

EXPLORATION AND MINING in British Columbia 2010





**Ministry of Forests, Mines
and Lands**

**Ministry of Natural Resource
Operations**

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Ministry of Forests, Mines and Lands
Mines and Mineral Resources Division
British Columbia Geological Survey

Ministry of Natural Resource
Operations
Regional Geologists

Front Cover:

Drill move at the Aley property of Taseko Mines Ltd. located northwest of Chetwynd.
(Photo credit: Duncan McLeish)

Back Cover:

Mining the Burnt Ridge South pit of the Line Creek Mine of Teck Coal Limited in the
Elk Valley. (Photo credit: Dave Grieve)

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FOREWORD

INTRODUCTION

Exploration and Mining in British Columbia 2010 represents the latest annual documentation of the activities of the province's exploration and mining industry. The record goes back to 1874 when the *Annual Report of the British Columbia Minister of Mines* first went to print and has evolved through various formats over the years. This publication provides a region-by-region perspective with an in-depth look at the mines and significant exploration and mine development projects in British Columbia. Readers who wish to acquire a first-pass or general picture of the mining and exploration industry in British Columbia may find the *British Columbia Mines and Mineral Exploration Overview* to be a useful publication.

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

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

Information in *Exploration and Mining in British Columbia 2010* has been compiled and written by the province's regional geologists and the Chief Geologist of the BC Geological Survey, based on their personal knowledge supplemented by industry information. A staffing vacancy in Prince George has necessitated that the chapters concerning the Omineca and Northeast regions are, for this year, less complete. In particular, the description for the Northeast is very brief. Readers will note that the names of the regions have changed from the preceding volume which reflects changes within government that occurred late in 2010. At this time the staff of the Ministry of Energy, Mines and Petroleum Resources were reassigned to several natural resource sector ministries. The regional geologists moved to the new Ministry of Natural Resource Operations while the British Columbia Geological Survey joined the new Ministry of Forests, Mines and Lands.

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

The regional geologists are located in Vancouver (Bruce Northcote), Smithers (Paul Wojdak), Kamloops (Bruce Madu), Prince George (vacant) and Cranbrook (Dave Grieve). They work with the BC Mineral Development Office in Vancouver to provide geological and mineral industry expertise and to promote mineral exploration and development in the province. As regional experts they also support various functions of the Ministry of Natural Resource Operations, the Ministry of Forests, Mines and Lands and particularly of their respective offices.

Regional geologists' key roles and responsibilities include:

- fostering sustainable exploration, development and use of the province's mineral and coal resources;

- providing clients with up-to-date technical information and professional advice about known and potential mineral and coal deposits;
- providing geological and mineral resource information to project review or land-use decision-making processes;
- monitoring the status of the mining industry and the development of infrastructure required for mineral resource development;
- working on field projects and surveys, compilations, promotional brochures and deposit models; and
- contributing information to maintain and update geosciences databases (e.g. MINFILE).

Contact Information:			
Omineca-Skeena regions – Smithers	Paul Wojdak	250-847-7391	paul.wojdak@gov.bc.ca
Northeast Area – Prince George	Vacant		
Thompson-Okanagan-Cariboo regions – Kamloops	Bruce Madu	250-371-6071	bruce.madu@gov.bc.ca
Coast Area – Vancouver	Bruce Northcote	604-660-2713	bruce.northcote@gov.bc.ca
Kootenay-Boundary regions – Cranbrook	Dave Grieve	250-426-1658	dave.grieve@gov.bc.ca
BC Mineral Development Office – Vancouver	A/Director, Kirk Hancock	604-660-3332	kirk.hancock@gov.bc.ca

Methodology

Compilation of *Exploration and Mining in British Columbia* presents certain challenges. Deadlines demand manuscript submission before all information from programs carried out later in the year is available, and before some programs are even complete. It is also difficult to garner information on all programs that have occurred. In particular, critical grassroots exploration that leads to new discoveries can be difficult to track.

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

Exploration expenditures are broken down by category: grassroots exploration, early-stage exploration, advanced exploration, mine evaluation and mine lease exploration. Grassroots exploration commonly does not require permitting and the activities and expenditures assigned to this category are less likely to be reported. Early-stage exploration involves focused activities often based on a deposit model. It may include geophysics, geochemistry, trenching and drilling. Advanced-stage exploration is concerned with resource definition emphasizing drilling and bulk sampling, but may include baseline environmental

studies, economic pre-feasibility work and exploration of secondary targets. Mine evaluation begins with the firm commitment to develop a resource, and usually coincides with a pending application to government to open a mine; it tends to concentrate on the environmental, social, engineering and financial assessments of a project. Mine lease exploration represents work on a mining property beyond known reserves; it may have characteristics of early-stage or advanced exploration.

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

ACKNOWLEDGMENTS

The cooperation of the industry in providing information and access to project sites is always welcomed and sincerely appreciated. The authors also wish to thank Dave Lefebure, Chief Geologist, for his contribution to the volume and for his editorial improvements and coordination of the volume. Compilation and layout of the volume was completed by George Owsiacski and Garry Payie of Total Earth Science Services.



Dave Grieve

Bruce Madu

Bruce Northcote

Paul Wojdak

Dave Lefebure

Jay Fredericks

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EXPLORATION AND MINING IN Omineca Region, British Columbia

By Paul Wojdak, MSc, PGeo
Regional Geologist, Smithers

SUMMARY AND TRENDS

Exploration spending is estimated to be \$37 million and expenditure on mine development at Mount Milligan was about \$33 million. There was about 83 000 m of exploration drilling spread between 18 projects. Although there is limited data for 2009 it is apparent that activity level increased in 2010. It is difficult to make a comparison with levels of activity in prior years because the area of the region has been changed to reflect Government's current administration boundaries, such that the Barkerville to Williams Lake area was transferred to Thompson-Okanagan-Cariboo region. Readers are referred to the Thompson-Okanagan-Cariboo chapter for the Gibraltar and Mount Polley mines and Cariboo district exploration projects. Figure 1 and Table 1 portrays mines and exploration activity in the new Omineca region.

Thompson Creek Metals Company Inc acquired the Mount Milligan copper-gold project in 2010 by acquisition of Terrane Metals Corp and is proceeding with mine development. Initial activities at Mount Milligan comprise construction of the access road and power line, installation of the construction camp and land clearing. Estimated cost for the entire project is \$915 million. Kemess South gold-copper mine is scheduled to close in the first quarter of 2011. Northgate Minerals Corp reactivated work on the Kemess North deposit to evaluate potential for a block-cave underground mine. More closely-spaced drilling in a part of the deposit identified higher gold and copper grades, including values of more than 2 g/t Au over significant intersections. Exploration activity in Omineca region focused on gold exploration in the Nechako Plateau south of Vanderhoof and copper-gold in Quesnel terrane northward of Prince George. Significant efforts were also devoted to rare metals and to lead-zinc in the Rocky Mountains, and to a new style of nickel deposit northwest of Fort St. James.

In the Nechako area, drilling by Richfield Ventures Corp on its Blackwater-Davidson epithermal gold prospect continued throughout the year, producing a number of wide, bulk-tonnage grade, gold intercepts (*e.g.* 1.25 g/t Au over 361 m). A resource estimate is anticipated in mid-2011. This new prospect is located close to, and in similar geological setting to the long-known Capoose silver-gold prospect. There, drilling by Silverquest Resources Ltd also resulted in significant intercepts. Junior explorers rushed to stake ground in the rapidly emerging Nechako gold district that extends 140 km south to the Newton prospect of Amarc Resources Ltd

and 165 km west to the Coles Creek property of Callinan Mines Ltd (see Skeena Region).

