeling that included re-logging and assaying of historic core, a 3-dimensional IP survey, and geotechnical, resource and ‘condemnation’ drilling. The feasibility study will evaluate a proposed 150 000 t/d open-pit mine. Resource drilling focused on definition of higher grade material in the Liard zone for a starter pit. The open-pit resource is 812 Mt grading 0.30%

Cu, 0.020% Mo, 0.21 g/t Au and 1.8 g/t Ag (measured and indicated) at a 0.20% Cu equivalent cutoff. A new resource estimate is expected in early 2011.

Avanti Mining Inc plans to open the past-producing **Kitsault** molybdenum mine (MINFILE 103P 120) as a new 40 000 t/d mine at an estimated capital cost of \$837 million (Figure 16). Kitsault received its “Section 11 order” under the British Columbia Environmental Assessment Process, which defines the scope of the project to be assessed and the potential effects to be considered. The Kitsault mine operated from 1967 to 1972 and from 1981 to 1982 with a total production of 13 600 tonnes of molybdenum. The site is still served by a power line and access road. Avanti and SeAH Holdings Corp, the largest steel producer in Korea, formed a strategic alliance that will fund the project through design engineering and Environmental Assessment. Work in 2010 comprised evaluation of alternate sites for a new mill and tailings impoundment, exploration of the Roundy Creek prospect aimed at identification of high-grade molybdenum, and preservation of historic drill core from the Bell Moly prospect. Kitsault has proven plus probable reserves of 232.5 Mt grading 0.081% Mo, determined in a feasibility study. In 1979, **Bell Moly** (MINFILE 103P 234) was estimated to contain 19.6 Mt grading 0.084% Mo (not NI 43-101 compliant).

At the **Kutcho Creek** copper-zinc project (MINFILE 104I 060) Capstone Mining Corporation completed



Figure 16. Kitsault molybdenum mine; proposed mill site is on top of basalt bluff on the skyline.

another preliminary economic assessment that built upon the 2009 study by focusing on early production of high grade ore from the Esso deposit. A major drilling program was undertaken that upgraded the Esso lens to an indicated resource of 1.816 Mt grading 2.69% Cu, 6.18% Zn, 0.66 g/t Au and 64.8 g/t Ag at a cutoff of 1.5% Cu.

The new resource estimate, along with new metallurgical data on the Esso lens, will be incorporated into a preliminary feasibility study. Currently, measured and indicated resources in the three lenses are estimated at 10.415 Mt 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 Mt at 2.09% Cu, 2.93% Zn, 33.6 g/t Ag and 0.46 g/t Au. Capstone contemplates development of a 2500 t/d mine at an estimated capital cost of \$133.5 million. The project continues in the pre-application stage of the Environmental Assessment Process.

The amended application to review proposed development of the **Morrison** copper-gold project was accepted by the British Columbia Environmental Assessment Office in 2010. Pacific Booker Minerals Inc proposes to build an open-pit mine to operate at 30 000 t/d. Drilling obtained material to study ARD potential of waste rock. Morrison (MINFILE 093M 007) is a porphyry copper deposit with a measured plus indicated resource of 206 869 000 tonnes grading 0.39% Cu, 0.20 g/t Au and 0.005% Mo.

For the **Mount Klappan** anthracite coal project (MINFILE 104H 020), Fortune Minerals Limited studied transportation options of moving its product to the port of Prince Rupert. The company favours gaining access for a proposed mine by upgrading the Dease Lake rail roadbed, owned by CN Rail which passes through the coal resource area, over constructing a 100 km access road from Highway 37. Fortune Minerals is searching for a partner to develop this major resource.

### ***Northeast British Columbia – Major Mine Development Projects***

The **Wolverine** mine (MINFILE 093P 015) of Western Coal Corp is involved in a recapitalization project this year. The mine has a life expectancy of 15-20 years and, this year the company is considering doing some underground mining in the **Perry Creek** (MINFILE 093P 025) area. Western Coal Corp has the **EB** (MINFILE 093P 015) and **Hermann** (MINFILE 093I 031) properties with a total of 40 Mt of proven coal reserves near the Wolverine mine. The EB pit was included in the original Environmental Assessment (EA) Certificate approval, while the Hermann property is subject to further approvals.

Teck Coal Ltd has committed to completing a feasibility study by late 2011 regarding the possible reopening of their **Quintette** (MINFILE 093P 020) mine in 2000 (Figure 17). They are also reviewing the status of the infrastructure on site, including their wash plant,



Figure 17. Quintette plant site in the fall of 2010. Teck Coal Ltd is working on a feasibility study regarding a possible reopening of their Quintette mine.

investigating the status of site permits and completing some baseline environmental work. Current plans are to focus on evaluating the 28 Mt coal resource on Mount Babcock as the source of the metallurgical coal to re-start the mine.

Peace River Coal is considering developing the **Roman Mountain** coal deposit that is adjacent to their Trend mine. It is proposed to be an open-pit mine producing 3 Mt of coal annually.

### ***North-Central British Columbia – Major Mine Development Projects***

Thompson Creek Metals Company Inc acquired the **Mount Milligan** copper-gold project (MINFILE 093N 191, 194) in 2010 by acquisition of Terrane Metals Corp and is proceeding with mine development. Mount Milligan is fully approved and permitted to build a 60 000 t/d open-pit mine estimated to cost \$915 million. Proven and probable ore reserves are stated at 482 Mt grading 0.20% Cu and 0.39 g/t Au. Construction is expected to take 2.5 years. Development work in 2010 comprised access road construction, site clearing, start on a 90 km power line and installation of a 250-man camp (to be expanded later to house 600). Thompson Creek estimates capital expenditure at Mount Milligan in 2010 at \$33 million.

Ore definition drilling at Mount Milligan (from 1990 era) was conducted primarily to a 300 m pit depth. A few deep holes show the ore zone continues beyond the planned pit depth. Recent exploration includes high-resolution airborne magnetics (in 2008) and a 50 km Titan-24 IP survey (in 2010). These surveys reveal several targets for deep mineralization that were tested in an 11 000 m drill program expected to conclude in early 2011.

The **Kemess North** deposit (MINFILE 094E 021) lies 5.5 km from Kemess South mine (Figure 18). Work



Figure 18. Kemess North, geologists and drill crew discuss drilling progress.

in 2005 delineated a resource of 720 Mt grading 0.15% Cu and 0.30 g/t Au but an open pit mine plan was not approved by Federal and Provincial regulators. Higher metal prices in 2009 prompted Northgate to reconsider the project in 2010 as an underground development. The northeast quadrant of Kemess North was targeted in a 16 000 m drill program to define this resource block better and to assess its geotechnical characteristics for possible block-cave mining. Hole KN-10-03 returned a 60 m intercept grading 0.95% Cu and 3.37 g/t Au, the highest grade from the entire Kemess property. A resource calculation is in progress.

The **Chu** molybdenum project (MINFILE 093F 001), owned by TTM Resources Inc, is in the pre-application stage of the British Columbia Environmental Assessment Process. The company contemplates an open-pit mine operating at 60 000 t/d. Measured plus indicated resources at Chu are estimated at 370.64 Mt grading 0.059% Mo and 0.035% Cu at a cutoff grade of 0.04% Mo.

### ***South-Central British Columbia – Major Mine Development Projects***

The **New Afton** mine development project (MINFILE 092INE023) of New Gold Inc continues on a schedule that will see production in 2012 (Figure 19). The



Figure 19. The Afton pit access to almost 11 km of underground development at the New Afton gold-copper project near Kamloops.

company expected to complete around 3000 m of underground development this year and by the third quarter 2479 m were completed. Having two access points (base of Afton pit and from the surface) to the underground workings has helped increase productivity. The total underground development at the site is expected to be approximately 20 000 m, and the company has approximately 11 000 m completed at year end.

Currently stated measured and indicated resources are 65.6 Mt at 1.02% Cu and 0.77 g/t Au. Probable reserves are 44.4 Mt 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 plans for resumption of mining at the **Copper Mountain** project (MINFILE 092HSE001) of Copper Mountain Mining Corporation and Mitsubishi Materials Corporation continued on schedule in 2010. The project involves the development of a super pit which incorporates three former pits and the construction of a new 35 000 t/d mill. Following the receipt of an amended *Mines Act* permit in April, the company completed the mill building, the truck maintenance shop, begun assembling the SAG and ball mills, commissioned a Komatsu shovel (Figure 20) and seven haul trucks. The company began stripping in Pit 3 as part of a push-back on the west wall which will liberate ore for the anticipated June 2011 mill start-up. This year's capital expenditures to the third quarter were \$158.7 million dollars on the project and final expenditures for the year are yet to be reported but are likely to be in excess of \$240 million. The company estimates the capital cost for the project will be \$438 million and a debt financing of \$322 million in the summer of this year finalized all the funding requirements for the project. Reported proven and probable reserves are 211 Mt of 0.36% Cu and anticipated gold and silver credits at April 2009. The mine plan forecasts copper production at 47 600 tonnes per year for the first twelve years and a 17-year mine life.

### ***Southeast British Columbia – Major Mine Development Projects***

Teck Coal Limited continued baseline environmental and other studies at **Line Creek** Operations' Phase 2



Figure 20. The first massive Komatsu PC 8000 production shovel was commissioned at the Copper Mountain mine development site in November, 2010 (photo courtesy of Copper Mountain Mining Corporation).

Expansion Project. The proposed expansion, which encompasses **Mount Michael** (MINFILE 082GNE022) and **Burnt Ridge North** (MINFILE 082JSE001), would extend Line Creek's production activities to the north of currently active pits. The project is in the pre-application stage of the Environmental Assessment Process, and an application is anticipated in late 2011. Burnt Ridge North

was the site of a large fill-in rotary exploration drilling program in 2010.

Teck Coal Limited also continued studies at Elkview Operations' proposed **Baldy Ridge** development (MINFILE 082GNE016). The Baldy Ridge proposal, which is below the threshold for the Environmental Assessment Process, has been scaled back for the time being to a single proposed pit known as the BR2. An application for the BR2 pit is anticipated in 2011. At Fording River, the Henretta Pit was the site of engineering studies and drilling by Teck Coal Limited related to the proposed (approved) pushback of a pit highwall.

### ***Southwest British Columbia – Mine Evaluation Projects***

Compliance Energy Corporation's **Raven** metallurgical coal project (MINFILE 092F 333) on Vancouver Island is in both federal and provincial environmental assessment processes (Figure 21). They published results of a pre-feasibility study in 2010. Measured and indicated resources total 72.0 Mt. A full feasibility study is ongoing. Under consideration is an approximately 2 million tonnes per year underground room and pillar operation. On Howe Sound, BURNCO Rock products Ltd's **McNab** Valley Aggregate project is also at the feasibility stage and in federal and environmental review processes. Under consideration is a sand and gravel operation producing in excess of one million tonnes per year.

## **MAJOR EXPLORATION HIGHLIGHTS ACROSS BRITISH COLUMBIA**

Exploration in British Columbia rose sharply in 2010. Following the economic slowdown of 2008, exploration in 2009 lagged substantially. However, in the last months of that year, exploration work showed a modest rise. That strengthened into the 2010 season and is reflected in the



Figure 21. View overlooking the proposed plant site for the Raven Coal.

doubling of exploration spending year over year; from \$154 to \$322 million. Also, the type of exploration changed. In 2009, most work was done on more developed properties with known potential. Exploration in 2010 ran the gamut from mine site extension of reserves/resources through known plays right to new, grass roots endeavours. 2010 saw the return of major mining companies doing regional/grassroots work and included both Teck and Xstrata. Overall, projects ranged in size from small, prospecting programs through to multimillion dollar resource development programs. The Skeena and Thompson districts carried the greatest amount of exploration but, all regions saw significant activity (Table 3).

## NORTHWEST BRITISH COLUMBIA

The historic **Engineer** gold mine (MINFILE 104M 014) on Tagish Lake was explored by BCGold Corp. Engineer comprises epithermal veins near the Llewellyn fault that produced 560 kg of gold mainly in the 1920s. In 2010, underground drilling was conducted from 5-level, the principal mine access.

The **Silvertip** high grade silver manto prospect (MINFILE 104O 038) was purchased by Silvercorp Metals Inc for \$15 million; installation of an all-season 49-man camp and a major exploration program followed. Mineral resources calculated in March were derived from historic work are Indicated – 2 349 055 tonnes at 352 g/t Ag, 6.73% Pb, 9.41% Zn and 0.54 g/t Au and, Inferred – 459 896 tonnes at 343 g/t Ag, 6.18% Pb, 9.81% Zn and 0.23 g/t Au. Work comprised a property-wide VTEM survey and nearly 11 000 m of surface drilling focused on the east and south margins of the resource area. Silvercorp is conducting baseline and engineering studies necessary to submit an application for a small mine.

Drilling focused on contact mineralization east of the Discovery zone and targeted an area where historic intercepts were too widely spaced to be included in the resource estimate (Figure 22). Significant intercepts include hole EW3-10-22, which cut 696 g/t Ag, 12.96% Pb and 14.48% Zn over 2.51 m. A new zone was discovered 300 m south of the 65 zone. Hole EW8.4-10-28 recorded two intercepts: 286 g/t Ag, 4.63% Pb and 11.59% Zn over 4.10 m, and a 13.3 m interval averaging 289 g/t Ag, 5.33% Pb and 8.65% Zn.

Columbia Yukon Resources Inc consolidated the ground position necessary to develop the **Storie** deposit (MINFILE 104P 069) near Cassiar. Three holes were drilled on claims optioned from Eveready Resource Corp that cover potential mill and tailings sites. A draft Project Description was submitted to the British Columbia Environmental Assessment Office. The measured plus indicated resource at Storie is 139.82 Mt grading 0.064% Mo. The inferred resource is 58.39 Mt grading 0.059% Mo; all resources are at a cutoff of 0.03% Mo.