In the northern Quesnel porphyry belt, there were major drilling programs at Kwanika (by Serengeti Resources Inc) and Mount Milligan in addition to that at Kemess North. Exploration at Mount Milligan is on deep targets, including below the designed open pit. The latter holes must be done in the time prior to pit development. Two major companies, Xstrata Copper Canada Ltd and Teck Resources, conducted grassroots programs in search of porphyry copper-gold deposits in the extensively overburden-covered area between Prince George and Mount Milligan.

First Point Minerals Corp and Cliffs Natural Resources Inc explored Cache Creek terrane ultramafic rocks northwest of Fort St. James for a new type of nickel deposit. Under select geologic conditions nickel in serpentinite is present as a native nickel-iron alloy that may be amenable to low-cost gravity and magnetic separation rather than needing the more expensive conventional flotation and smelting.

In the northern Rocky Mountains, many junior companies acquired ground in a belt of carbonatite and affiliated alkaline intrusions that are prospective for rare metals. Taseko Mines Limited conducted a major investigation of the Aley niobium prospect. Closer to Prince George, Canadian International Minerals explored the Wicheeda carbonatite complex for lanthanum, cerium and other light rare earth elements. In the Kechika district, Canada Zinc Metals Corporation reactivated drilling for bedded lead-zinc mineralization on the Akie property.

METAL MINES

The **Kemess South** copper-gold mine is located 430 km northwest of Prince George or 240 km north of Smithers and is 100% owned by Northgate Minerals Corporation. The mine operated at 52 000 tonnes per day and employed 350 people full time. Production in 2010 is forecast at 3170 kg Au (102 000 ounces) 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. In 2009, Kemess processed 18 353 000 tonnes of ore producing 5382 kg Au (173 040 ounces) and 23 812 tonnes of Cu. Metal recoveries were 66% for gold and 81% for copper. The net cash cost of production was \$348 per ounce of gold. Cut-off grade (in August 2010) was 0.09% Cu and 0.19 g/t Au. Mining of Kemess South is scheduled to end

Mines and Major Exploration Projects Omineca Region

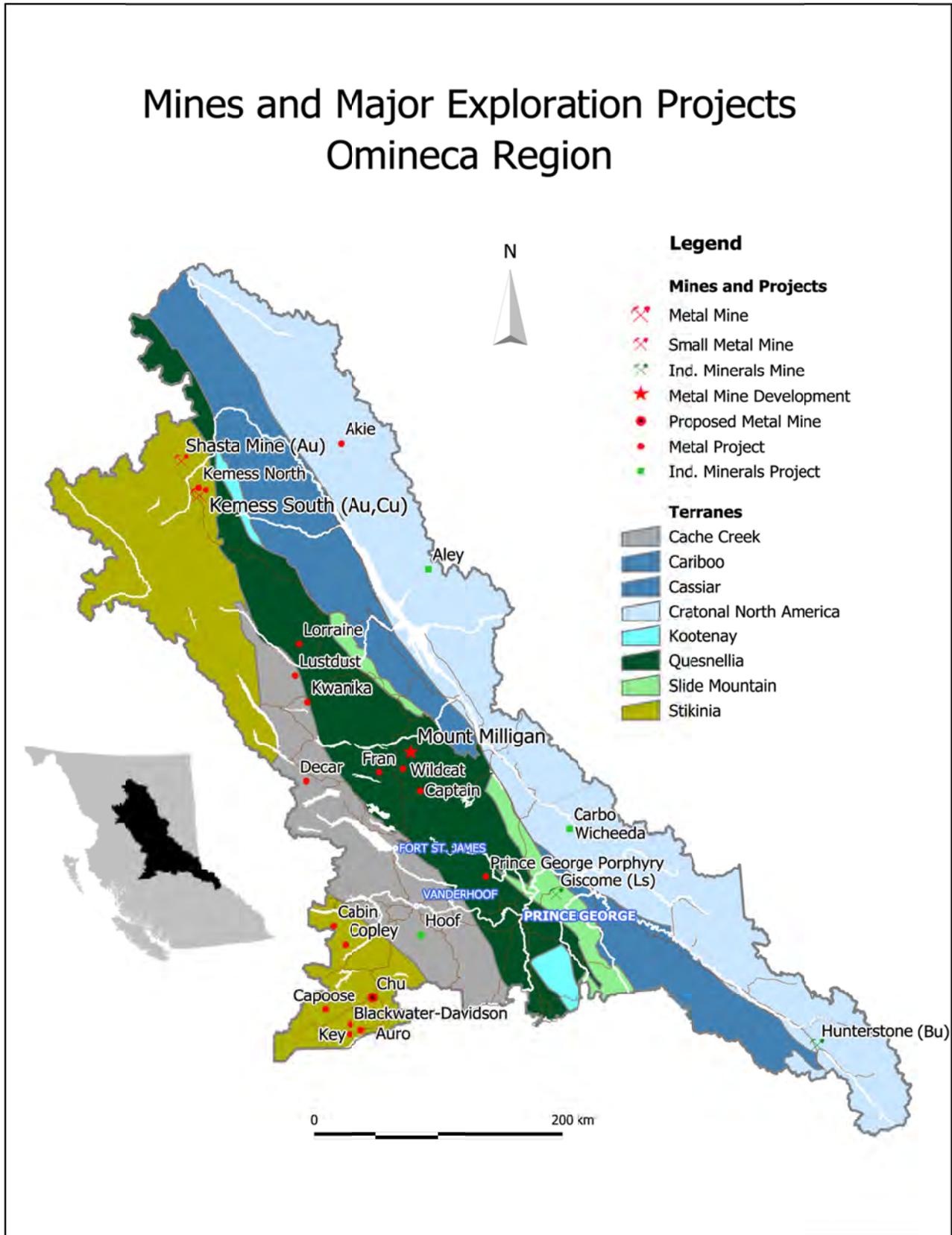


Figure 1. Mines and Exploration Projects in Omineca Region.

TABLE 1. MAJOR EXPLORATION PROJECTS, OMINECA REGION

Property	Operator	MINFILE (1:20 000 Map Sheet)	Commodity	Deposit Type	Work Program
Akie	Canada Zinc Metals Corp	094F 031	Zn, Pb, Ag	Massive Sulphide	DD (6228 m, 13 holes); A
Aley	Taseko Mines Limited	094B 027	Nb, REE	Carbonatite	G; DD (4516 m, 23 holes)
Auro	Gold Reach Resources Ltd	(093F.017)	Au	Epithermal vein	AB (1598 km); G; 3D-IP (80 km); GC (3000 soil)
Blackwater Davidson	Richfield Ventures Corp	093F 037	Au	Vein	DD (~20 000 m); A (20 km); IP
Cabin	Paget Minerals Corp	093F 038	Au, Ag	Epithermal	IP, MG; DD (1418 m, 10 holes)
Capoose	Silver Quest Resources Ltd	093F 040	Ag, Au	Vein	MG (115 km); IP (10 km); DD (10 590 m, 37 holes)
Captain	Orestone Mining Corp	093J 026	Cu, Au	Porphyry	GC (soil); IP (2 km); DD ?
Carbo	Canadian International Minerals Inc	093J 014	REE	Industrial Mineral	AB-MG-RD; G; GC; DD (1939 m, 9 holes)
Chu	TTM Resources Inc	093F 001	Mo	Porphyry	GC (4430 samples); MS; DD (1162 m, 6 holes)
Copley	Kootenay Gold Corp	(093F.076)	Au	Epithermal	GC; DD (1000 m, 11 holes)
Decar	Cliffs Natural Resources Inc	093K 041	Ni	Disseminated	G; MG; IP; DD (2430 m, 10 holes)
Fran	Yankee Hat Minerals Ltd	093K 108	Au, Cu	Vein	DD (up to 10 000 m?)
Hoof	Porpoise Bay Minerals Ltd	093G 018	Mg, Ni	Industrial Mineral	A (2.7 km)
Kemess North	Northgate Minerals Corp	094E 094	Cu, Au	Porphyry	DD (16 439 m)
Key	Troymet Exploration Corp	093F 069	Au	Epithermal	G; P; IP; GC (soil);
Kwanika	Serengeti Resources Inc	093N 073	Cu, Au	Porphyry	DD (7 600 m, 31 holes)
Lorraine	Teck Resources Limited	093N 002	Cu, Au	Porphyry	G; GC (soil)
Lustdust	Alpha Gold Corp	093N 009, 044	Au, Cu	Skarn	DD (? m)
Mt Miligan	Thompson Creek Metals Company Inc	093N 194	Au, Cu	Porphyry	DD (~8000 m); IP (Titan-24, 50 km)
Nonda	Stikine Energy Corp	(094N.083)	Industrial Mineral	Industrial Mineral	BU (450 t); Pilot Plant; P, G
Prince George Porphyry	Xstrata Copper Canada Ltd	(093J.015, 025)	Cu, Au	Porphyry	GC; G; DD (~1500 m?)
Shasta Mine	Sable Resources Ltd	094E 050	Au	Vein	mining activity
Wicheeda	Spectrum Mining Corp	093J 014	Ce, La, Nd	Carbonatite	MS (400 kg); GC (soil)
Wildcat	Cayden Resources Inc	093N 228	Cu, Au	Porphyry	AB-EM-MG (310 km)

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)

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 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.

Kemess South (MINFILE 094E 094) is a gold-rich porphyry copper deposit developed in a potassium-rich calcalkaline monzodiorite. The 200 Ma pluton is flat-lying, underlain and partially overlain by Takla Group augite basalt to andesite; overlying all this are epiclastic rocks of the Lower Jurassic Toodoggone Formation. Mineralization is a vein stockwork of quartz, magnetite and chalcopyrite with attendant biotite and sericite alteration; copper grade is directly proportional to quartz vein content. Mineralization is best developed in the pluton and weakly developed in Takla volcanic rocks. A leached and then supergene enriched zone is developed below the epiclastic rocks that comprises up to 70 m of

sparse native copper and lesser cuprite, covellite and chalcocite (G. Skrecky, personal communication, 2010). Gold grade is similar to hypogene ore in both the leached cap and supergene zones. The deposit is elongated east-west, segmented into West and East sub-pits by a central “high” of Takla Group rocks. To the north, the deposit is truncated by a normal fault with the north side displaced upward.

Mining of the West Pit was terminated approximately in August 2009 by failure of the Toodoggone epiclastic rocks at the west end of the pit. The epiclastic rocks are high in montmorillonite and decompose quickly to material having an angle of repose of only 8° (A. Stewart, personal communication, 2010). Since then waste rock and tailings were placed in the west pit, impounded by the central “high” (Figure 2). In the East pit, the North wall is also problematic. Graphitic sedimentary rocks of the Asitka Group dip south into the pit and, where undercut by mining, are prone to failure (refer to Figure 2).

The **Kemess North** deposit (MINFILE 094E 021) lies 5.5 km from Kemess South mine. It is developed in a



Figure 2. 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.

separate monzodiorite pluton, also sill shaped, about 700 by 500 m in size and dated at 202 Ma. The intrusive body does not outcrop but its presence is revealed by an intense gossan developed in the overlying Takla Group volcanic rocks (Figure 3). Work 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



Figure 3. Kemess North, gossan developed in Takla Group andesite.

underground development. The core of Kemess North was estimated to comprise 70 Mt containing 0.65 g/t Au and 0.3-0.4% Cu. This area was targeted in a 16 000 m drill program (Figure 4) to define this resource block better and to assess its geotechnical characteristics for possible block-cave mining.

Results of the 2010 program show the northeast quadrant of Kemess North is higher grade than predicted from the widely spaced 2005 drillholes. 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. The company reports the 2005 block model tended to homogenize gold and copper grades. Application of geologic criteria, such as alteration, enables definition of grade domains containing from 1 g/t Au to more than 2 g/t Au. A resource calculation is in progress. Mineralization in Kemess North is a quartz-magnetite-pyrite-chalcopyrite stockwork associated with early K-feldspar and biotite alteration. Grade tenor is best in the upper portion of the intrusive body, passing into a quartz-pyrite stockwork with chlorite alteration at depth. The northeast extent of the deposit is cut off by the Kemess North fault with apparent reverse displacement of at least 1000 m (C. Edmunds, personal communication, 2010).

The **Shasta** gold mine (MINFILE 094E 050) is located 30 km north of Kemess and 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 tonnes per day, but production was only reported for two months (September and October) totalling 1450 gold-equivalent ounces. This was sufficient to purchase a 3.5 yard scoop tram and single-boom jumbo drill. No other production data was available and there is no statement of ore reserves or mineral resources. Shasta is an epithermal quartz-calcite vein and breccia system cutting Takla Group volcanic rocks. Native gold and silver, electrum and acanthite occur, along with base metal sulphide minerals.



Figure 4. Kemess North, geologists and drill crew discuss drilling progress.

MINE DEVELOPMENT PROJECTS

Thompson Creek Metals Company Inc acquired the **Mount Milligan** copper-gold project in 2010 by purchasing Terrane Metals Corporation in a cash and share deal worth approximately \$650 million. By the deal, Goldcorp Inc, which was majority owner of Terrane, acquired an 8% interest in Thompson Creek and \$240 million in cash. Mount Milligan is fully approved and permitted to build a 60 000 tonne per day 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). The site is relatively flat and without major impediments to development (Figure 5). Thompson Creek estimates capital expenditure at Mount Milligan in 2010 at \$33 million.

Mount Milligan (MINFILE 093N 194) is an alkalic porphyry copper-gold deposit in Quesnel terrane with a measured and indicated resource of 706.7 Mt grading 0.18% Cu and 0.33 g/t Au. Mineralization is associated with the Southern Star, MBx and barren Goldmark monzonite stocks dated at 183 to 186 Ma. This makes the mineralizing event 20 Ma younger than most other Quesnel terrane porphyry deposits. The stocks are satellites of an intrusive complex consisting of gabbro, monzonite and hornblende granite. Nicola Group volcanic stratigraphy at Mount Milligan dips about 45° east and the mineralized stocks plunge 45° west. Copper and gold are not coincident; copper occurs mainly within intrusive rocks, the MBx stock in particular, whereas gold occurs in adjacent basalt, mainly in fracture veins. The principal fracture-filling mineral is pyrite with lesser quartz and minor chalcopyrite. Alteration comprises widespread pervasive biotite, albite and local magnetite, as in the MBx (magnetite breccia) zone. In addition, epidote is prominent in the 66 zone though it is also common throughout the district.

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 (D. O'Brien, personal communication, 2010) including Camp Hill (Figure 6) where early exploration holes intersected favourable geology but low copper and gold grades near surface. All these targets are being tested in a 11 000 m drill program that began in September 2010 and is expected to conclude in early 2011.



Figure 5. Mount Milligan, Darrin O'Brien (Thompson Creek Mining) and Jay Fredericks (British Columbia Geological Survey) view site of planned open-pit development.



Figure 6. Mount Milligan, geologic discussion at the exploration camp; Camp Hill in the background overlies one of several deep exploration drill targets.