**Turnagain** is a bulk-tonnage nickel prospect

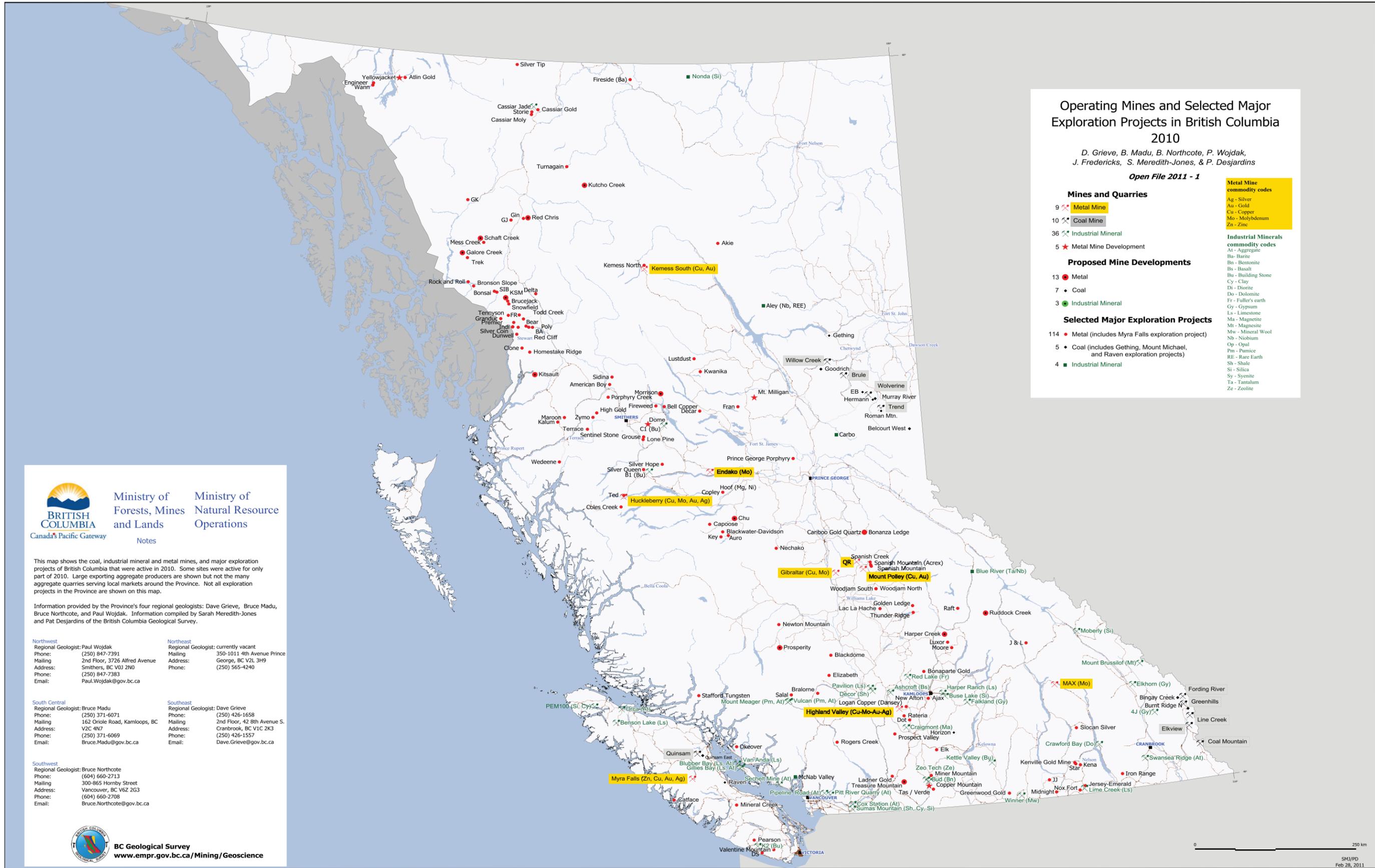


Figure 22. Drilling east on the Silvertip project to extend the Discovery zone eastward.

(MINFILE 104I 014, 119) in a zoned ultramafic complex owned by Hard Creek Nickel Corporation. Measured plus indicated nickel sulphide resources are estimated at 695 Mt at a grade of 0.174% Ni and 0.014% Co. The company had envisaged an on-site hydrometallurgical facility with a very large capital cost and large power requirement. Recent work has focused on production of a direct-shipping concentrate. Metallurgical test work on a composite sample graded 0.33% Ni. Flotation yielded 50% nickel recovery in a concentrate grading a minimum 25% Ni. The iron to magnesium ratio, a critical parameter of nickel concentrates, is within acceptable limits for smelting. Further test work is ongoing.

On the **SIB** property, Eskay Mining Corp drilled five, 700 to 800 m deep drillholes in search of the fault-displaced continuation of Eskay Creek-type stratiform gold and silver-rich massive sulphides. In 2008, the Lulu zone (MINFILE 104B 376) returned a 10 m drill intercept grading 9.0 g/t Au, 405 g/t Ag and 0.19% Zn in a succession directly correlative with the rich Eskay Creek deposit. No significant mineralization was found but success in solving displacement on the Coulter Creek thrust fault provides confidence to continue the program.

Copper Creek Gold Corp explored the **Bonsai** prospect (MINFILE 104B 383). Stratabound massive pyrite at Bonsai is associated with rhyolite and Salmon River formation mudstone, a similar stratigraphic position to mineralized zones at Eskay Creek. Eleven deep holes in



### Operating Mines and Selected Major Exploration Projects in British Columbia 2010

D. Grieve, B. Madu, B. Northcote, P. Wojdak,  
J. Fredericks, S. Meredith-Jones, & P. Desjardins

*Open File 2011 - 1*

<b>Mines and Quarries</b>		<b>Metal Mine commodity codes</b> Ag - Silver Au - Gold Cu - Copper Mo - Molybdenum Zn - Zinc
9	Metal Mine	
10	Coal Mine	<b>Industrial Minerals commodity codes</b> Ai - Aggregate Ba - Barite Bs - Basalt Bu - Building Stone Cy - Clay Di - Diomite Do - Dolomite Fr - Fuller's earth Gy - Gypsum Ls - Limestone Ma - Magnetite Mt - Magnetite Mw - Mineral Wool Nb - Niobium Op - Opal Pm - Pumice RE - Rare Earth Sh - Shale Si - Silica Sy - Syenite Ta - Tantalum Ze - Zeolite
36	Industrial Mineral	
5	Metal Mine Development	
<b>Proposed Mine Developments</b>		
13	Metal	
7	Coal	
3	Industrial Mineral	
<b>Selected Major Exploration Projects</b>		
114	Metal (includes Myra Falls exploration project)	
5	Coal (includes Gething, Mount Michael, and Raven exploration projects)	
4	Industrial Mineral	

**Ministry of Forests, Mines and Land Operations**

**Ministry of Natural Resource Operations**

Notes

This map shows the coal, industrial mineral and metal mines, and major exploration projects of British Columbia that were active in 2010. Some sites were active for only part of 2010. Large exporting aggregate producers are shown but not the many aggregate quarries serving local markets around the Province. Not all exploration projects in the Province are shown on this map.

Information provided by the Province's four regional geologists: Dave Grieve, Bruce Madu, Bruce Northcote, and Paul Wojdak. Information compiled by Sarah Meredith-Jones and Pat Desjardins of the British Columbia Geological Survey.

<b>Northwest</b> Regional Geologist: Paul Wojdak Phone: (250) 847-7391 Mailing Address: 2nd Floor, 3726 Alfred Avenue, Smithers, BC V0J 2N0 Phone: (250) 847-7383 Email: Paul.Wojdak@gov.bc.ca	<b>Northeast</b> Regional Geologist: currently vacant Mailing Address: 350-1011 4th Avenue Prince George, BC V2L 3H9 Phone: (250) 565-4240
<b>South Central</b> Regional Geologist: Bruce Madu Phone: (250) 371-6071 Mailing Address: 162 Oriole Road, Kamloops, BC V2C 4K7 Phone: (250) 371-6069 Email: Bruce.Madu@gov.bc.ca	<b>Southeast</b> Regional Geologist: Dave Grieve Phone: (250) 426-1658 Mailing Address: 2nd Floor, 42 8th Avenue S, Cranbrook, BC V1C 2K3 Phone: (250) 426-1557 Email: Dave.Grieve@gov.bc.ca
<b>Southwest</b> Regional Geologist: Bruce Northcote Phone: (604) 660-2713 Mailing Address: 300-865 Hornby Street, Vancouver, BC V6Z 2G3 Phone: (604) 660-2708 Email: Bruce.Northcote@gov.bc.ca	

**BC Geological Survey**  
www.empr.gov.bc.ca/Mining/Geoscience

**TABLE 3. MAJOR EXPLORATION PROJECTS IN BRITISH COLUMBIA, 2010**

Property	Operator	MINFILE (or NTS)	Commodity	Deposit Type	Work Program	Region
Afton Area (West Ajax, East Ajax)	Abacus Mining and Exploration Corp / KGHM	092INE012, 013, 028, 030	Cu, Au, Ag, Pd	Porphyry	FS, ES, DD (~20 000 m), GD	Thompson-Okanagan-Cariboo
Akie	Canada Zinc Metals Corp	094F 031	Zn, Pb, Ag	Massive Sulphide	DD (6228 m, 13 holes); A	Omineca
Aley	Taseko Mines Limited	094B 027	Nb, REE	Carbonatite	G; DD (4516 m, 23 holes)	Omineca
American Boy	TAD Capital Corp	093M 047	Ag, Au	Intrusion Vein	DD (703 m, 8 holes)	Skeena
Atlin Gold	Blind Creek Resources Ltd	104N 044	Au	Orogenic Vein	DD (1568 m, 11 holes)	Skeena
Auro	Gold Reach Resources Ltd	(093F.017)	Au	Epithermal vein	AB (1598 km); G; 3D-IP (80 km); GC (3000 soil)	Omineca
BA	Great Bear Resources Ltd	104A 178	Ag, Zn, Pb	VMS	G; AB-EM (1000 km) ; DD (15 000 m, 85 holes)	Skeena
Bear	Auramex Resource Corp	104A 024	Au	Vein	DD (1295 m, 3 holes)	Skeena
Bell Copper	Xstrata Copper Canada Ltd	093M 001	Cu, Au	Porphyry	DD (3400 m, 6 holes)	Skeena
Big Missouri & Dilworth	Ascot Resources Ltd	104B 044, 092	Au, Ag	Epithermal Vein	DD (21 711 m, 68 holes)	Skeena
Bingay Creek	Centremount Coal Ltd	082JSE011	Coal	Sedimentary	G, RC (18 809 m), DD, TR	Kootenay-Boundary
Blackdome Mine	Sona Resource Corp	092O 053, 051, 052	Au, Ag	Vein / Breccia	DD, G, GC, PFS	Thompson-Okanagan-Cariboo
Blackwater Davidson	Richfield Ventures Corp	093F 037	Au	Vein	DD (~20 000 m); A (20 km); IP	Omineca
Blue River Tantalum/Niobium (Upper Fir)	Commerce Resources Corp	083D 005, 035	Ta, Nb	Magmatic	DD (~7000 m), G, PFS, MS	Thompson-Okanagan-Cariboo
Bonanza Ledge	Barkerville Gold Mines Ltd	093H 019	Au	Vein / Breccia	ES, DD (~3000 m), TR,	Thompson-Okanagan-Cariboo
Bonaparte Gold	Encore Renaissance Resources Corp	092P 050	Au	Vein / Breccia	UG, BS	Thompson-Okanagan-Cariboo
Bonsai	Copper Creek Gold Corp	104B 383	Au, Ag, Zn, Cu	VMS	3D-IP (10.6 km); DD (3461 m, 11 holes)	Skeena
Bralorne Camp	Bralorne Gold Mines Ltd	092JNE164, 001	Au, Ag	Vein / Breccia	UG, G	Thompson-Okanagan-Cariboo
Bronson	Skyline Gold Corp	104B 077, 004	Au, Cu, Fe	Porphyry, Vein	G; DD (3144 m)	Skeena
Brucejack	Pretium Resources Inc	104B 193, 196	Au, Ag	Epithermal, Porphyry	G; DD (33 100 m, 73 holes)	Skeena
Brynnor	Logan Resources Ltd	092F 001	Fe (magnetite)	Fe skarn	G; MG (5.5 km)	Coast Area
Burnt Ridge North	Teck Coal Limited (Line Creek Operations)	082JSE001	Coal	Sedimentary	A, G, RC (8148 m), EN	Kootenay-Boundary
Cabin	Paget Minerals Corp	093F 038	Au, Ag	Epithermal	IP; MG; DD (1418 m, 10 holes)	Omineca
Capoose	Silver Quest Resources Ltd	093F 040	Ag, Au	Vein	MG (115 km); IP (10 km); DD (10 590 m, 37 holes)	Omineca
Captain	Orestone Mining Corp	093J 026	Cu, Au	Porphyry	GC (soil); IP (2 km); DD ?	Omineca
Carbo	Canadian International Minerals	093J 014	REE	Industrial	AB-MG-RD; G; GC; DD	Omineca
Cariboo Gold Quartz	Barkerville Gold Mines Ltd	093H 019	Au	Vein / Breccia	DD	Thompson-Okanagan-Cariboo
Cassiar Gold	Hawthorne Gold Corp	104P 012	Au	Orogenic Vein	AB-EM	Skeena
Cassiar Moly	Velocity Minerals Ltd	104P 035	Mo	Porphyry	DD (1398 m, 3 holes)	Skeena
Catface	Imperial Metals Corporation	092F 120, 231, 251	Cu, Mo, Ag	Porphyry Cu	DD (3548 m, 13 holes); A; G	Coast Area
Chist	Paget Minerals Corp	103I 185	Cu, Zn, Au, Ag	VMS	G; P	Skeena
Chu	TTM Resources Inc	093F 001	Mo	Porphyry	GC (4430 samples); MS; DD (1162 m, 6 holes)	Omineca
Clone	Canasia Industries Corp	103P 251	Au	Shear Vein	DD (1354 m, 16 holes); BU (34 tonnes)	Skeena
Clubine	Klondike Gold Corp	082FSW200	Au, Ag, Cu	Vein	DD (600 m)	Kootenay-Boundary
Coles Creek	Callinan Mines Ltd	93E 041	Au, Ag	Epithermal	GC; IP (60 km); DD (7069 m, 20 holes)	Skeena
Copley	Kootenay Gold Corp		Au	Epithermal	GC; DD (1000 m, 11 holes)	Omineca
Copper Mountain (Exploration)	Copper Mountain Mining	092HSE001, 024	Cu, Au	Porphyry	DD (~10 000 m)	Thompson-Okanagan-Cariboo
Decar	Cliffs Natural Resources Inc	093K 041	Ni	Disseminated	G; MG; IP; DD (2430 m, 10 holes)	Omineca
Deer Creek	Kootenay Gold Inc and Northern Vertex Capital Inc	(082E/8E)	Au	Vein	DD (500 m)	Kootenay-Boundary
Delta	Frontline Gold Corp	104A 165, 166	Cu, Zn, Au, Ag	VMS	GC; AB-EM (1421 km)	Skeena
Dome	Gavin Mines Ltd	093L 022	Au	Orogenic Vein	DD (4724 m, 33 holes); A; FS	Skeena
Dot	Dot Resources Ltd	092ISE023, 019,	Cu, Au, Ag	Porphyry	DD (~1000 m)	Thompson-Okanagan-Cariboo
DS Copper-Gold	New Shoshoni Ventures Ltd	(092C.050)	Cu, Au	Breccia	G; MG, IP, UTEM; DD	Coast Area
Dunwell	Mountain Boy Minerals Ltd	103P 052	Ag, Au	Vein	DD (8021 m, 50 holes)	Skeena
Elizabeth	Sona Resources Corp	092O 012	Au, Ag, Cu, Mo	Vein / Breccia	R, DD (~3000 m), UG	Thompson-Okanagan-Cariboo
Elk (Siwash North)	Almaden Minerals Ltd	092HNE096	Au, Ag	Vein / Breccia	DD (~8000 m), PEA	Thompson-Okanagan-Cariboo
Elkview	Teck Coal Limited	082GNE017	Coal	Sedimentary	RC (10 793 m), EN	Kootenay-Boundary
Elsiar	Eagle Plains Resources Ltd	103I 229	Au	Intrusion Vein	G; GC	Skeena
Endako	Thompson Creek Metals	093K 006	Mo	Porphyry	DD (13 778 m, 91 holes)	Skeena
Engineer	BCGold Corp	104M 014	Au	Epithermal Vein	DD (1308 m, 13 holes)	Skeena
Eva Lake	New Pacific Metals Corp	104N 017	Zn	Unknown	G; AB-EM	Skeena
Fireweed	Shamrock Enterprises Inc	093M 151	Ag, Zn, Pb	Manto, Vein	DD (1854 m, 11 holes)	Skeena