MINE EVALUATION PROJECTS

The **Chu** molybdenum project (MINFILE 093F 001), located 80 km south of Vanderhoof and owned by TTM Resources Inc, is in the pre-application stage of the BC environmental assessment process. The company contemplates an open pit mine operating at 60 000 tonnes per day. Measured plus indicated resources at Chu are

estimated at 370.64 Mt grading 0.059% Mo and 0.035% Cu at a cut-off grade of 0.04% Mo.

A quartz-molybdenite stockwork is developed in a composite stock and adjacent siltstone and lesser andesite of the Hazelton Group (Figure 7). The principal hostrock is biotite hornfels derived from the sedimentary rocks. The stock comprises hornblende granodiorite and a peripheral phase of leucocratic quartz-feldspar porphyry, which is the next most prominent hostrock for molybdenum. TTM dated molybdenite in the pluton at 53.6 Ma by the Re-Os method (W. Raven, personal communication, 2010). It appears that early coarse pyrite-chalcocopyrite-quartz veins, with chlorite alteration, are cut by younger quartz veins with a molybdenite selvage. Spessartine garnet is prominent locally as an ore-related alteration mineral (Figure 8). A north-northeast shear zone with inferred low molybdenum grade bisects the ore zone; however, core recovery from holes in the shear zone is reduced and molybdenite loss may account for the lower grade.

Extensive soil sampling surveys (224 line km) were conducted on the Chu property in 2010, including



Figure 7. Chu, Wes Raven (TTM Resources) reviews molybdenum assay data and drill core.



Figure 8. Chu, hydrothermal spessartine garnet in drill core; also visible are fractured siltstone hornfels and granodiorite.

recently acquired claims. Molybdenum determinations were done in the field using a portable XRF analyzer, with check-work performed at a conventional laboratory - a lower cost and quick turnaround method becoming widespread in the exploration industry. A follow-up core drilling program (2000-3000 m) began in mid-November.

EXPLORATION

Porphyry Copper Projects in Quesnel Terrane

Most porphyry copper exploration in the Omineca region took place in Quesnel terrane, an upper Triassic volcanic island arc containing coeval plutons, which is prolific in porphyry copper-(gold-molybdenum) deposits throughout its 1000 km length in British Columbia. Omineca region encompasses the northern 300 km of this belt and includes Mount Milligan (described above). Kemess (also described above) lies in Stikine terrane, another volcanic island arc that contains pre-accretion porphyry copper-(gold-molybdenum) deposits. The Stikine terrane is restricted in extent in Omineca region. The projects described below are in a north to south progression.

Gold Fields Toodoggone Exploration Corp conducted a limited geochemical survey at the **Mex** prospect (MINFILE 094E 057), 3 km southeast of the Pine porphyry copper-gold prospect. Mex comprises an advanced argillic alteration assemblage with a strong gold-copper geochemical anomaly (R. Sherlock, personal communication, 2010). Mex is located 20 km north of Kemess mine.

Serengeti Resources Inc drilled on the **Kwanika** copper-gold property (MINFILE 093N 073) 140 km northwest of Fort St. James, to augment mineral resources in the South zone. Two drill rigs completed 7600 m in 31 holes (Figure 9). The company announced the program



Figure 9. Kwanika, Hugh Samson (Serengeti Resources) at a reclaimed and clover-seeded drill site. Geochemistry of the organic layer in the surrounding pine forest is a successful new exploration technique.

“will likely result in an expansion of the mineralized envelope, albeit at a generally lower grade” than previous 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 cut-off 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 cut-off 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.

The Kwanika deposit is within medium grained to porphyritic monzonite of the multiphase Hogem batholith. Mineralization is dated at 198.6 Ma (H. Samson, personal communication, 2010). The Central and South zones are both characterized by strong K-feldspar alteration but a strong quartz stockwork present in the Central zone (Figure 10) is not well developed in the South zone. Chalcopyrite and bornite occur in the Central zone but chalcopyrite and molybdenite are the principal ore minerals in the South zone where the gold content is lower. In the Central zone a strong overprint of albite-Fe-carbonate-hematite alteration is developed near the paleo-surface beneath a post-mineral sedimentary basin. A zone of supergene enrichment is present below this paleo-surface, consisting of native copper, chalcocite and covellite (H. Samson, personal communication, 2010).

Teck Resources is earning majority ownership of the **Lorraine** copper-gold prospect (MINFILE 093N 002) under an agreement with Lorraine Copper Corp. Teck conducted an A_H horizon soil geochemical survey, a new technique used successfully at Kwanika to detect mineralization below thick overburden. In addition, core was relogged to apply new ideas on alteration vectors. The aim of the work is to generate new exploration targets. Lorraine is 130 km northwest of Fort St. James.

Oceanside Capital Corp conducted a late-season program on the **Indata** property (MINFILE 093N 192) located 130 km northwest of Fort St James.



Figure 10. Kwanika Central zone, supergene chalcocite in quartz stockwork with overprint of albite-Fe-carbonate-hematite alteration, from drillhole 62.

Mineralization at Indata comprises gold-quartz veins and associated listwanite alteration in rocks of Cache Creek terrane west of the Pinchi fault and, to the east, copper-gold porphyry type in Quesnel terrane volcanic and plutonic rocks. Soil geochemical and IP surveys focused on new targets north and south of previously explored areas.

The **Chuchi North** property of Silver Quest Resources Ltd covers an historic 3.5 km gold-in-soil anomaly near the southerly tail of the Hogem batholith. The claims are located 50 km northwest of Mount Milligan. Geological and soil geochemical surveys were performed. Results will determine if drilling will follow in 2011.

On its **Mount Milligan North** property, Terracast Geological Services carried out preliminary geological work and prospecting, and may drill in 2011.

On the **Wildcat** property (MINFILE 093N 228) 12 km southwest of Mount Milligan, Cayden Resources Inc completed a 310 line km ZTEM and magnetic airborne geophysical survey. This is a new technique capable of mapping resistivity and conductivity anomalies related to porphyry deposits beneath thick overburden. Twelve core holes totalling 2200 m are planned in early 2011.

A 5000 m drill program began in mid-November on the **Fran** prospect (MINFILE 093K 108) located 25 km southwest of Mount Milligan. There is a porphyry-type geological setting at Fran, with small stocks and dikes of diorite to monzonite emplaced into Takla Group volcanic and sedimentary rocks. 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. New targets were generated from a computer modelling exercise.

The **Captain** property (MINFILE 093J 026) was also explored late in the season by Orestone Mining Corp. Located 30 km south of Mount Milligan, prospective Quesnel terrane rocks are largely covered by glacial deposits and by Tertiary basalt. The bottom 3.1 m of a 137 m core hole drilled in 2009 returned an assay of 0.16% Cu and 0.34 g/t Au, an encouraging intercept that warrants follow-up. An orientation A_H soil geochemical survey was completed in 2010, to be followed by IP and winter 2010-11 drilling (G. Richards, personal communication, 2010).

The **Prince George** porphyry project of Xstrata Copper Canada Ltd comprises twelve claim blocks in Quesnel terrane between Prince George and Fort St. James. Xstrata has completed grassroots exploration for new porphyry copper deposits in an area of extensive overburden using geochemical and geophysical methods. There are 20 targets; most were identified from the QUEST airborne geophysical survey. MMI geochemistry and limited IP surveying were completed in 2008 and 2009. The program budget was increased in 2010 to

include leaf-litter geochemistry (A_H horizon) and core drilling using an innovative tractor-mounted rig (Figure 11). The rationale for using this piece of equipment is its low mobilization cost and low surface disturbance which facilitates regulatory approval. Many targets were tested, with up to 30 m of overburden, and some holes located new plutons that warrant further drilling in 2011 (M. Keogh, personal communication, 2010). However, the rig was unable to reach bedrock on other targets and a larger drill was brought in to test these. All core logging was done in Prince George (Figure 12).



Figure 11. Kubota-mounted diamond drill used in the Prince George Porphyry project.



Figure 12. Max Keogh (Xstrata Copper Canada) displays drill core from the Prince George Porphyry project.

Nickel, Magnesium and Gold Projects in Cache Creek Terrane

Ultramafic rocks are an integral component of the oceanic Cache Creek terrane (refer to Figure 1). The area of Mount Sydney Williams and Trembleur Lake northwest of Fort St. James is underlain by large bodies of ultramafic rock, extensively converted to serpentinite. Ultramafic rocks have higher nickel contents than other rock types. Normally the nickel is bound up in silicate minerals; mainly olivine in primary ultramafites or in serpentinite in metamorphosed bodies. The high cost of liberating nickel from these silicate minerals precludes them as an economic source of nickel.

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, 80 km northwest of Fort St. James. The target is awaruite, a naturally occurring iron-nickel alloy documented at several localities around the world. The apparent rarity of the mineral may be a function of its generally fine grain size which renders it difficult to distinguish from more common metallic minerals, such as pyrrhotite and pentlandite (Figure 13). Awaruite is hypothesized to form if olivine is converted to serpentinite under the unusual conditions of low oxygen and low sulphur fugacity. Total nickel content is not enriched over that of the ultramafic parent rock and is typically in the order of 0.2% Ni. The economic



Figure 13. Peter Bradshaw and Trevor Rabb (First Point Minerals) look for awaruite in serpentinite at Decar.

significance of awaruite is that it is dense and highly magnetic, properties that make it amenable to simple methods of concentration that are lower in cost than flotation and smelting required of nickel sulphide ores. First Point conducted a wide ranging reconnaissance program over the past several years before focusing exploration at Decar in 2009 (Figure 14).

Initial field work at Decar mapped the grain size of awaruite across the property. 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. Serpentinized peridotite contains relict pyroxene and accessory magnetite, chromite and sub-millimetre size disseminated awaruite (Figure 15). 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.

Kilometre 26 is a gold (and nickel) project conducted by Oroandes Resource Corporation under an



Figure 14. Aligning the drill for a new hole at Decar.



Figure 15. Darcy Vis and Ian Carr prepare geotechnical and geological core logs at Decar.

agreement with Eastfield Resources Ltd. The property is 55 km northwest of Fort St. James and underlain by serpentinite along the Pinchi fault. In the 1980s an auriferous boulder exhibiting listwanite alteration was discovered but its source was not found. In late 2010, soil geochemical, magnetic and IP surveys were conducted. In addition, analytic work was undertaken to determine if nickel is present in alloy form (see Decar above).

At the **Hoof** property on Sinkut Mountain, 20 km south of Vanderhoof, magnesium is of primary interest (Figure 16). If economic, nickel might be recovered as a byproduct. Work by Porpoise Bay Minerals Limited in 2008, including 10 core holes totalling 1000 m, determined the Sinkut ultramafic body contains 20-26% Mg (Figure 17). A preliminary engineering study indicates the deposit should be considered for mining to produce magnesium ore. A 2500 m drilling program is set to begin in mid-winter of early 2011.

Alpha Gold Corporation conducted a drilling program on its **Lustdust** gold project (MINFILE 093N 009, 044), located 250 km northwest of Prince George. Gold and copper occur in skarn and manto zones developed within a sequence of limestone, siltstone and



Figure 16. Rupert Seel on the Sinkut Mountain ultramafic body, Hoof project.



Figure 17. Hoof project, relict orthopyroxene in serpentinite.

mafic tuff of the Cache Creek Group, intruded by the dikes and sills of the Eocene Glover stock. 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.

Gold-Silver Projects on Nechako Plateau

The Nechako Plateau comprises an assemblage of Cretaceous to Tertiary volcanic, plutonic and lesser sedimentary rocks that intrude and overlap Stikine and Cache Creek terranes over a broad area. Basin-and-range style block faulting along northeast and northwest trends characterizes the area. Key stratigraphic components include the Cretaceous Bowser Lake and Kasalka groups, the Tertiary Ootsa Lake and Endako groups, and, in the Stikine basement, the Jurassic Hazelton Group.

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 program to a planned 50 000 m. The property is located 100 km due south of Fraser Lake (150 km by road from Vanderhoof). The HQ drilling was on a 50 m grid (Figure 18) 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. Representative intercepts from the gold zone include:

- 0.76 g/t Au and 3.1 g/t Ag over 312 m in BW-63 (Figure 19),
- 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 (Figure 20) and
- 0.59 g/t Au and 5.6 g/t Ag over 67 m in BW-86 (Figure 21)

The principal hostrock is rhyolite breccia consisting of flow-banded fragments that is assigned to the Upper Cretaceous Kasalka Group. Volcanic breccias of uncertain origin are also important (refer to Figure 21) which contain clasts of similar size and shape but different alteration and mineralization. Gold mineralization is unusual in character, but similar to the nearby Capoose deposit. Considerable insight is gained from historical work there (see Capoose below).



Figure 19. Blackwater-Davidson Hole 63, black sulphide 'specks' and 'dendrites' surrounded by silica coronas; part of 312 m interval that grades 0.76 g/t Au.



Figure 20. Blackwater-Davidson Hole 68, black sulphide 'specks' and 'dendrites' with faint breccia texture in rhyolite; part of 227 m interval that grades 1.51 g/t Au.



Figure 18. Diamond drill at Blackwater-Davidson gold project.



Figure 21. Blackwater-Davidson Hole 68, rhyolite breccia with grey silica clasts, brown sphalerite clasts and pale kaolin clasts; kaolin rims on many clasts; part of a 67 m interval that grades 0.59 g/t Au.

Mineralization comprises fine disseminations and minute discontinuous black veinlets (“dendrites”) thought to include sulphide minerals. The sulphides commonly exhibit coronas of very fine silica (refer to Figures 19 and 20). Dark red-brown to black, manganese-rich garnet that characterizes the Capoose deposit (see below) occurs locally as irregular clusters in rhyolite (Figure 22). It also exhibits silica coronas. Elsewhere, disseminated pyrite in rhyolite is replaced by pyrrhotite, sphalerite and fine black sulphide. Features prevalent in volcanic breccia are rhyolite clasts, some with kaolinite rims, wholly kaolinized clasts and sphalerite clasts (refer to Figure 21). Throughout the gold zone, veins are rare and, where present, are medium to coarse grained and appear to be late stage. Pyrite and rare vivianite occur on late fractures.

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 (Figures 23, 24). Capoose lies 25 km northwest of Blackwater-Davidson in the Fawnie Range. It was discovered in 1970, but mainly explored by Granges Ltd from 1976 to 1985. The property was dormant until it was reactivated by Silver Quest in 2008. 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 cut-off of 0.4 g/t Au. The mineralized zone is approximately 1000 m long and trends north-south. Southward, near its midpoint, the zone branches into west and east limbs, wishbone shaped. Magnetic and induced polarization surveys were conducted to help extend the zone. 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.