**TABLE 3. CONTINUED**

Property	Operator	MINFILE (or NTS)	Commodity	Deposit Type	Work Program	Region
FR	Mountain Boy Minerals Ltd	104A 112	Au, Ag	Vein	DD (695 m, 5 holes)	Skeena
Fran	Yankee Hat Minerals Ltd	093K 108	Au, Cu	Vein	DD (up to 10 000 m ?)	Omineca
Galore Creek	Galore Creek Mining Corp	104G 090	Cu, Au	Porphyry	EN; MS; GD (4531 m)	Skeena
Georgie River	Auramex Resources	103O 013	Au	Vein	G; AB-EM (681 km)	Skeena
Gin	C.J.L Enterprises Ltd	104H 031	Cu, Au	Porphyry	P; GC; IP	Skeena
GJ	Teck Resources Limited	104G 034	Cu, Au	Porphyry	G; IP (27 km)	Skeena
GK	Strategic Metals Ltd	104G 003	Cu, Au	Porphyry	GC; DD (928 m)	Skeena
Golden Ledge (Art-DL, Deception Ledge)	Happy Creek Minerals Ltd		Au, Ag	Vein / Breccia	G, GC, DD (11 holes ~2000 m)	Thompson-Okanagan-Cariboo
Granduc	Castle Resources Inc	104B 021	Cu, Ag, Au	VMS	DD (8223 m, 18 holes)	Skeena
Greenwood Gold	Grizzly Discoveries Inc	082ESE034, 147, 174, 082ESW231	Au, Ag, Cu, Mo, Zn, Pt	Vein, Skarn, Intrusion-related	P, G, GC, MG, EM, AB-EM, DD (4000 m)	Kootenay-Boundary
Grouse Mtn	Bard Ventures Ltd	093L 026, 251	Cu, Mo, Au	Porphyry ?	G; GC	Skeena
Harper Creek	Yellowhead Mining Inc	082M 008, 009	Cu, Ag, Au, Zn, Mo	Massive Sulphide	PFS, ES, DD (~4000 m)	Thompson-Okanagan-Cariboo
Harry	Teuton Resources Corp	(104B.020)	Au	Vein	DD	Skeena
High Gold	Argonaut Exploration Inc	093L 076	Cu, Mo, Au	Porphyry	G; IP (13 km); TR (171 m); DD (2542 m, 9 holes)	Skeena
Highland Valley Mine Homestake	Teck Highland Valley Copper Bravo Gold Corp	092ISE013 103P 216, 091	Cu, Mo Au, Ag, Cu	Porphyry Epithelial Vein	DD (~7000 m) GC; DD (17 924 m, 48 holes)	Thompson-Okanagan-Cariboo Skeena
Hoof	Porpoise Bay Minerals Ltd	093G 018	Mg, Ni	Industrial	A (2.7 km)	Omineca
Huckleberry	Huckleberry Mines Ltd	093E 037	Cu, Mo	Porphyry	GC, IP; DD (4400 m, 21 holes)	Skeena
Indi	Nanika Resources Inc	104B 402	Au, Ag	Epithelial Vein	DD	Skeena
Iron Range	Eagle Plains Resources Ltd and Providence Capital Corp	082FSE014 to 028	Au, Zn, Pb, Fe, Cu	IOCG, SEDEX	DD (3337 m)	Kootenay-Boundary
J & L	Merit Mining Corp	082M 003	Au, Ag, Pb, Zn	Sedimentary Replacement	UG-DD (3500 m)	Kootenay-Boundary
Jersey-Emerald	Sultan Minerals Inc	082FSW009, 010, 011, 059, 218	W, Zn, Pb, Mo, Au	Skarn (W, Au), Sedimentary Replacement (Pb, Zn), Porphyry (Mo)	GC, TR, DD (555 m)	Kootenay-Boundary
Jumping Josephine (JJ)	Astral Mining Corp and Kootenay Gold Inc	082ESE275	Au	Vein	DD (5500 m), TR	Kootenay-Boundary
Kalum	Eagle Plains Resources Ltd	103I 228	Au	Intrusion Vein	G; DD (420 m, 6 holes)	Skeena
Kemess North	Northgate Minerals Corp	094E 094	Cu, Au	Porphyry	DD (16 439 m)	Omineca
Kena	Sultan Minerals Inc	082FSW237, 332,	Au, Cu	Porphyry	IP, DD (1400 m)	Kootenay-Boundary
Kenville Gold Mine (Nelson Mining Camp project)	Anglo Swiss Resources Inc	082FSW086	Au, Cu	Vein, Porphyry	AB-EM, DD, UG-DD (5850 m)	Kootenay-Boundary
Key	Troymet Exploration Corp	093F 069	Au	Epithermal	G; P; IP; GC (soil)	Omineca
Kitsault	Avanti Mining Inc	103P 120	Mo	Porphyry	G; A; EN; PF; DD (24 12 m)	Skeena
Krof	Nomad Ventures Inc	092HNNW070	Cu, Zn, Au, Ag	VMS	GC (soil); DD (585m)	Coast Area
KSM	Seabridge Gold Inc	104B 103, 176	Au, Cu, Mo, Re	Porphyry	EN; MS; FS; DD (28 209 m, 90 holes)	Skeena
Kutcho Creek	Capstone Mining Corp	104I 060	Cu, Zn, Au, Ag	VMS	DD (17 970 m, 34 holes);	Skeena
Kwanika	Serengeti Resources Inc	093N 073	Cu, Au	Porphyry	DD (7600 m, 31 holes)	Omineca
Lac La Hache (Aurizon), Ladner Gold	GWR Resources Inc Module Resources Incorporated	092P 001, 002, (093L.094)	Cu, Au, Fe, Ag Au	Porphyry Veins	DD (~7000 m), TR, GC, A; DD (900 m, 5 holes); MS	Thompson-Okanagan-Cariboo Coast Area
LCS	W. Lychak Contracting Ltd	(093L.094)	Cu	Redbed	DD (300 m, 6 holes)	Skeena
Logan Copper (Dansey)	Logan Copper Inc	092ISE012, 190	Cu, Mo, Ag	Porphyry	DD (~1500 m)	Thompson-Okanagan-Cariboo
Lone Pine	Bard Ventures Ltd	093L 027, 028	Mo	Porphyry	A; DD (3427 m, 9 holes);	Skeena
Lorraine	Teck Resources Limited	093N 002	Cu, Au	Porphyry	G; GC (soil)	Omineca
Lustdust	Alpha Gold Corp	093N 009, 044	Au, Cu	Skarn	DD (? m)	Omineca
Luxor	Kingsman Resources Inc	082M 062,	Mo	Porphyry	R, TR, DD (1066 m), P, GC	Thompson-Okanagan-Cariboo
Maroon	WCB Resources Ltd	103I 030	Au	Vein	TR; DD (599 m, 6 holes)	Skeena
MAX	Roca Mines Inc	082KNW087	Mo	Porphyry	UG-DD (1500 m)	Kootenay-Boundary
McNab Valley	BURNCO Rock Products Ltd	(092G.053)	Aggregate	Sand and Gravel	PD (230 M); EN; FS	Coast Area
Midnight (Rossland project)	West High Yield (W.H.Y.)	082FSW 119, 116,	Au, Mg, Ni	Vein, Ultramafic	DD (1698 m)	Kootenay-Boundary
Miner Mountain	Sego Resources Inc	092HSE078, 203	Cu, Au, Ag	Porphyry	TR; DD (~1500 m)	Thompson-Okanagan-Cariboo
Mineral Creek	Bitterroot Resources Ltd / Mineral Creek Ventures Inc	092F 078, 079, 331	Au, Ag	Veins	AB-EM (400 km); GC (soil); UG-BU	Coast Area
Moore	Almo Capital Corp	082M 051	Cu, Pb, Zn, Ag, Mo	Massive Sulphide	DD (~3500 m)	Thompson-Okanagan-Cariboo
Morrison	Pacific Booker Minerals Inc	093M 007	Cu, Au	Porphyry	DD (1451 m, 12 holes)	Skeena
Mount Polley (Exploration)	Mount Polley Mining Corporation	093A 008, 164	Cu, Au	Porphyry	DD (~45 000 m), TR, G, UG	Thompson-Okanagan-Cariboo
Mt Milligan	Thompson Creek Metals Company Inc	093N 194	Au, Cu	Porphyry	DD (~8000 m); IP (Titan-24, 50 km)	Omineca

TABLE 3. CONTINUED

Property	Operator	MINFILE (or NTS)	Commodity	Deposit Type	Work Program	Region
Newton Mountain	Amarc Resources Ltd	092O050	Au, Cu	Porphyry	DD, GC, GP-AB	Thompson-Okanagan-Cariboo
NIC	Compliance Energy Corporation	092L 266	Cu, Mo	Porphyry Cu-Mo	AB; G; GC (silt, soil)	Coast Area
Nonda	Stikine Energy Corp	(094N.083)	Industrial Mineral	Industrial Mineral	BU (450 t); Pilot Plant; P; G	Omineca
Nox Fort	Jaxon Minerals Inc	082FSW002	Au, Bi, Te, Pb, Zn, W, Mo	Intrusion-related	DD (1581 m)	Kootenay-Boundary
OK	Eastfield Resources Ltd/Prophecy Resource Corp	092K 008, 057, 155	Cu, Mo	Porphyry Cu-Mo	GC (740 soil); IP (linecutting)	Coast Area
Pearson	Pacific Iron Ore Corporation	092C 022, 023, 025	Fe (magnetite)	Fe skarn	DD (9100 m, 32 holes); EN	Coast Area
Poly	Frontline Gold Corp	027 no1 104A 177	Au, Ag	VMS	AB-EM (305 km); GC	Skeena
Porphyry Creek	Duncastle Gold Corp	093M 061	Cu, Au	Porphyry	AB-EM, MG, RD (514 km); DD (1360 m, 3 holes)	Skeena
Prince George Porphyry	Xstrata Copper Canada Ltd	(093J.015, 025)	Cu, Au	Porphyry	GC; G; DD (~1500? m)	Omineca
Prospect Valley (Discovery)	Altair Ventures Incorporated		Au, Ag	Vein / Breccia	DD (~3000 m), G, P	Thompson-Okanagan-Cariboo
Prosperity (Exploration)	Taseko Mines Ltd	092O 041	Cu, Mo, Au	Porphyry	FS, ES, MS	Thompson-Okanagan-Cariboo
QR (Exploration)	Barkerville Gold Mines Ltd	093A 121	Au	Skarn	DD;UG, DD, FS	Thompson-Okanagan-Cariboo
Quinsam East	Hillsborough Resources Ltd	(092F.094)	Coal	Sedimentary	A; DD; PD; (1400 m, 12 holes)	Coast Area
Raft (Ready Mix)	Newmac Resources Inc	082M 056	Au, Ag, W	Magmatic	GC, P, GP-EM, TR, DD	Thompson-Okanagan-Cariboo
Rateria	Happy Creek Minerals Ltd	092ISE092, 150,	Cu, Mo	Porphyry	DD (~3000 m)	Thompson-Okanagan-Cariboo
Raven	Comox Joint Venture (Compliance Energy Corporation, Itochu Corporation, LG International Corp)	092F 333	Coal	Sedimentary	R; CQ; EN; FS	Coast Area
RC South	Bolero Resources Corp	104H 011	Cu, Au	Porphyry	GC; IP (55 km)	Skeena
Red Chris	Imperial Metals Corp	104H 005	Cu, Au	Porphyry	CD; GD; DD (55 000 m); FS	Skeena
Red Cliff	Mountain Boy Minerals Ltd	104A 033	Au	Vein	DD (8929 m, 57 holes)	Skeena
Red Cliff East	Nanika Resources Inc	104A 035	Au	Vein	DD (1100 m, 8 holes)	Skeena
Reed	Pacific Bay Minerals Ltd	104P 021	Zn, Pb, Ag, Mo	Skarn	TR (107 m)	Skeena
Rock and Roll	Pacific Northwest Capital Corp	104B 377	Ag, Au, Zn, Cu	VMS	G	Skeena
Rogers Creek	Miocene Metals Limited	(092J.008, 009)	Cu, Au, Ag, Mo	Porphyry Cu	AB; DD (1100 m, 2 holes)	Coast Area
Ruddock Creek (Exploration)	Imperial Metals Corp	082M 082, 083	Zn, Pb, Ag	Massive Sulphide	DD (~1800 m), UG (400 m)	Thompson-Okanagan-Cariboo
Salal Creek	Miocene Metals Limited	092JW 005	Mo	Porphyry Mo	AB; GC (rock channel); P; DD (~800 m, 2 holes)	Coast Area
Schaft Creek	Copper Fox Metals Inc	104G 015	Cu, Mo, Au	Porphyry	IP (66 km); EN; GD; DD	Skeena
Shasta Mine	Sable Resources Ltd	094E 050	Au	Vein	mining activity	Omineca
SIB	Eskay Mining Corp	104B 376	Au, Ag, Zn, Cu	VMS	G; DD (3857 m, 5 holes)	Skeena
Sidina	TAD Capital Corp	093M 038	Au, Ag	Vein	DD (804 m, 6 holes)	Skeena
Silver Coin	Jayden Resources Inc	104B 150	Au, Ag, Pb, Zn	Epithermal Vein	DD (2801 m, 18 holes)	Skeena
Silver Hope	Finlay Minerals Ltd	093L 256	Cu, Mo, Ag	Porphyry	DD (2036 m, 6 holes)	Skeena
Silver Queen	New Nadina Explorations Limited	093L 002	Cu, Zn, Au, Ag	Porphyry, Vein	GP; DD (4110 m, 26 holes)	Skeena
Silvertip	Silvercorp Metals Inc	104O 038	Ag, Pb, Zn, Au	Manto	G; AB-EM (4114 km); DD (10 913 m, 36 holes); EN	Skeena
Slocan Silver	Klondike Silver Corp	082FNW013, 043, 050	Ag, Pb, Zn	Vein	G, P, GC, TR, DD (1750 m), UG (100 m)	Kootenay-Boundary
Snowfield	Pretium Resources Inc	104B 179	Au, Cu, Mo, Re	Porphyry	GD; MS; PF; DD (17 976 m)	Skeena
Spanish Mountain	Spanish Mountain Gold Ltd	093A 043	Au	Vein / Breccia	DD (~5000 m), MS, GD	Thompson-Okanagan-Cariboo
Spanish Mountain (Acrex)	Acrex Ventures Ltd	093A 043	Au	Vein / Breccia	TR (6), DD (~1500 m), GC	Thompson-Okanagan-Cariboo
Stafford Lake	Dentonia Resources Ltd	(092K.073, 074, 083, 084)	W	W skarn	AB-MG (565 km); GC (rock panel); G	Coast Area
Star	Valterra Resource Corporation	082FSW083, 084,	Au, Ag, Cu	Vein, Porphyry	P, DD (3000 m)	Kootenay-Boundary
Storie	Columbia Yukon Explorations Inc	104P 069	Mo	Porphyry	EN; DD (763 m, 3 holes)	Skeena
Sweeney	Nanika Resources Inc	093E 076	Cu, Mo	Porphyry	DD (718 m, 2 holes)	Skeena
Tas / Verde	Supreme Resources Ltd	092HSE193, 192	Cu, Ag, Au, Zn	Porphyry	DD (~662 m); GC, G, TR,	Thompson-Okanagan-Cariboo
Tatsamenie	Nakina Resources Ltd	104K 137	Au	Carlin	G; GC	Skeena
Ted	Nanika Resources Inc	093E 086	Cu, Mo	Porphyry	DD (1274.8 m, 4 holes)	Skeena
Tennyson	Teuton Resources Corp	104B 167	Cu, Au	Porphyry	DD (1698 m, 10 holes)	Skeena
Thunder Ridge (Spanish Creek)	Spanish Mountain Gold Ltd	(092P.098)	Au	Vein / Breccia	DD (1797 m)	Thompson-Okanagan-Cariboo
Todd Creek	Orestone Mining Corp	104A 001	Cu, Zn, Au, Ag	VMS	AB-EM (2172 km)	Skeena
Treasure Mountain (Exploration)	Huldra Silver Inc	092HSW016, 018	Ag, Pb, Zn	Vein / Breccia	TR, PFS, DD (~600 m)	Thompson-Okanagan-Cariboo
Trek	Romios Gold Resources Inc	104G 022	Cu, Au	Porphyry	G; GC; 3D-IP; DD (3975 m, 8 holes)	Skeena
Turnagain	Hard Creek Nickel Corp	104I 119	Ni, Co, Pt	Magmatic	MS; PF; DD (410 m, 2 holes)	Skeena
Valentine Mountain	Mill Bay Ventures Inc	092B 108	Au	Veins	DD (1775 m, 10 holes); TR	Coast Area
Voigtberg	BC Gold Corp	104G 146	Au, Cu	Porphyry	G; GC; P	Skeena