Mineralization at Capoose shares many similarities with Blackwater-Davidson. Capoose was the subject of a

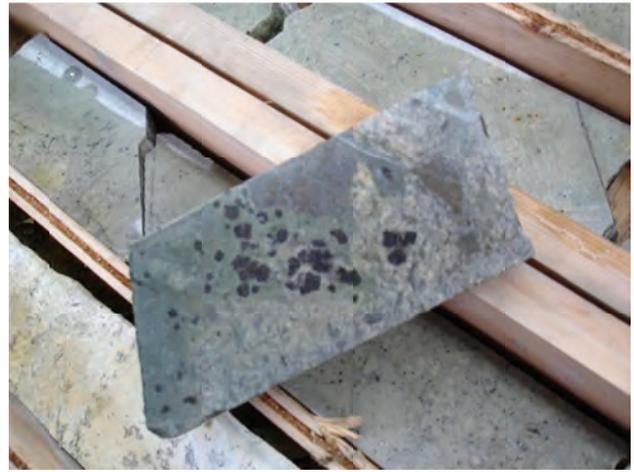


Figure 22. Blackwater-Davidson, cluster of dark garnet and surrounding silica corona, within rhyolite (image out of focus).



Figure 23. Diamond drill at Capoose in the Fawnie Range.



Figure 24. Capoose, core logging, sampling and storage facility within pine beetle-killed forest.

comprehensive and insightful study by Kathryn Andrew (MSc thesis, 1988). The hostrock is subaerial rhyolite, likely ignimbrite although primary textures are poorly preserved. They are variously flow banded, fragmental and spherulitic with rare quartz phenocrysts but containing 1 to 5% spessartine garnet that commonly lines

cavities (D. Pawliuk, personal communication, 2010). The rocks are dated at 71-72 Ma and are correlated with the Kasalka Group. As determined by Andrew, Capoose garnets are among the most manganese-rich garnets reported in the literature. Garnet is dark brown to black (Figure 25) but is pink under a hand lens and surrounded by black material (exsolved manganese oxide) and very fine grained pyrite, sphalerite and galena. Garnets are anhedral and irregularly shaped, as are galena and sphalerite. Andrew reported that silver and gold are associated with the base metals as microscopic inclusions of tetrahedrite and pyrrargyrite.

Garnets exhibit an aphanitic bleached halo, or corona. Andrew investigated the parameters of garnet and sulphide deposition and formation of the quartz-sericitic coronas by microprobe analysis, fluid inclusion study and stable isotope (oxygen and hydrogen) determinations. She determined that garnet formed from a juvenile fluid at magmatic temperatures (*circa* 600°C) and the alteration coronas formed later from invasion of low salinity (meteoric) fluids at temperatures of about 300°C. Base and precious metal sulphides formed at an intermediate stage and may have been nucleated by garnet grains. Veins are rare at Capoose; however, locally coarse grained garnet-sphalerite-galena-pyrite veins occur that are up to 25 cm wide. In one unusual instance a fracture-filling hydrothermal vein comprises equal amounts of 2-4 mm euhedral garnet and pyrite.

The **Auro** claims of Gold Reach Resources are located in between Capoose and Blackwater-Davidson. An airborne geophysical survey (1598 line km) was followed by extensive soil geochemistry (over 3000 samples), three-dimensional IP (80 km) and geological mapping. Late season core drilling was planned.

The **Key** property (MINFILE 093F 069) is owned by Troymet Exploration Corp and adjoins the Blackwater Davidson property to the south. Historic, overlapping soil surveys by three different operators were integrated and found to outline a broad trend of anomalous zinc, copper, lead, arsenic, gold and silver, and to correspond with



Figure 25. Capoose Hole 127, specimens from an interval rich in garnet, note anhedral shape.

anomalous gold values from bedrock. Bedrock in the target area includes garnet-bearing rhyolite with associated pyrrhotite and sphalerite. An induced polarization survey was underway at time of writing.

Geo Minerals Ltd commenced geological mapping, prospecting and soil geochemical surveying in October on its **West Blackwater** claims.

The **Cabin** gold-silver prospect (MINFILE 093F 038) 22 km southwest of Fraser Lake is under exploration by Paget Minerals Corp. The property was acquired by a regional program that was a Joint Venture with Richfield Ventures Corp. It was subsequently assigned to Paget under an option agreement. Mineralization comprises veins, stockwork and breccias over an area of 600 m by 1000 m within a felsic pluton. A total of 72 rock chip and grab samples average 0.96 g/t Au, 73.4 g/t Ag, 0.46% Zn and 0.36% Pb. An induced polarization and drilling program began in mid-October. The property was not visited.

Copley is a new gold property under exploration by Kootenay Gold Corp located 35 km south of Fraser Lake and 10 km southeast of the Holy Cross epithermal prospect (MINFILE 093F 029). Initial work by a team of geologist and prospectors found spherulitic to tuffaceous rhyolite, of uncertain stratigraphic correlation, that is fractured and cut by quartz veins over an area of 55 m by 150 m. Channel samples show the entire area is anomalous in gold and range up to 10.02 g/t across 2 m. In addition to silicification, alteration includes argillic (celadonite) and brick-red hematite (R. Thompson, personal communication, 2010). A drill program began in November and completed 11 holes (1000 m) in December.

Polymetallic Massive Sulphide Projects in Northern Rocky Mountains

Sedimentary exhalative (SEDEX) lead-zinc-silver-barite deposits occur as a major metallogenic district in Selwyn Basin, Yukon and its southern arm in British Columbia, the 500 km long Kechika Trough. Most Selwyn Basin and all Kechika Trough SEDEX deposits are of similar upper Devonian age. In the Kechika Trough the deposits are within the Gunsteel Formation.

Canada Zinc Metals Corp completed an additional eleven core holes totalling 6128 m on its **Akie** SEDEX zinc-lead project. The property is located 260 km north-northwest of Mackenzie and is underlain by folded and faulted shale and siltstone of the regionally mineralized Gunsteel Formation. 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 (Figure 26) results in



Figure 26. North Lead anomaly at Akie, two drill pads (not in use) are visible on the steep mountainside.

longer holes, 500-600 m deep, while the difficult ground requires large drill rigs and sturdy platforms (Figure 27).

Stratigraphy of the mineralized zone comprises (N. Johnson, personal communication, 2010):

- Hangingwall shale with nodular barite and pyrite laminae; 10-30 m thick
- Shale with very fine grained, laminated massive pyrite; 10-25 m thick
- Ore horizon: laminated pyrite, sphalerite and galena; 10-30 m thick
- Barite, massive sand-size grains, not laminated; 1-10 m thick

The hangingwall nodular barite is distinctive (Figure 28) and may be more extensive than the ore horizon. A heterolithic debris flow occurs below the ore sequence; below the centre of the Cardiac Creek deposit, its matrix is replaced by pyrite.

At the time of writing results from four holes remain to be reported. To date, the most intriguing result is from a Northwest Extension hole which intersected nickel sulphide in a unique debris flow deep in the stratigraphic sequence. It includes a sulphide-replaced interval consisting of massive pyrite and crosscutting sphalerite stringers that assayed 0.60% Ni, 2.69% Zn and 4.4 g/t Ag across 1.17 m. The interval is anomalous in gold, lead, copper, molybdenum, antimony, phosphorus, vanadium



Figure 27. Akie, large drill platform to support a drill rig for deep holes.



Figure 28. Akie, delicate laminae and pearl-like beads of barite in the hangingwall shale of the Cardiac Creek SEDEX deposit.

and thallium. It is reminiscent of bedded nickel mineralization at the similar aged Nick prospect in Selwyn Basin, Yukon. Other Northwest Extension holes intersected variable widths of nodular to massive barite and laminated to thickly bedded pyrite comparable to the Cardiac Creek sequence. No work was done on other targets; the GPS barite-laminated pyrite horizon or the Breccia vein-type showing.

The **Sedex** property comprises four claim blocks in the Kechika lead-zinc district. Rio Grande Mining Corp, under an agreement with Megastar Development Corp, carried out an 1199 line km magnetic survey to assist in interpreting stratigraphy and faults on the property.