TABLE 3. CONTINUED

Property	Operator	MINFILE (or NTS)	Commodity	Deposit Type	Work Program	Region
Wedeeene	Decade Resources Ltd	103I 169	Cu, Au	Vein, Porphyry	DD (5325 m, 19 holes)	Skeena
Wicheeda	Spectrum Mining Corp	093J 014	Ce, La, Nd	Carbonatite	MS (400 kg); GC (soil)	Omineca
Wild Rose	Golden Dawn Minerals Inc	082ESE116	Au, Cu, Ag	Vein, Porphyry	DD (2000 m)	Kootenay-Boundary
Wildcat	Cayden Resources Inc	093N 228	Cu, Au	Porphyry	AB-EM-MG (310 km)	Omineca
Woodjam North	Gold Fields Horsefly Exploration Corporation	093A 078	Cu, Au	Porphyry	DD (14 613 m), GP-IP	Thompson-Okanagan-Cariboo
Woodjam South	Gold Fields Horsefly Exploration Corporation	093A 078	Cu, Au	Porphyry	DD (7295 m), GP-IP, GP-MAG	Thompson-Okanagan-Cariboo
Yellow Chris	Teuton Resources Corp	(104H.061)	Cu, Au	Porphyry	AB-EM	Skeena
Yellow Jacket	Eagle Plains Resources Ltd	104N 043	Au	Orogenic Vein	G; RC (2206 m, 64 holes)	Skeena
Zymo	Eastfield Resources Ltd	093L 324	Cu, Au	Porphyry	P; GC; IP (25 km)	Skeena

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 2010 program tested geophysical targets. Flow banded, brecciated rhyolite containing disseminated sulphide and geochemically anomalous silver was intersected.

Silver Standard Resources Inc continued a major program on the **Brucejack-Snowfield** property completing a total of 51 000 m of diamond drilling. After the field season, Pretium Resources Inc agreed to purchase the Brucejack-Snowfield property for \$450 million in a combination of cash and shares. Open-pit resources at Brucejack (as of December 1, 2009), including 900 historic holes, and at Snowfield (as of July 27, 2010) are as follows:

- Brucejack, measured plus indicated – 120.5 Mt grading 1.04 g/t Au, 16.9 g/t Ag;
- Brucejack, inferred – 198.0 Mt grading 0.76 g/t Au, 11.2 g/t Ag;
- Snowfield, Measured plus Indicated – 1095.3 Mt grading 0.63 g/t Au, 1.75 g/t Ag, 0.11% Cu, 89 ppm Mo, 0.49 g/t Re;
- Snowfield, Inferred – 847.2 Mt grading 0.40 g/t Au, 1.53 g/t Ag, 0.07% Cu, 82 ppm Mo, 0.33 g/t Re.

**Brucejack** saw the majority of work in 2010, with 33 100 m of drilling in 73 holes distributed between the Bridge, Galena Hill (Figure 23) and West zones (MINFILE 104B 200, 196 and 193, respectively). The Brucejack resource includes the Gossan Hill (MINFILE 104B 190) and SG zones, but there was little work on these in 2010. The Bridge zone was expanded to more than 600 by 900 m and drillhole spacing was increased to 200 m (from 100 m) in order to determine the overall extent of the deposit.

Silver Standard drilled 45 holes totalling nearly 18 000 m to upgrade and expand resources in the

**Snowfield** gold-copper porphyry deposit. Snowfield comprises the Main (or North) copper-gold zone and the upper gold-molybdenum zone. The Main zone is similar to the Mitchell deposit on the adjacent KSM property, while the upper gold-molybdenum zone is characterized by disseminated pyrite and a weak to moderate quartz-pyrite-carbonate stockwork in undeformed volcanic rocks. Gold is present mainly in anhedral, disseminated pyrite.

Drilling extended the Snowfield Main zone 1000 m to the southeast and by 200 to 300 m in width. A representative hole, MZ-116, intersected 83 m grading 0.44% Cu and 1.45 g/t Au. Drilling also increased the known extent of the Snowfield Upper zone 300 m to the south, in part beneath the ice cap on Josephine Ridge. For example, MZ-113 assayed 0.04% Cu and 0.98 g/t Au over 78 m (molybdenum was not reported).

Skyline Gold Corporation explored the **new Snip-1** shear-vein gold zone it discovered in 2009 southeast of the **Bronson** copper-gold deposit (MINFILE 104B 077).



Figure 23. Brucejack project; Galena Hill zone as seen from the exploration camp.

Two drilling programs were conducted; one early in the season and one late, totalling 3144 m. Structural geological mapping was performed by a technical climber in mid-season. Hole SK-10-08 of the first phase program intersected 17.46 g/t Au, 234 g/t Ag, 2.06% Cu, 0.88% Pb and 7.80% Zn over 2.65 m. Over a length of 144.1 m, including the high-grade interval, the hole graded 0.63 g/t Au, 10.7 g/t Ag, 0.08% Cu, 0.06% Pb and 0.42% Zn. The new prospect is on strike with the Twin vein at the closed Snip gold mine on the northwest side of the Bronson porphyry deposit.

Meanwhile, Skyline augmented the value of the Bronson porphyry deposit by adding magnetite to the resource estimate and then contracted a preliminary economic assessment. The total measured plus indicated resource is 186.9 Mt grading 0.122% Cu, 0.36 g/t Au, 2.19 g/t Ag and 5.3% magnetite, at a \$9 per tonne cutoff and with a 0.77 strip ratio.

Castle Resources Inc conducted an 8200 m drilling campaign on the **Granduc** massive sulphide deposit (MINFILE 104B 021). Drilling demonstrated copper mineralization extends 300 m below the limits of previous mining, and over a 1000 m strike length. Historical drill intercepts were replicated, indicating that a portion of the historic resource remains. Granduc is a volcanogenic deposit with a total mineral inventory of 29.03 Mt grading 1.83% Cu, of which 15.4 Mt was mined. Key 2010 drill intercepts include GD10-02 which averaged 2.15% Cu over 16.75 m and GD10-12 which averaged 1.45% Cu over 33.48 m. Partial rehabilitation of the 17 km access tunnel is planned in 2011 that will enable underground exploration.

Jayden Resources Inc (formerly Pinnacle Mines) conducted a 2800 m drill program on the **Silver Coin** property (also known as Silver Butte, MINFILE 104B 150). Silver Coin is a joint venture between Jayden Resources, Mountain Boy Minerals Ltd and Nanika Resources Inc. Gold, zinc and silver-bearing epithermal veins and breccias have been drilled at 20 m spacing. In September, Jayden announced an updated measured and indicated resource estimate of 27.16 Mt grading 0.96 g/t Au and 5.98 g/t Ag, based on a cutoff grade of 0.3 g/t Au. The inferred resource is 29.65 Mt grading 0.69 g/t Au and 6.00 g/t Ag. The resource area extends onto the adjoining **Indi** claims (MINFILE 104B 402) which were the subject of a 1000 m drilling campaign by Nanika Resources Inc.

Ascot Resources Ltd continued to explore the **Big Missouri - Dilworth** property with a major drilling program comprising 21 700 m in 68 core holes. Quartz-calcite veins, stockwork and breccia contain pyrite, sphalerite and galena and variable amounts of gold and silver. Work focused on the Unicorn zone (MINFILE 104B 044). One of the best intercepts graded 8.99 g/t Au over 14.5 m. The Province zone (MINFILE 104B 147), located 300 m southwest of Unicorn, was tested over an 800 m length.

Great Bear Resources Ltd has an option earn up to

70% interest in the **BA** project (MINFILE 104A 178) from Mountain Boy Minerals Ltd. Great Bear conducted a major program consisting of a 1000 line km VTEM survey, geological mapping and 15 000 m of drilling focused on the Barbara zone (Figure 24). Surface work resulted in discovery of new mineral zones located 300 to 2000 m to the north of Barbara. Drilling highlights included 401.0 g/t Ag, 0.46% Cu, 4.14% Pb and 0.46% Zn over 3.05 m in BA-2010-82 and 117.5 g/t Ag, 0.02% Cu, 1.18% Pb and 2.81% Zn over 15.24 m in BA-2010-147.

Decade Resources Ltd completed 57 core holes totalling nearly 9000 m in the Montrose zone on the **Red Cliff** gold property (MINFILE 104A 033). The property is situated near the base of the extremely steep west wall of American Creek. At **Red Cliff East**, Nanika Resources Inc drilled 1100 m in eight holes on the Waterloo zone (MINFILE 104A 035), 400 m from the Montrose zone drilled by Decade Resources.

Bravo Gold Corp continued exploration of the **Homestake** gold-silver prospect (MINFILE 103P 216), completing nearly 18 000 m of drilling in 48 holes. Drilling focused on a northwest extension of the Homestake Ridge zone and, 800 m to the southeast, delineation of the Homestake Silver zone. Drilling at the Fox Reef zone (MINFILE 103P 093) southeast of Homestake Silver also returned encouraging intercepts. In May, prior to the drill season, Bravo announced a new resource estimate calculated at a 3 g/t Au cutoff:

- Main Homestake, 888 000 tonnes grading 6.69 g/t Au, 47.2 g/t Ag and 0.15% Cu (Indicated);
- Main Homestake, 1 140 000 tonnes grading 5.02 g/t Au, 50.9 g/t Ag and 0.25% Cu (Inferred);
- Homestake Silver, 1 200 000 tonnes grading 4.25 g/t Au, 158 g/t Ag and 0.02% Cu (Inferred).

**Chist Creek** is a large volcanogenic alteration zone found by a British Columbia Geological Survey mapping crew in 2007. The Barresi zone was discovered by Paget



Figure 24. BA silver project; folded chert and jasper of the mineral sequence within the Salmon River Formation, broadly correlative with the Eskay Creek deposit.

Resources Corp during follow-up mapping and prospecting. It is described as semimassive lenses and stringers of pyrite-sphalerite-chalcopyrite-galena with associated quartz-sericite-pyrite alteration at the contact between mafic and felsic volcanic rocks of Paleozoic age. Paget reported rock sample assays up to 4.4 g/t Au and 92 g/t Ag, and local bonanza grades (to 685 g/t Au) from late, overprinting quartz-chalcopyrite-pyrite veins.

Nineteen holes totalling more than 5300 m were drilled on the **Wedene** property near Kitimat by Decade Resources Ltd. Closely-spaced holes targeted the Jeanette copper vein (MINFILE 103I 169) that occurs in volcanic rocks recently reinterpreted by the British Columbia Geological Survey to be of Paleozoic age.

Finlay Minerals Ltd discovered copper-molybdenum porphyry mineralization on its **Silverhope** property. Drilling targeted Equity Silver style copper-silver mineralization as had been found in the nearby Gaul zone (MINFILE 093L 256). SH10-03 intersected 0.30% Cu, 0.019% Mo and 3.37 g/t Ag over 219.87 m (from 38.9 m depth). Two hundred metres north, SH10-05 intersected 0.29% Cu, 0.014% Mo and 1.6 g/t Ag over 209.71 m (from 6.7 m depth).

A modest 6 hole (3400 m) drilling program was conducted at the closed **Bell Copper mine** (MINFILE 093M 001) by Xstrata Copper Canada Ltd to test a deep resource. Bell Copper produced 77.2 Mt of ore containing 0.47% Cu and with a recovered grade of 0.17 g/t Au. When the mine closed in 1992, there remained a resource of 70.4 Mt grading 0.44% Cu, 0.20 g/t Au located below the open pit.

Bard Ventures Ltd intersected a new molybdenum zone on its **Lone Pine** prospect (MINFILE 093L 027, 028). Drilling of nine holes targeted on a soil geochemical anomaly resulted in **discovery** of the **61 zone**, 500 m northeast of the Alaskite zone (Figure 25). 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. In the 2010 campaign, hole BD-10-61 intersected molybdenite mineralization over a 300 m length, including intervals of 0.04% Mo over 44.8 m from 133.6 m depth. Significant silver values were also obtained; 12.51 g/t Ag over 37.2 m from 253.2 m depth. **Silver Queen** is known primarily as a polymetallic vein system with past production of gold, silver, zinc, lead, copper and cadmium (MINFILE 093L 002). But drilling by New Nadina Explorations Limited targeted porphyry copper mineralization with a 4100 m program.

Callinan Mines Ltd completed a 60 km induced polarization survey, and drilled 20 core holes totalling over 7000 m, on its gold-silver prospect at **Coles Creek** (MINFILE 093E 041). Cole-28 intersected 3.37 g/t Au, 15.3 g/t Ag, 2.04% Zn and 0.15% Pb over 21.25 m. Another interval 75 m higher in the hole graded 0.15 g/t Au, 68.9 g/t Ag, 2.00% Zn and 1.22% Pb over 11.55 m.



Figure 25. Drilling in the 66 zone on the Lone Pine molybdenum project.

Both intervals also contain over 10 000 ppm Mn.

## NORTHEAST BRITISH COLUMBIA

There were a number of coal exploration programs in the Peace River Coalfield. For example, Canadian Dehua International Mines Group Inc was completing one of the larger programs with more than 20 holes planned on their **Murray River** property. Should an economic resource be discovered, these metallurgical coal seams would only be accessible by underground mining techniques. Other companies with exploration programs in the region were Coal Hunter on the Carbon Creek project, Colonial on the Huguenot project, First Coal on their Central South deposit, Hillsborough on the Wapiti deposit, Peace River Coal near the Trend Mine, Teck Coal on their Quintette property, and Western Coal on and near their Brule and Willow Creek mine sites. There was no Regional Geologist for the Northeast region in 2010; therefore only minimal reporting is available.

## NORTH-CENTRAL BRITISH COLUMBIA

Stikine Energy Corporation mined a 430-tonne bulk sample from its **Nonda** property (MINFILE 094N 011). It was transported to Abbotsford where a pilot plant was built to prepare it for testing as a frac sand. Initial processing of Nonda quartz arenite produces +70 to -140 (“100 mesh”) material. Potential users of the Nonda

product include the Horn River and Liard shale gas fields within 200 km of the property.

Canada Zinc Metals Corp completed an additional eleven core holes totalling 6128 m on its **Akie** SEDEX zinc-lead project. At Akie, the Cardiac Creek deposit (MINFILE 094F 031) has an inferred resource of 23.6 Mt grading 7.6% Zn, 1.5% Pb and 13 g/t Ag. Three holes were drilled in the central to northwest edge of the Cardiac Creek deposit, four holes tested the Northwest Extension target and four holes explored the North Lead anomaly. The steep topography results in longer holes, 500-600 m deep, while the difficult ground requires large drill rigs and sturdy platforms (Figure 26).

The Rocky Mountain carbonatite belt comprises eight known individual carbonatite bodies or clusters spaced over a 1500 km length of the Foreland belt from the United States border to near the Yukon border. The alignment of carbonatite-alkalic complexes approximates the ancient North American continental margin. Aley and Wicheeda are two of these carbonatite bodies. Alkalic plutons comprising nepheline syenite and ijolite are associated with some carbonatites in the Rocky Mountain belt, but carbonatites are not known at other alkalic complexes. These carbonatite and alkalic complexes contain a wide spectrum of uncommon, nonferrous metals, such as niobium (Nb), zirconium (Zr) and lithium (Li) and rare earth elements (REEs) such as yttrium (Y), cerium (Ce), praseodymium (Pr), neodymium (Nd), promethium (Pm) and dysprosium (Dy) that are important in high-technology electronics. There has been a surge in exploration for these rare metals in recent years, especially in 2010.

Taseko Mines Ltd carried out a comprehensive investigation of the **Aley** carbonatite (MINFILE 094B 027) that involved structural mapping, mineralogical study and the drilling of 4516 m in 23 holes (Figure 27). Aley, and its contained niobium deposit, were discovered and explored by Cominco in 1985-86. Taseko acquired Aley and drilled it in 2007. The Wicheeda district comprises several bodies of carbonatite and syenite breccia (syenite clasts in carbonatite matrix) intruded over a 15 km distance. Spectrum Mining Corp owns the Wicheeda project which has triggered exploration interest in the district. The **Carbo** property adjoins Wicheeda, a carbonatite-hosted rare earth elements project (MINFILE 093J 014), and covers part of the same carbonatite complex and a cerium-in-soil anomaly. Canadian International Minerals Inc is earning a 75% interest in the Carbo claims from Commerce Resources Inc. Initial work in 2010 consisted of a district-scale airborne electromagnetic, magnetic and radiometrics survey, followed by an auger-assisted soil geochemistry and core drilling. Drilling focused in an area 1 km northeast of that tested by Spectrum Mining Corp; nine holes totalling 1939 m were completed. Minor constituents of the carbonatite include niobium minerals pyrochlore and columbite, and rare earth minerals monazite and bastnaesite.



Figure 26. Akie, large drill platform to support a drill rig for deep holes.



Figure 27. Aley carbonatite showing deformation fabric, image courtesy of Duncan McLeish.

Serengeti Resources Inc drilled on the **Kwanika** copper-gold property (MINFILE 093N 073), to augment mineral resources in the South zone. Two drill rigs completed 7600 m in 31 holes. From past work, the inferred resource in the South zone is 129.1 Mt grading 0.30% Cu, 0.09 g/t Au, 0.01% Mo and 1.76 g/t Ag at a cutoff grade of 0.25% Cu equivalent. The Central zone has an indicated resource of 182.6 Mt grading 0.29% Cu and 0.28 g/t Au at a cutoff grade of 0.25% Cu equivalent. In a significant advance toward a social license for the project, Serengeti Resources and the Takla Lake First Nation signed an exploration access agreement in August.

A 5000 m drill program began in mid-November on the **Fran** prospect (MINFILE 093K 108). There is a porphyry-type geological setting at Fran. Gold mineralization comprises fracture controlled quartz-sulphide veins and replacement of wallrock. Previous exploration comprises extensive surface work and 71 core holes. As an example, FR-055 intersected 8.51 g/t Au, 14.8 g/t Ag and 0.25% Cu over 9.55 m. Alpha Gold Corporation conducted a drilling program on its **Lustdust** gold project (MINFILE 093N 009, 044). Gold and copper

occur in skarn and manto zones. Prior to the program the company announced a resource estimate in the Canyon Creek zone comprising 910 000 tonnes Indicated at a grade of 1.56% Cu, 1.678 g/t Au and 39.3 g/t Ag, and 1 965 000 tonnes Inferred at a grade of 1.34% Cu, 1.716 g/t Au and 32.1 g/t Ag. The calculation was based on 96 drillholes over a strike length of 500 m.

First Point Minerals Corporation and their partner, Cliffs Natural Resources Inc, are advancing a new concept in nickel exploration on the **Decar** property near Mount Sydney Williams. The target is awaruite, a naturally occurring iron-nickel alloy documented at several localities around the world. Initial field work at Decar mapped the grain size of awaruite across the property (Figure 28). Core drilling focused on areas with the largest grain size, the Baptiste and Sidney target areas which are three kilometres apart. The drilling program totalled 2430 m in 10 holes. Analytic work distinguished nickel alloy from total nickel. In the principal Baptiste zone, nickel alloy grades from 0.105% to 0.145% Ni from the top of bedrock to the end of all seven holes, ranging up to 341 m deep. Total nickel content is 0.22-0.24% Ni. First Point reported that several tonnes of drill core will be used in mechanical mineral processing test work.

Numerous gold-bearing intercepts at **Blackwater-Davidson** (MINFILE 093F 037) justified Richfield Ventures Corp upgrading 20 km of access road, installing a year-round camp and expanding its two year drill



Figure 28. Peter Bradshaw and Trevor Rabb (First Point Minerals) look for awaruite in serpentinite at Decar.

program to a planned 50 000 m. The HQ drilling was on a 50 m grid and will enable resource estimation in 2011. About 15 500 m of the program is expected to be done in 2010. A deep-penetration IP survey was completed to help interpretation and drilling. The gold zone straddles the boundary between a claim that is 100% owned by Richfield and one that is 75% owned by Richfield and 25% by Silver Quest Resources Ltd. Later in the year, once Richfield had earned its interest in the joint claim, the drilling focused on the wholly-owned tenure until Silver Quest determines how it wants to manage its interest. Gold mineralization is unusual in character, but similar to the nearby Capoose deposit. Representative intercepts from the gold zone include:

- 0.76 g/t Au and 3.1 g/t Ag over 312 m in BW-63;
- 1.57 g/t Au and 6.7 g/t Ag over 260.3 m in BW-64;
- 1.51 g/t Au and 5.7 g/t Ag over 227 m in BW-68 and,
- 0.59 g/t Au and 5.6 g/t Ag over 67 m in BW-86.

On the **Capoose** project (MINFILE 093F 040), Silver Quest Resources Ltd completed 37 core holes totalling 10 598 m aimed at upgrading and expanding the gold-silver resource. Capoose lies 25 km northwest of Blackwater-Davidson in the Fawnie Range. Based on drilling up to 2010, a new resource estimation calculated the inferred mineral resource at 53.45 Mt in the inferred category grading 0.41 g/t Au and 23.9 g/t Ag at a gold-equivalent cutoff of 0.4 g/t Au. One of the best holes drilled in 2010, D-10-127 intersected 0.74 g/t Au and 9.37 g/t Ag over 301.5 m. Significant zinc occurs throughout the 301.5 m length, as demonstrated by sub-intervals of 0.74% Zn over 48 m, 0.75% Zn over 26 m and 0.43% Zn over 26 m.

## SOUTH-CENTRAL BRITISH COLUMBIA

### Metals Projects

At the **Mount Polley** mine (MINFILE 093A 008), Imperial Metals Corporation was exploring its properties with a large surface drill campaign. This year's exploration of the **Junction**, **Springer**, **WX** and **C2** zones is testing for possible expansions of the Springer pit. At the Pond and Southeast zones the company drilled near these currently producing skarn-style mineralized bodies. A 500 m underground ramp is being driven from the exhausted Wight pit to allow underground drilling of the **Boundary** and **Zuke** zones. The Boundary zone currently has a measured and indicated resource of 517 066 tonnes grading 2.45% Cu, 1.5 g/t Au and 14.00 g/t Ag. The ramp will allow the company to evaluate the feasibility of bulk underground mining (Figure 29).

Spanish Mountain Gold Ltd (formerly Skygold Ventures Ltd) made strides this year in bringing its **Spanish Mountain** project (MINFILE 093A 043) closer



Figure 29. The bottom of the Wight pit at the Mount Polley copper-gold mine was used to start a decline to facilitate testing the Boundary and Zuke zones where the potential for underground mining is being considered.

to feasibility stage. Positive results were reported for gold recovery test work whereby an optimized gravity concentration, flotation and cyanidation process could produce recoveries of 90%. The company also released the results of a preliminary economic assessment of the project. This study contemplated a 40 000 t/d operation producing up to 6 650 000 grams per year (213 800 ounces per year) for the first five years at a cash cost of \$18.30/gram (\$570/ounce). A ten-year mine life is estimated at an initial capital cost of \$447 million (excluding leased mining equipment). The mineral inventory for the project is stated at 77.4 Mt at a grade of 0.55 g/t Au in the measured and indicated category and 39.5 Mt at a grade of 0.48 g/t in the inferred resource category: both the Main and North zones are included in these estimates.

Northwest of the Spanish Mountain Gold Ltd project is another **Spanish Mountain** gold property under exploration by Acrex Ventures Ltd. The company, along trend from its namesake neighbour, has extended a significant gold-in-soil and geophysical anomaly that was drilled this year. The company reports it has confirmed the presence of a gold-bearing structure with the best drill result being found in hole SpM1007 that intersected 15.7 m grading 0.677 g/t Au with a higher grade interval of 3.0 m grading 1.14 g/t Au. To the northwest of this project, and along a regional trend, is the Tiex Inc **Gold**

**Creek** project that was drilled this year utilizing a sonic drilling method that boasts better recoveries than in previous programs. Two holes were completed near previous drillholes; an improved intersection of 82.29 m grading 0.559 g/t Au was returned in hole GC 10-02.

Barkerville Gold Mines Ltd has been very active at the **Bonanza Ledge** project (MINFILE 093H 140) at Wells where the company is proposing an open pit (Figure 30) to mine the orebody and truck the ore to its QR mill for processing. Disseminated gold-sulphide mineralization is contained in the footwall of the historical BC vein. The company completed 22 holes in a summer program that confirmed the attractive tenor of the mineralization, such as hole BC10-10 which cut 22.6 m grading 6.93 g/t Au. The company reports the discovery of a **new zone** located just beyond the current targeted area. In this zone, a channel sample from Trench #1 yielded an assay of 8.7 m grading 80.78 g/t Au.

Nearby at the **Cariboo Gold Quartz** mine (MINFILE 093H 019) on Cow Mountain, Barkerville Gold Mines Ltd was also drilling to expand current resources and define a new gold mineralized zone discovered northwest of the proposed open-pit mine. In the new zone, 2009 hole CM09-07 intercepted 13.5 m grading 5.06 g/t gold in the deeper portion of the hole. To facilitate mining of its many resources in the camp, Barkerville Gold Mines Ltd has signed a letter of intent to purchase the Goldstream mill currently located north of Revelstoke. If completed the company would relocate it to Cow Mountain, refurbish it and increase the capacity to 2000 t/d with an eye to bringing it onstream in 2013.

At the **Blue River** tantalum and niobium project, Commerce Resources Corp spent the year completing definition drilling aimed at upgrading resources. Work continues on the preliminary economic assessment which will present for the first time solids modeling, preliminary metallurgy and a flow sheet design. Current resource estimates are reported for the **Upper Fir** (MINFILE 083D 035) carbonatite and give an indicated resource of



Figure 30. The location of the proposed Bonanza Ledge open pit near Wells in the Barkerville Camp. Ore would be trucked to Barkerville Gold Mines' QR mill for processing.