Rare Metals in (Northern) Rocky Mountain Carbonatite Belt

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 U.S. border to near the Yukon border. Aley and Wicheeda are two of these 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.

The alignment of carbonatite-alkalic complexes approximates the ancient North American continental margin, delineated by the facies change from carbonate (continental shelf) to shale (continental slope). Furthermore, their Devonian age corresponds to a period of rifting along the North American margin that produced the Selwyn and Kechika basins.

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 29). Aley, and its contained niobium deposit, were discovered and explored by Cominco in 1985-86. Taseko acquired Aley and drilled it in 2007. No resource estimate has been reported to date.

The Aley carbonatite occurs as two apparently conformable bodies within siltstone of the Cambrian-Ordovician Kechika Formation. Field work by Duncan McLeish determined that the stratigraphic sequence is overturned and complexly deformed (International Workshop, Geology of Rare Metals in November, 2010). Mineral laminations in the carbonatite that appear to conform to bedding in the adjacent siltstone represent a deformation fabric derived from plastic flow during isoclinal folding and shearing that transposed the carbonatite into a sheet (Figure 30). Subsequent crossfolding produced a dome and basin pattern that led to preservation of the carbonatite in two down-warped basins.

The Aley carbonatite comprises three phases; a narrow border phase of calcite carbonatite, a predominant phase of dolomite carbonatite and a small amount of heavy mineral cumulate as layers and clasts. Ryan Kressall investigated the mineralogy (International Workshop, Geology of Rare Metals, November, 2010). Niobate minerals comprise 1-2% of dolomite carbonatite and up to 5% of the cumulate phase. The cumulate phase consists mainly of magnetite and apatite with minor phlogopite and trace amounts of zircon and baddelyite. Principal niobate minerals are pyrochlore, columbite and fersmite.

Wicheeda is a carbonatite-hosted rare earth elements project 80 km northeast of Prince George (MINFILE 093J 014). Significant drill intercepts with values in Ce, La and Nd were reported by privately owned Spectrum Mining Corp in 2008 and 2009, but the Wicheeda project was



Figure 29. Aley carbonatite showing deformation fabric, image courtesy of Duncan McLeish.



Figure 30. Drill move at Aley, image courtesy of Duncan McLeish.

inactive during 2010. The Wicheeda property comprises two claim blocks. A drilling program was contemplated at the time of writing.

The **Carbo** property adjoins Wicheeda and covers part of the same carbonatite complex and a cerium-in-soil anomaly. The Wicheeda district comprises several bodies of carbonatite and syenite breccia (syenite clasts in carbonatite matrix) intruded over a 15 km distance. 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 (Figure 31). 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 32).

Bolero Resources Corp holds the extensive **Carbonatite Syndicate** property in the Wicheeda district that adjoins the Wicheeda and Carbo properties. Bolero



Figure 31. Helicopter arrives at the Carbo project, image courtesy of Tor Bruland.



Figure 32. Carbo hole 6 at 149.7 m, cumulate layer of bastnaesite, a REE carbonate mineral, image courtesy of Allison Brand.

shared in the district-scale airborne survey with Canadian International Minerals (see above) and followed up with geochemical and geological surveys.

Zimtu Capital Corp conducted regional exploration in the Rocky Mountain rare metal belt with several different partners. Cathro Resources Corp and Caazador Resources Ltd partnered with Zimtu to conduct field surveys on seven of twelve properties. Zimtu teamed with Dahrouge Geological Consulting Ltd to investigate three of four properties in the Wicheeda district. The Zimtu-Javorsky partnership also holds four properties, three of which were explored.

Mount Bisson is a Rare Earth project owned by Paget Minerals Corporation and located 55 km northwest of Mackenzie. The property is underlain by syenite and pegmatites that intrude and alter high grade metamorphic rocks. Geologic mapping and sampling resulted in finding a new zone 3.5 km from the previously known Laura showing (MINFILE 0930 021). The company reported a sample from the new zone contains 8.64% total rare earth elements. Pegmatite at the Laura showing contains allanite and monazite with significant amounts of lanthanum, cerium, praseodymium and neodymium.

Industrial Mineral Projects in Northern Rocky Mountains

Stikine Energy Corporation mined a 430 tonne bulk sample from its **Nonda** property (Figure 33). Compressors, hand drills, small-scale loaders and a dozer were airlifted to the site, 50 km northeast of Liard Hot Springs, and the rock, Nonda Formation quartz arenite, was transported by helicopter to a staging area on the Alaska Highway (Figure 34). Next, it was transported to Abbotsford where a pilot plant was built to prepare it for



Figure 33. Nonda bulk sample rock being loaded into helicopter bucket.



Figure 34. Staging point for Nonda bulk sample, storage on a prepared platform to avoid contamination.

testing as a frac sand. Frac sand consists of millimetre-size (100 mesh) silica spheres that can be effective, when injected under pressure to hold fractures open so as to liberate natural gas trapped in shale by allowing it to flow to recovery wells. Processing of Nonda quartz arenite produces +70 to -140 (“100 mesh”) material. At time of writing the pilot plant was commissioned and process optimization work was in progress. Currently, frac sand is transported over great distances to shale gas fields in northeast British Columbia. The combination of silica size, quality, gradation, ease of liberation and proximity to end users are critical to the project. Potential users of the Nonda product include the Horn River and Liard shale gas fields within 200 km of the property.

2011 OUTLOOK

Three areas are expected to see a continued high level of exploration activity in 2011. These are:

- 1) the Nechako gold district south of Vanderhoof and Fraser Lake;
- 2) the Quesnel copper-gold porphyry belt between Prince George and Kemess mine, in particular close to the Mount Milligan mine development; and
- 3) the Rocky Mountain carbonatite belt near Wicheeda.

Depending on final results of work in 2010, other areas that are likely to have significant activity are the Fort St. James area for serpentinite-hosted nickel and the Kechika lead-zinc belt.

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EXPLORATION AND MINING IN SKEENA REGION, BRITISH COLUMBIA

By Paul Wojdak, MSc, PGeo
Regional Geologist, Smithers

SUMMARY AND TRENDS

Activity in the exploration and mining industry in northwest British Columbia increased to a near-record level in 2010. Mine development expenditures amounted to \$241.5 million. Exploration totaled about \$172 million and drilling amounted to 350 000 m (Figures 1 and 2). The outlook for 2011 is positive.

The Endako open pit molybdenum mine is in the midst of a \$498 million expansion and modernization project. The Huckleberry open pit copper-molybdenum mine is developing a mine plan that will incorporate new resources and potentially extend mine life many years. Foremost among proposed new mines are Red Chris and Galore Creek, both copper-gold projects. Work toward development certificates awarded under the British Columbia and Canadian Environmental Assessment acts

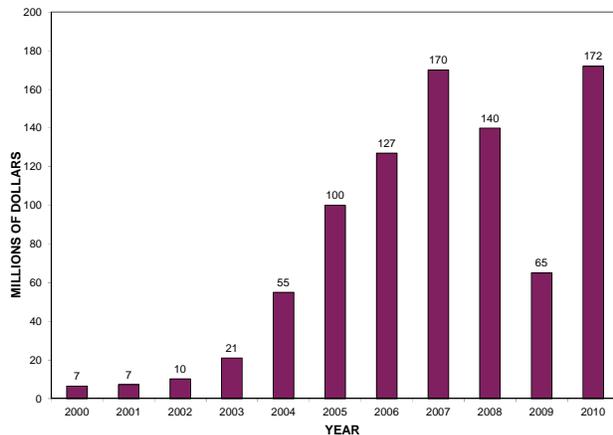


Figure 1. Annual exploration expenditure, Skeena Region.