7.38 Mt at 217 g/t Ta<sub>2</sub>O<sub>5</sub> and 1202 g/t Nb<sub>2</sub>O<sub>5</sub> and inferred resource of 16.49 Mt of 213 g/t Ta<sub>2</sub>O<sub>5</sub> and 1222 g/t Nb<sub>2</sub>O<sub>5</sub> at a 175 g/t Ta<sub>2</sub>O<sub>5</sub> cutoff. Most of the resources are contained within a series of north-south trending, sill-like, carbonatite bodies within a 91 m thick geological package that extends roughly 1450 m in length and over 800 m width. The minerals containing the tantalum and niobium are primarily pyrochlore and ferrocolumbite.

In October, the company and the Simpcw First Nation signed an innovative mineral exploration agreement. The agreement will ensure the Simpcw First Nation's concern about the environmental health of their traditional territory is honoured during all phases of mineral exploration as well as there will be a focus on training and hiring people from their community.

Gold Fields Horsefly Exploration Corporation undertook the largest exploration program in the Cariboo where approximately 22 000 m of drilling was completed at the **Woodjam South** and **Woodjam North** properties (MINFILE 093A 078) 45 km east of Williams Lake. The properties are optioned from Fjordland Exploration Inc (60%) and Cariboo Rose Resources Ltd (40%). At Woodjam South, the Southeast zone has been successfully drill tested over an area of 1300 by 900 m and to a depth of 700 m. Within this large area, a core area of mineralization has a footprint of 800 by 630 m (Figure 31). Highlight holes from this year's drilling at the Southeast zone include: SE10-14 intersected 244 m grading 0.50% Cu, 0.04 g/t Au and 0.015% Mo and SE10-01 intersected 401 m grading 0.30% Cu, 0.07 g/t Au and 0.006% Mo.

A significant portion of this year's drilling at Woodjam North focused on the Deerhorn zone, where gold-copper mineralization associated with a monzonite porphyry has been traced along northern portions of the zone over a strike length of about 700 m. Notable holes include DH10-09 that intersected 90.8 m grading 0.58 g/t Au and 0.39% Cu, including 30.4 m grading 1.10 g/t Au and 0.72% Cu, and DH10-14 that intersected 115.9 m



Figure 31. Potato-sized clots of epidote and tourmaline replacing bleached and altered volcanic rocks adjacent to the Takomkane batholith at the Woodjam property.

grading 0.29 g/t Au and 0.32% Cu. The fall phase of drilling targeted a new southern mineralized zone. Hole DH10-21 (a step out hole from DH09-03, a significant gold-enriched intersection) bettered its result by intersecting 156.6 m grading 1.14 g/t Au and 0.29% Cu, including 64 m grading 1.92 g/t Au and 0.39% Cu.

Southeast of the Woodjam projects, Capstone Mining Corp optioned the **Tak** properties (MINFILE 093N 067) from Fjordland Exploration Inc and Fjordland itself undertook a grassroots exploration program targeting copper-gold porphyry mineralization within and around the Takomkane batholith. They report two **new discoveries** of copper-gold-molybdenum mineralization on the Moffat property. Five grab samples from two areas approximately 800 m apart gave encouraging results with the best result being MR-10-05 which assayed 0.36% Cu, 0.29 g/t Au, 6.94 g/t Ag and 11 ppm Mo.

At the **Lac La Hache** porphyry copper-gold property (MINFILE 092P 152), GWR Resources Inc continues to better its understanding of the geological environment through re-evaluation of its wealth of historical information as well as ongoing exploration. At the Aurizon South zone, now recast as the Aurizon South SuperGold zone, a gold-rich deep zone is being tested. Hole AZS10-21 extended previous hole AZS08-04 and intersected 137 m grading 1.36 g/t Au and 0.31% Cu starting at a depth of 477 m. Mineralization is reported as disseminated, fracture filling and massive chalcopyrite, fine-grained bornite, gold-cobalt bearing pyrite and magnetite in hairline and thicker stringers.

Sona Resources Corp completed a preliminary economic assessment which evaluated restarting the **Blackdome** (MINFILE 092O 053) mine, mining the Elizabeth deposits and processing the ore at the Blackdome mine. In late season, the company announced it had entered a business partnership agreement with the Stswecem'c Xgat'tem Development Limited Partnership of Dog Creek. The idle Blackdome gold-silver mine and mill anchors this duo. The 200 t/d mill is intact and the property has a restated indicated resource of 144 500 tonnes grading 11.9 g/t Au and 50.01 g/t Ag and inferred resources of 90 600 tonnes of 8.79 g/t Au and 18.61 g/t Ag.

At the nearby Elizabeth property (MINFILE 092O 012), bonanza-grade gold is hosted within northeast trending, steeply northwest dipping mesothermal veins. Current inferred resources at the property include 522 900 tonnes of 12.3 g/t Au at a 5.0 g/t Au cutoff. The company focused most of its attention here this year drilling the Southwest and No. 9 veins, rehabilitating the Upper adit, trenching the West vein at surface and assembling supplies for a second adit to drift and raise along the Southwest zone.

The **Prosperity** gold-copper porphyry project (MINFILE 092O 041) of Taseko Mines Ltd received in January, 2010 the provincial government environmental assessment certificate. In June, 2010 it was the granted a

25-year mining lease. However, in November the federal Minister of Environment did not grant federal authorization to proceed with the project as proposed. The company is proceeding with discussions with both levels of governments in an effort to find an appropriate next step. As proposed the Prosperity project would have involved a capital expenditure of \$815 million to develop a 70 000 t/d mine that would provide roughly 500 jobs over the 20 plus year mine life. Stated proven and probable reserves are 831 Mt at 0.23% Cu and 0.41 g/t Au. The company is well financed to see this project through to production with its operating Gibraltar mine, an agreement with Franco-Nevada Corporation for 22% of the gold produced, and financial assets from other business arrangements.

The most advanced project in the famous Gold Bridge mesothermal gold-quartz vein camp is at the **Bralorne** mine (MINFILE 092JNE001) of Bralorne Gold Mines Ltd. It operated continuously from 1928 to 1971 and was the dominant contributor to the approximately 4.15 million ounces of gold produced at this camp. Infrastructure on the property includes extensive underground workings, a partially completed tailings pond and a 100 t/d gravity/flotation pilot mill. Trial mining at the **BK zone** and **North vein** is stockpiling material to feed the mill. In mid-September the company reported it had 5800 tonnes on the surface grading 12.1 g/t Au and another 4700 tonnes broken underground (Figure 32).

Drilling from the surface continued at the upper BK zone this year as well with some very encouraging results. Results were reported that ranged from 0.96-140.46 g/t Au over intervals from 0.2-1.2 m with the best result being Hole 169 which cut 140.64 g/t Au over 0.6 m. This potentially significant zone can be accessed from the unfinished BK zone adit which was started at the 575-level in 2009.

At the **Luxor** project northeast of Barriere, Kingsman Resources Inc encountered a **new zone** of molybdenum mineralization in a road construction effort. This prompted the company to prospect a broadened area and a series of grab samples gave assays that ranged from 0.063-0.278% Mo. The company drilled the new zone late in the fall and had not received results at time of writing.

Encore Renaissance Resources Corp has a permit to remove high grade gold-quartz vein material from its **Bonaparte Gold** property (MINFILE 092P 050). The company shipped 330 tonnes of ore to the Kinross mill in Washington State yielding 5037 grams of Au at a recovery rate of 93.51%. At the exploration site, the company resumed activities in late September and reports it is progressing toward the Eagle vein where high grade gold intercepts have been reported. Along the way they exploited around 180 tonnes from the #20 vein where an average grade from 8 grab samples was 7.55 g/t.

Imperial Metals Corporation got a late start this



Figure 32. Loading explosives into an ore cart at the Bralorne mine.

season at its **Ruddock Creek** project (MINFILE 082M 082, 083, 084). Activities commenced after the company signed a Memorandum of Understanding with Itochu Corporation and Mitsui Mining and Smelting Co Ltd where these two companies can earn a 50% interest in the project by providing financing. The company drilled the Creek zone this season, a 2006 discovery that was subject to wide-spaced drilling in 2007 and found to be very similar in character to the E zone – the primary focus at the project. Results for this drilling are pending. The company dewatered the decline to the E zone this fall and anticipates extending the workings by 400 m to drill test the E zone to depth. Current resources for the E zone include an 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 cutoff of 4% combined Pb plus Zn.

At the **Harper Creek** copper project (MINFILE 082M 009), Yellowhead Mining Inc was active after a relatively quiet year in 2009. A new resource estimate has been prepared for the project with an indicated resource of 569 Mt of 0.32% Cu at a 0.2% Cu cutoff. A preliminary economic assessment is currently underway which will update the resource again and include precious metals for the first time. The project is currently within the British Columbia Environmental Assessment process. A fall program of drilling was completed with the objective of expanding the open-pit resources. The company reports the deposit is open ended to the north and that the central sections are sparsely drilled. A program of re-logging core from the 1960s and 1970s continues.

Geologist Leo Lindinger **discovered** new mineralization on his **Argent** property located near the Raft River and northeast of Clearwater. Described as a manto-type volcanogenic massive sulphide occurrence within a skarn host, the mineralization gave some of the best zinc results ever sampled by Leo with chip samples 905692 grading 40.5% Zn, 12% Pb and 160 g/t Ag and 905693 grading 13% Zn, 5.1% Pb and 75 g/t Ag.

Abacus Mining and Exploration Corp welcomed its new joint-venture partner this year, KGHM Polska Miedz S.A., the world's ninth largest copper producer and second largest silver producer. The joint venture will see the companies take the **Ajax** copper-gold porphyry project (MINFILE 082FNW012, 013) near Kamloops through to a bankable feasibility study at which point KGHM can increase its share in the project and continue through to production. Currently field work and engineering studies in support of the feasibility study are underway and include drilling to further define resources, process plant milling circuit, mine haulage, in pit crushing and tailings disposal studies. The current pre-feasibility study contemplates a 60 000 t/d operation exploiting the measured and indicated resource of 442 Mt at 0.30% Cu and 0.19 g/t Au.

Drilling at project was aimed at continued testing of the Ajax East extension where near-surface resources are the target (Figure 33). Hole AM-10-066 supports this effort with 72 m grading 0.61% Cu and 0.35 g/t Au starting at 27 m down the hole. Infill drilling has also been significant in and around the Ajax East and West pits in order to upgrade resources. Holes, such as AE-10-065, show the potential of these deposits with an intersection of 382 m grading 0.36% Cu and 0.3 g/t Au.

Mine site exploration occurred during the year at the **Highland Valley Copper** mine (MINFILE 092JSW012), which is centered in the Guichon Creek batholith. The Teck Highland Valley Partnership conducted a 7000 m drilling program in the vicinity of the Lornex pit to provide additional information for the purposes of further



Figure 33. Abacus Mining and Exploration Corp and partner KGHM Polska Miedz S.A. are advancing the Ajax copper-gold project near Kamloops through to a feasibility study. Photo of drilling in the previously mined Ajax East pit which will be incorporated into a larger pit (file photo).

delineating the resources of the Lornex Extension.

Happy Creek Minerals Ltd continued its successful exploration at the **Rateria** porphyry copper-molybdenum property. Results this year from drilling Zone 1 continued to define mineralization over an area of 700 by 100 m and to depths of 300 m. The company also explored around last season's discovery at the **West Valley** property. Drillholes were completed at the NTP and Nord prospects where positive gold results were reported.

Dot Resources Ltd completed a winter drill program at the **Dot** property (MINFILE 092ISE023), testing extensions and continuity of porphyry copper-gold-silver mineralization at the Southeast and Northwest zones as well as induced polarization chargeability anomalies. The company included the results of this program to update its resources at project: indicated resources are reported to be 5.33 Mt of 0.54% Cu and inferred resources are reported to be 4.28 Mt of 0.49% Cu, both at a 0.2% Cu cutoff.

Altair Ventures Incorporated was active at the **Prospect Valley** property. The target is bulk-mineable epithermal gold. The company completed an initial campaign of drilling in the South Discovery zone whereby several holes are reported to have intersected similar grades to those encountered in extensive drilling in 2006-07. A prospecting campaign this year may have discovered a highly significant northeastern extension (Figure 34) of the controlling structure in the area – giving it a potential strike length of up to 3 km length. The Northeastern Extension zone has yielded chip sample values of 0.12-4.55 g/t Au and 0.7-3.1 g/t Ag with elevated molybdenum values.

Almaden Minerals Ltd continues to evaluate the **Elk** mesothermal gold-quartz vein project (MINFILE 092HNE041). In the 1990s, 1.6 million grams of gold were produced from 16 700 tonnes of ore extracted from the B vein system in open pit and underground operations. After releasing new resource estimates last year, the company set out to test portions of the deposit where more definition was required. This included grid-style drilling in the Siwash North vein zone where the WD and B veins were the principle targets. Results were supportive of the high-grade, bulk tonnage potential of the deposit and will be integrated into a preliminary economic assessment.

Southwest of the village of Tulameen and along the Tulameen River, Huldra Silver Inc reinvigorated its effort at the **Treasure Mountain** vein silver-lead-zinc project (MINFILE 092HSW016). The company hopes to re-submit an application for a 135 t/d underground mine operating on a seasonal basis and involving on-site gravity concentration. The Main zone at the project currently hosts an indicated resource of 33 Kt of 830 g/t Ag, 4.16% Pb and 3.8% Zn at a 311 g/t cutoff and an inferred resource of 120 Kt of 926 g/t Ag, 2.79% Pb and 4.36% Zn. The company confirmed grades this year by sampling a 6000-tonne stockpile which gave averaged results of 645 g/t Ag, 5.05% Pb and 3.2% Zn. There is



Figure 34. Sample of silicified breccia from the 2010 discovery of the Northeastern extension at the Prospect Valley epithermal gold project west of Merritt – giving it a potential strike length of up to 3 km (photo courtesy of Warner Gruenwald).

currently 2750 m of underground development and this year the company reconstructed a portal and completed a vent raise in preparation for more development.

The company discovered a **new area** of mineralization upwards of a kilometre away from its Main zone. Called the East zone extension, the company trenched historical soil anomalies to discover high-grade mineralization. This gave a highlight chip sample result of 30.5 cm grading 2920 g/t Ag, 38.5% Pb and 0.5% Zn. The company completed a series of shallow drillholes in an effort to better understand the potential of the discovery.

Despite most of the corporate efforts being focused on mine development, exploration resumed at the **Copper Mountain** project (MINFILE 092HSE001) after a hiatus last year. Much of the work was directed at future production activity with infill and condemnation holes forming much of the announced 10 000 m campaign. At the Oriole zone, previously drilled percussion holes showed potential for a high-grade zone in an area planned for waste rock storage. Twelve diamond-drill holes were completed to test the area's potential for valuable mill feed at the start-up of the operation. Additional drilling was completed east of Pit 2, in the saddle zones between the existing pits and adjacent to and below Pit 3. At the time of writing most results were pending and the drills were still completing the program.

## SOUTHEAST BRITISH COLUMBIA

### Metals Projects

Eagle Plains Resources Ltd and Providence Capital Corp carried out a diamond drilling program on the **Iron Range** property. Providence Capital holds the option to earn a 60% interest in the property. Diamond drilling in 2010 was initially focused on a potential SEDEX lead-zinc target at the Sullivan horizon, the host stratigraphy at the closed Sullivan mine near Kimberley (Figure 35). Encouraging results were obtained in terms of sulphide

mineralogy and alteration, suggesting the existence of a nearby hydrothermal vent system at Sullivan time. Significant gold values are associated with base metal sulphide mineralization.

Merit Mining Corp carried out underground drilling at the **J&L** gold-silver-zinc-lead property. The polymetallic mineral zones at the J&L (MINFILE 082M 003) are stratabound, massive sulphide-bearing units. Mineralization occurs in two significant zones, one of which, the Main zone, is described as a stratiform, structurally controlled precious metal and polymetallic-base metal massive sulphide deposit. The Main zone has been exposed over 850 m in underground drifting. Previous underground drilling has defined the zone over a 1.4 km strike length, while on surface it has been traced for a total of 1.6 km. It averages 2.5 m in thickness. The subparallel Yellowjacket zone is a siliceous zinc-lead-silver stratabound zone in the immediate hanging wall of the Main zone. Drilling in 2010 focused on the Main zone, which has a historic (pre-NI 43-101) resource. Drilling is intended to allow a compliant resource estimate, as well as to potentially increase the known extent of the zone. Further underground drifting and cross-cut extensions are planned in future, prior to further drilling.

Klondike Silver Corp's **Slocan Silver** project, east of New Denver, is in a rich historic silver-lead-zinc mining area. Klondike's holdings are divided into six areas or "camps", each of which encompasses past producers of vein-style mineralization. These include Sandon, Hewitt, Silverton Creek, Cody Creek, Payne and Jackson Basin. The company's Silvana mill at Sandon, a 100 t/d concentrator, is operational and the company has an arrangement for a smelter to accept concentrates from the mill. Underground exploration was focused on the past producing Silvana mine (MINFILE 082FNW050), where drift development and diamond drilling were carried out. The 4625-level of the Silvana mine was extended to the west, in order to test the potential extension of the Silvana



Figure 35. Diamond drilling on the Iron Range property (Eagle Plains Resources Ltd and Providence Capital Corp).

main lode structure, a major source of ore in the Slocan. Another ongoing objective of the underground program is to outline and recover ore-grade material in the range of thousands to tens of thousands of tonnes, and process it in the Silvana mill. Surface work in 2010 included ground-based geophysics, soil geochemistry, trenching and drilling.

Sultan Minerals Inc's **Kena** property includes the **Gold Mountain** (MINFILE 082FSW379), **Kena Gold** (MINFILE 082FSW237), **Copper King** and **South Gold** zones. The belt comprising these zones trends northwest-southeast and is subparallel to, and east of, the Silver King shear zone. The main objective of the 2010 drilling program was to demonstrate the continuity of a known high grade gold corridor. Mineralization has now been intersected in twelve core holes and one trench over a strike length of 5.65 km. The average grade of these intersections is 15.65 g/t Au over a minimum 2.0 m width. High grade gold veins are often surrounded by an envelope of lower grade mineralization. Drilling in 2010 also targeted copper-gold mineralization in the Copper King zone (MINFILE 082FSW332). Resampling and analysis of historic drill core from this zone was also carried out.

West High Yield (W.H.Y.) Resources Ltd carried out diamond drilling on the **Midnight** property. 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 major effort in 2010 was focused on the Midnight Crown-granted mineral claim. Work on the Midnight property consisted of in-fill drilling, with the objective of generating a gold resource estimate.

Grizzly Discoveries Ltd's extensive **Greenwood Gold Project** was active for the third consecutive year. Grizzly Discoveries property covers an area roughly

70 km by approximately 25-30 km. Activities in 2010 included diamond drilling, prospecting, sampling, mapping and ground geophysics at various locations throughout the project area. The properties and areas drilled in 2010 included: the **Copper Mountain** area, including the Prince of Wales showing; the **Motherlode** past producer; the **Sappho** past producer; the **Ket 28** prospect; and, the **Dayton** past producer. A gold intersection at the **Prince of Wales** target (MINFILE 082ESE255) was reported as a **new discovery**.

Golden Dawn Minerals Inc undertook a late season diamond drilling program on the **Wild Rose** property. Gold-silver-copper mineralization is hosted by the Wild Rose (quartz) vein (MINFILE 082ESE116), which has been explored through underground workings and previous drilling campaigns. A main focus of the 2010 drilling program was a system of lower grade, bulk tonnage gold-copper targets and potential in zones to the east and west of the old workings. The Deadwood gold zone, an example of one of these zones, trends northwest-southeast and coincides with a magnetic anomaly. Previous drilling defined an extent of up to 2000 m.

Activities at the large **Jumping Josephine** or **JJ** property, undertaken by joint-venture partners Astral Mining Corporation and Kootenay Gold Inc, have been centred on a 2003 discovery of high grade gold mineralization known as the JJ Main zone (MINFILE 082ESE275) (Figure 36). The mineralized structure in the vicinity of the JJ Main zone has been intersected in trenching and drilling over a strike length of greater than 900 m and at up to 240 m vertical depth in drillholes. There is a 300 m long core zone of higher grade material. Geology, geophysics and geochemistry had previously suggested that the host structure may extend for up to 2.5 km. Drilling in 2010, including work at the Highway zone, confirmed that the structure is continuous over a strike length of greater than 2 km. Additional drilling also targeted suspected parallel zones to the JJ Main which provided further evidence for a parallel zone to the southeast of the JJ Main (Ford zone). Drilling of the Cedar zone, to the northwest, confirmed the presence of

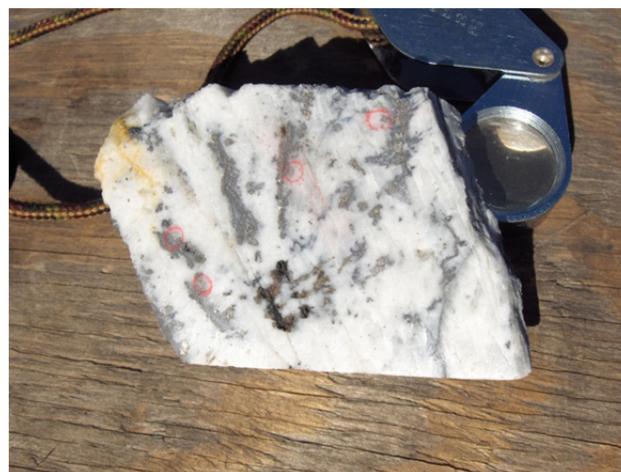


Figure 36. Pyrite, arsenopyrite and gold (inside red circles) in quartz vein material; Jumping Josephine property drill core.

quartz stockwork and vein breccias with pyrite and arsenopyrite.

Valterra Resource Corporation's gold-silver-copper Star project includes both the **Star** and the **Toughnut** properties. The project area contains five known gold zones in proximity to the prospective Silver King shear zone, including the Star and Eureka past producers, the Alma N zone (immediately to the south of the Star), the Toughnut occurrence and the Gold Eagle zone further to the southeast. Work in 2010 began with an airborne EM-MAG survey, followed by initial drilling on the Toughnut (MINFILE 082FSW294), Eureka and Star (MINFILE 082FSW083) zones. A zone anomalous in gold has now been outlined through drilling over a potential strike length of greater than 3.5 km. A second-phase drilling program started late in the year, with a focus on the Gold Eagle and Alma N zones. Drilling at the latter zone in 2009 demonstrated approximately 250 m of mineralized strike length to a maximum depth of 135 m.

Anglo Swiss Resources Inc was active again on its **Kenville Gold Mine** property (MINFILE 082FSW086). The past producing Kenville mine, also known as the Granite-Poorman, operated intermittently between 1890 and 1954, with the bulk of production prior to 1912. Production averaged more than 17 g/t Au, from a series of northeast dipping quartz veins. Exploration at the Kenville in 2010 included surface and underground diamond drilling. The company's objectives have been to explore for extensions of known ore-grade material and new mineralization, focusing on the sulphide-bearing, mesothermal quartz veins. The current focus is to follow up on recent drilling, which has yielded vein intersections at depth and to the south and southwest of the underground workings. Some of the known veins have been extended over 200 m to the south. New mineralized veins have also been intersected.

Jaxon Minerals Inc's **Nox Fort** property is an intrusion-related gold prospect with bismuth and tellurium. Known mineralization on the property includes the Bunker Hill mine (MINFILE 082FSW002), a minor past producer prior to 1942 of gold with tungsten, silver, molybdenum and zinc. The company believes that mineralization on the property, particularly in the vicinity of the Bunker Hill mine, represents a reduced, intrusion-related gold (RIRGD) system, perhaps analogous to deposits in the Tintina gold belt, including the Fort Knox mine in Alaska. Drilling in 2010 was focused on the western contact of the Bunker Hill intrusive, an area with anomalous gold, bismuth and tellurium concentrations in soils. The target zone was the third level of the Bunker Hill mine, a lower elevation target than previously intersected.

The **Jersey-Emerald** property was the site of significant work by Sultan Minerals Inc again in 2010. The underground Jersey lead-zinc and Emerald tungsten mines (MINFILE 082FSW009, 010, 011 and 218) closed in 1973. The Jersey mine was a major lead-zinc producer, and the Emerald was Canada's second largest tungsten

producer (Figure 37). Sultan produced a NI 43-101 lead-zinc resource estimate for the Jersey-Emerald in 2010. It includes an indicated resource of 1.9 Mt averaging 1.96% Pb and 4.10% Zn, using a cutoff grade of 3.5% combined Pb-Zn. This resource is located solely in the area of the old Jersey mine workings. Exploration work involved diamond drilling and trenching to test magnetic geophysical anomalies in the vicinity of the HB mine. Exploration was successful in extending mineralization, consisting of pyrrhotite associated with sphalerite, to the north of the Garnet open pit.

## EAST KOOTENAY COALFIELDS PROJECTS

Centremount Coal Ltd carried out a large diamond and rotary drilling program on the **Bingay Creek** property (MINFILE 082JSE011) within the Elk Valley coalfield. This program was the largest exploration project in the region in 2010, and also represents the largest investment of Chinese capital in a southeastern British Columbia coal exploration play to date. Bingay Creek is currently being evaluated as a potential underground and/or open pit metallurgical coal mine. Drilling in 2010 was intended to define the extent of the known coal occurrences, delineate mineable reserves, and to provide samples for exhaustive coal quality testing. Bingay Creek appears to be relatively rich in coal, both in terms of number of potentially mineable seams and average seam thickness. For example, there are four seams consistently greater than



Figure 37. The Emerald open-pit mine (tungsten past producer) near Salmo on Sultan Mineral Inc's Jersey-Emerald property.

15 m in thickness. Coals at Bingay Creek are known to be medium-volatile and high volatile-A bituminous in rank, based on previous exploration results.

Teck Coal Limited's Line Creek Operations rotary drilled the **Burnt Ridge North** property, 2 to 6 km north of currently active pits at the Line Creek Operations. Burnt Ridge North with **Mount Michael** (MINFILE 082GNE022) has entered the Environmental Assessment Process as part of the Line Creek Operations proposed Phase 2 Expansion Project. Both areas are intended to provide new reserves. Exploration rotary drilling in 2010 was mainly of a fill-in nature and was targeted at delineating mineable reserves. The coals are predominantly medium-volatile bituminous in rank, with some high volatile-A bituminous coals near the top of the section and can be expected to yield good metallurgical coal products.

Teck Coal Limited carried out large mine-site exploration rotary drilling programs at the Elkview and Fording River sites. At Elkview the work was carried out on **Adit Ridge**. At Fording River the drilling occurred in the **North Greenhills** area (MINFILE 082JSE010), along strike from Greenhills Operations. In both cases, the potential for new open pit mining opportunities is being evaluated.

## SOUTHWEST BRITISH COLUMBIA

**Myra Falls** (MINFILE 092F 330) had the largest exploration program in the region. In total, the amount of drilling for exploration purposes will be approximately 15 000 m, representing roughly 90% of 2010 drilling at the mine. A track drift extended toward the **Marshall** zone will act as a base for exploration drilling (Figure 38). There was also development in the **Price** mine, to be used for establishing drill platforms to explore between the west end of the Price and the east end of the South Flank lens. Another potential target is the Trumpeter lens to the north.

Imperial Metals Corporation drilled the **Catface** property (MINFILE 092F 120, 231, 251) in 2010. The 3548 m 13-hole program tested north-south continuity of the Cliff zone with a sub-horizontal hole as well as resource expansion to the north and south of the zone. The hole through the Cliff zone returned 755 m grading 0.46% Cu and 0.006% Mo. This included 275.5 m of 0.60% Cu, 0.014% Mo and 3.52 g/t Ag. The Irishman Creek zone was also drilled to confirm the existence of a high-grade breccia zone. 2009-2010 work also included re-activation of 8.4 km of road access, construction of core facilities and a program of geological mapping. Selkirk Metals Corp (now merged with Imperial Metals) published a resource estimate in 2009, based largely on historical drilling and results which did not incorporate molybdenum and silver. Total sulphide and mixed sulphide-oxide ore was estimated at 58.863 Mt at 0.40% Cu indicated and 262.448 Mt at 0.38% Cu inferred resources. Oxide copper over 66% CuO/Cu is not



Figure 38. Part of a copper-rich intersection at Myra Falls, evidence of the success of near-infrastructure exploration.

included in the estimate.

Grande Portage Resources Ltd reported results of initial metallurgical testing of a bulk sample taken from the Copper Knob area at its **Merry Widow** copper gold skarn project (MINFILE 092L 044). Gold recovery was 95.1%, silver 88.9% and copper 88.0%. Head grades were 9.9 g/t Au, 74.0 g/t Ag and 5.9% Cu. The company has a permit in place for a 10 000 tonne bulk sample.

Late in the year, coal miner Hillsborough Resources Limited began exploration drilling 8 km to the east of the **Quinsam** mine site (MINFILE 092F 319). The planned 12 hole, 1400 m program will represent a departure from recent exploration efforts located much closer to existing workings.

Following a substantial drill program in 2009, Bitterroot Resources Ltd's 2010 program at **Mineral Creek** (MINFILE 092F 078, 079, 331) included compiling a GIS database of recent and historical exploration data which identified untested soil anomalies. These were examined in 2010, in addition to stream sediment and moss-mat sampling. Late in the season, an airborne VTEM survey identified targets on the northern part of the property. Mineral Creek Ventures Inc continued bulk sampling of the Linda vein at Mineral Creek in 2010. Monetary proceeds are shared with Bitterroot (Figure 39). To date the Mineral Creek property has at least 6 known high grade gold-bearing structures.

Pacific Iron Ore Corporation's **Pearson** project was among the larger programs in the region again in 2010 with a 9100 m, 32 hole drill program focused on enhancing the current magnetite resource in the Bugaboo Creek area (MINFILE 092C 022, 023, 025, 027). A revised estimate is in preparation incorporating 2009 and 2010 results. Baseline environmental monitoring began in the fall. Pacific Iron Ore's goal is to export magnetite iron ore concentrate directly to the worldwide steel industry.

New Shoshoni Ventures Ltd generated a **new project** in the Jordan River area. The 2010 program at the **DS copper-gold** project consisted of geology, geophysics



Figure 39. The portal of Westmin's 1989 exploration adit at Mineral Creek. It now houses a gravity mill used to process a bulk sample.

(magnetics, IP, UTEM) and an initial drill program of 1800-2000 m in 13 holes. The initial showing that prompted the current investigation is copper-gold mineralization in breccia exposed in a borrow pit, with first recorded sampling in the 1990s. Highlights of initial drilling confirmed the copper-gold mineralization and include 39 m of 0.93% Cu and 0.71 g/t Au, 26 m of 1.2% Cu and 0.9 g/t Au, 22 m of 1.06% Cu and 0.79% Au in siliceous breccia with pyrite, chalcopyrite, bornite and minor native copper.

A drilling and trenching program occurred late in the year at the **Valentine Mountain** (MINFILE 092B 108) gold project on southern Vancouver Island. Mill Bay Ventures drilled ten holes totalling 1775 m in the Discovery zone. Visible gold is reported in a quartz vein in the host metamorphic rocks in one of the holes. Existing trenches were partially re-opened for sampling and mapping. Initial highlights from grab samples in the "B" vein trench were 25.7 g/t Au over 0.23 m and 57.4 g/t Au over 0.22 m. A 1990 (historical) resource estimate for the "C" structure in the Discovery zone has 30 660 tonnes averaging 14.7 g/t Au.

Prophecy Resource Corp and Eastfield Resources Ltd resumed activity at the **Okeover** or **OK** project (MINFILE 092K 008, 057, 155). The Okeover property hosts several copper-molybdenum occurrences spread over approximately five kilometres in a north-northwest direction. The North Lake zone is the most-explored of these, and it is the surrounding area that is currently targeted. The 2010 program included 20 km of cut line and soil geochemistry. The work is intended to identify step-out targets at the North Lake zone, for which there is an inferred resource of 86.8 Mt grading 0.31% Cu and 0.014% MoS<sub>2</sub>. The work identified three strong new soil anomalies.

Miocene Metals Limited is a private company formed to explore Wallbridge Mining Company Limited's southern British Columbia properties. Primary targets are occurrences of porphyry style mineralization spatially

associated with Miocene intrusions in the northern Cascades magmatic arc. One of the properties is the **Salal Creek** property (MINFILE 092JW 005). A program of airborne geophysics, prospecting, channel sampling and a 2-hole late season drill program, one of 450 m in the Float Creek area, a second hole in the Plug Creek area. Topography has presented challenges to drill programs in the Float Creek area, the most-developed prospect on the property (Figure 40).

Module Resources Incorporated had an exploration program stepping out to the north of late 2009 drilling at the **Ladner Gold** project (MINFILE 092HNW003, 007, 018). It consisted of an approximately 900 m, 5-hole surface drill program at the McMaster zone, which extended the zone to the east. Hole McM-32-09 intercepted 2.86 g/t Au over 43.6 m including 27.6 m grading 3.96 g/t Au. The target is a potential open pit gold resource. An aspect of the Ladner project is the potential gold resource in tailings of the former Carolin mine. Gold recovery during the 1982-84 operating period was roughly 50%, leaving an average 1.68 g/t Au in tailings. Module commissioned preliminary metallurgical testing on composite tailings samples. An intensive whole ore cyanide leach test yielded 87.2% gold recovery and a flotation test returned an initial 63% recovery.

## THE BRITISH COLUMBIA GEOLOGICAL SURVEY

The British Columbia Geological Survey (BCGS) continued to play a leading role in the creation of a thriving, safe, and sustainable mining industry in British Columbia in 2010. This was accomplished by providing world-class geoscience expertise and data to government, industry, and the general public. These diverse groups use our expertise and data in different ways, but an underlying interest of all groups is to see the province position itself as a favoured destination for investment by the mineral exploration and mining industry. A great attribute of the



Figure 40. Previously unreported molybdenum mineralization was noted near the foot of a retreating glacier at the Salal Creek project.

BCGS in the fast-paced world of today is its ability to consistently deliver standardized, high quality geological maps, geoscience reports, and online interactive geoscience databases in a very short timeframe. All geoscience products are made available online via MapPlace, the award-winning internet portal of the BCGS.

The BCGS continuing to focus on creating new geoscience products from existing data and developing innovative programs that involved cooperative partnerships with the federal government, universities, industry, and other public geoscience agencies. The BCGS continued its long collaboration with the Geological Survey of Canada (GSC) by participating in four joint field projects in 2010. Three field mapping projects were delivered as part of the GSC's Geo-mapping for Energy and Minerals (GEM) program and a new multi-year rare metals project started under the auspices of the renewed Targeted Geoscience Initiative program (TGI-4). This rare metals project is a national initiative with George Simandl of the BCGS chosen to be the National Science Lead. Another important BCGS partner was Geoscience BC (GBC). In 2010, the BCGS and GBC collaborated on the delivery of a surficial mapping and till sampling program southeast of Houston in the Taitsa Lake district of west-central British Columbia. Finally, as in past years, university students were employed as co-op interns and geoscience assistants to help deliver our field programs and work on improving provincial digital geoscience databases.

A main priority of the BCGS is to generate new geoscience data and products, including bedrock and surficial geology maps and targeted mineral deposit studies. Field mapping studies continued in the following areas of the province: the North Coast, led by J. Nelson; the Iskut River, led by M. Mihalynuk; and Taitsa Lake, led by T. Ferbey. A new two-year GEM "Edges" project in northern British Columbia started in 2010 with mapping in the Kutcho Creek area near the Kutcho Creek volcanogenic massive sulphide deposit and is led by P. Schiarizza. Several other projects were undertaken by survey geologists as well as in co-operation with BCGS emeritus staff and other geoscientists.

MapPlace, our internet portal and one of the most effective geoscience online map systems globally, continues to improve with the addition of new data layers and improved interface tools.

Over the course of the year, there has been a steady increase, in the amount of new data available on MapPlace. The first of the key enhancements is the British Columbia digital bedrock geology map, named BCGeology map. A draft copy of the map is now available for download. The essential advancement of this map is how it allows the ability to digitally update the map and reduce both redundancy in compilation and data integration. This draft is the starting point to streamline integration of past and future mapping and create a seamless, integrated provincial database. The second key

enhancement to the MapPlace is the addition of ARIS technical reports to the database and having all the reports available without a backlog. There are over 30,900 reports in the database. In 2010, 930 reports were submitted of which 911 were approved. The third key enhancement is the significant increase in the number of historical documents to the Property File database. This unique collection of old reports, field notes, maps and assorted geological miscellany from the 1850's to present had only been available through hardcopy files at the BCGS in Victoria. A systems design program, combined with extensive scanning of documents over the last 6 years, has led to an integrated system that presents this information digitally via the web. Approximately 80 000 to 100 000 documents are present in the files. As of the end of 2010, roughly 26 000 documents are available on the web, available through Property File at:

<http://www.empr.gov.bc.ca/mining/geoscience/PropertyFile/Pages/default.aspx>.

## **GEOSCIENCE BC - PUBLIC GEOSCIENCE DELIVERY OUTSIDE OF GOVERNMENT**

Geoscience BC (GBC) is an industry-led, not-for-profit, applied geoscience organization established in 2005. GBC works in partnership with industry, academia, government, First Nations, and communities to fund applied geoscience projects with the objective to attract mineral and oil and gas exploration and investment to British Columbia.

GBC's mandate includes the collection, interpretation, and delivery of geoscience data and expertise, to promote investment in resource exploration and development in British Columbia. It has received \$36.7 million in grants from the British Columbia government since 2005 to complete minerals and oil and gas related geoscience.

The organization is governed by a volunteer Board of Directors which includes representatives from the mining and oil and gas industries, industry associations, First Nations and academia. Volunteer Technical Advisory Committees, whose members are largely drawn from industry, recommend funding priorities and projects to the Board.

From April 2005 to October 2010, Geoscience BC has made funding commitments of over \$30 million for a total of 5 major programs, 86 proposal-driven partnership projects, support for 36 student projects and 40 graduate scholarships. They leveraged almost \$9 million through partnerships with industry, university, government (federal) and communities, including receiving significant grants from the Mountain Pine Beetle Recovery Accounts of the Northern Development Initiative Trust based in Prince George for work in British Columbia's interior to help diversify forestry-dependent communities.

Geoscience BC's annual Summary of Activities containing technical reports on these projects and others active in 2010 was released at the annual Mineral Exploration Roundup. Project details and data are available from their website at: <http://www.geosciencebc.com>.

## **ASIA PACIFIC INVESTMENT MISSION**

Throughout the year Ministry of Forests, Mines and Lands staff work with companies, industry associations and other government agencies to attract Asian companies seeking mining investment and partnership opportunities to British Columbia and to coordinate matchmaking with foreign delegations. For the last five years the Ministry has sponsored investment missions to coincide with the China Mining Congress, a conference held in mid-November. Exploration, mining and mining service companies and industry associations played key roles on the missions and the companies were given opportunities to showcase their projects and to meet interested Asian companies. The mission in 2010 also included visits to companies and government agencies in Tokyo and Hong Kong as part of the Investment Mission.

Current plans are to organize a sixth Asia-Pacific Investment Mission for November 2009. Similar to the previous missions, the Ministry of Forests, Mines and Lands will work the Ministry of Tourism, Trade and Investment, interested companies from the mineral industry, the Association for Mineral Exploration British Columbia, Geoscience BC, Mining Association of British Columbia and other governmental agencies to deliver the mission.

If your company is interested in profiling your projects or investment opportunities in the fall Investment Mission, you can contact the British Columbia Mineral Development Office in Vancouver at the address below.

Kirk Hancock, A/Director  
BC Mineral Development Office  
Suite 300 - 865 Hornby Street  
Vancouver, BC V6Z 2G3  
Tel: 604-660-3332  
Email: [kirk.hancock@gov.bc.ca](mailto:kirk.hancock@gov.bc.ca)

## **MINING INDUSTRY OUTLOOK**

Following the last two years of significant reductions in available risk capital, as part of the worldwide economic downturn, financial markets are rebounding for the mineral industry. This is reflected in the number and variety of projects seen in the province and around the world. Of key importance is the fact that major mine development projects are able to access funding, into the 100's of millions of dollars, to move projects forward. The net effect has been a swell in funding for exploration and mining, at all levels in the mineral exploration and mine development sequence, as well. Much of the funding

has come from Asian investors, ranging from individuals through integrated industrial consortiums through to State agencies. This funding is led by China, but Korea, India and southeast Asia are major influences. Not to be missed in this influx of Asian investment has been significant investments from what can be considered more 'traditional' sources from North America and Europe.

A second driver has been the combined increase in prices for a broad spectrum of mineral commodities with gold leading at well over US\$1000 per ounce, followed by copper at over US\$4.00 per pound and coal, specifically metallurgical grade, at over US\$200 per tonne. Other key commodities like molybdenum are showing sustained strength and stability. Over the near term of the next couple of years, forecasts indicate a continued sustained commodity process and continued demand worldwide.

For British Columbia, this is good news. The province has a varied and productive geological environment that has demonstrated the ability to host a broad variety of mineral products. It is home to the largest concentration of junior mining and capital companies in the world and raises billions of risk capital each year. These companies also have significant exploration and development expertise. The Provincial government recognizes this combination and the importance of mining and exploration in British Columbia so continues to support these industries and their activities. Over the next number of years it is anticipated that British Columbia's mineral industry will continue to build a stronger connection to Asian markets and companies. This will involve building on existing relationships with Japan and Korea and developing new business connections with China. Key Chinese government agencies are encouraging investment outside of China in early stage exploration projects, in addition to their more traditional approach of seeking projects closer to the development stage and easing restrictions on foreign investments by Chinese private sector companies. British Columbia is Canada's Pacific Gateway and a natural business partner for Asian companies.

## **ACKNOWLEDGMENTS**

The information contained in this publication, and covered in more detail in the publication Exploration and Mining in British Columbia 2010 is provided by British Columbia's Regional Geologists based in offices in Cranbrook (Dave Grieve), Kamloops (Bruce Madu), Prince George (currently vacant), Smithers (Paul Wojdak), and Vancouver (Bruce Northcote). The article benefited from edits by Dave Lefebure and Larry Jones. George Owsiacki of Total Earth Science Services was responsible for editing, desk topping the publication and provided valuable input. The lead author (K.H.) would like to personally thank the Regional Geologists for their support and excellent geological reporting that forms the core of this volume.

<b>Regional Geologists Contact Information</b>			
Northwest – Smithers	Paul Wojdak	250-847-7391	paul.wojdak@gov.bc.ca
Northeast / North-Central – Prince George	Vacant		
South-Central – Kamloops	Bruce Madu	250-371-6071	bruce.madu@gov.bc.ca
Southeast – Cranbrook	Dave Grieve	250-426-1658	dave.grieve@gov.bc.ca
Southwest – Vancouver	Bruce Northcote	604-660-2713	bruce.northcote@gov.bc.ca
BC Mineral Development Office – Vancouver	Kirk Hancock (A/Director)	604-660-3332	kirk.hancock@gov.bc.ca

---

MINISTRY OF NATURAL RESOURCE OPERATIONS

MINISTRY OF FORESTS, MINES AND LANDS

[www.empr.gov.bc.ca/geology](http://www.empr.gov.bc.ca/geology)

---