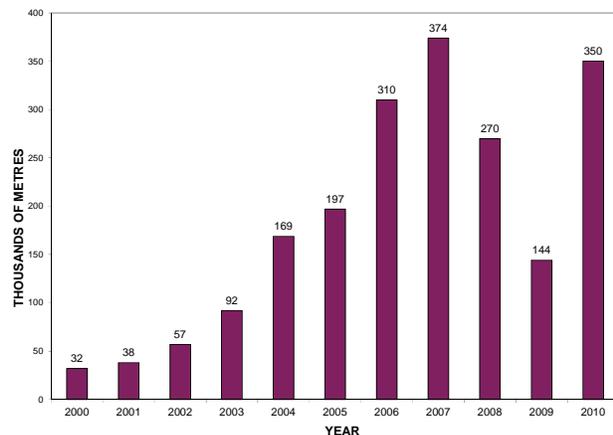


Figure 2. Annual exploration drilling, Skeena Region.

continued on other projects proposed for mine development: KSM gold-copper, Kitsault molybdenum, Kutcho Creek copper-zinc, Morrison copper and Schaft Creek copper-gold-molybdenum. The Tulsequah Chief copper-zinc-gold-silver mine development project has new owners and may be reactivated. Figure 3 shows major mines, small mines and proposed mines in Northwest region. Metal production and mine reserves are listed in Table 1.

Among small mines, Fireside barite benefited from high demand for its product and strengthened its seasonal operation. Consolidated ownership of the Yellowjacket gold project will enable a resumption of mining. Development continues at the Dome Mountain underground gold project near Smithers.

The Canadian federal and British Columbia provincial governments have pledged to build a high-capacity power transmission line in northwest British Columbia. The Northern Transmission Line completed its public comment period in the fall of 2010 within the Environmental Assessment process with strong positive response, including support from the Tahltan First Nation. Start of construction of this infrastructure project could begin in early 2011.

Mineral exploration expenditures rose sharply in 2010 to \$172 million, compared with \$65 million in 2009. There were 55 drilling projects and 18 projects that had \$2 million or more in expenditure. Drilling, at 350 000 m, was up substantially from 144 000 m in 2009. Significant achievements and exploration highlights to the time of writing in December were (in the order that they appear in the text):

- 1) Yellowjacket – high grade lode gold re-discovered by placer mining
- 2) Red Chris – new copper-gold resource and reserve estimates; 50 000 m drill program
- 3) KSM – Iron Cap zone delineated, a major addition to copper-gold resources
- 4) Schaft Creek – porphyry copper project reactivated and progressing toward feasibility
- 5) Kitsault – scope of environmental assessment set; high grade molybdenum intersections at Roundy Creek prospect
- 6) Kutcho Creek – high grade copper-zinc intercepts from Esso lens
- 7) Brucejack-Snowfield – project acquired by Pretium Resources; 51 000 m drill program will

Mines and Proposed Mines

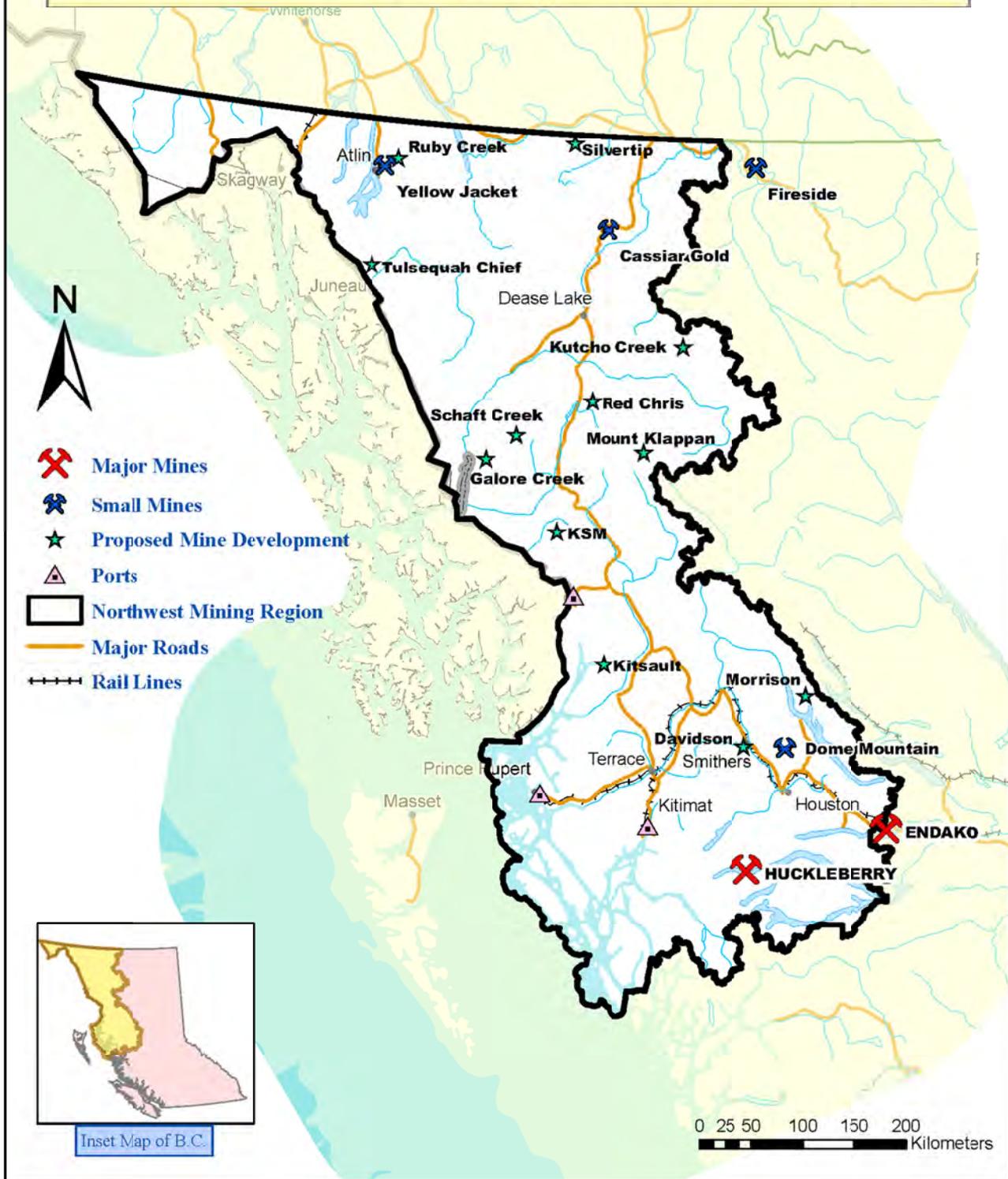


Figure 3. Mines and proposed mines, Skeena Region; Endako and Fireside are outside Skeena region but are administered by Skeena region.

TABLE 1. MINE PRODUCTION AND RESERVES, SKEENA REGION

Mine	Operator	Production (2009)	Reserves (Dec.31, 2009)	Tonnes milled (2009)	Grade
Endako	Thompson Creek Metals Company (75%) & Sojitz Corporation	4504 tonnes molybdenum	280 100 000 tonnes at 0.047% Mo (includes low-grade stockpile)	9 759 000	0.059% Mo
Huckleberry	Huckleberry Mines Ltd. (50% Imperial Metals Corp.)	20 834 tonnes copper, 6.56 tonnes molybdenum, 10.8 kg gold	14 010 000 tonnes at 0.362% Cu, 0.005% Mo (on May 11, 2010)	6 133 700	0.377% Cu, 0.006% Mo
Fireside	Fireside Minerals Inc.	16 000 tonnes (in 2010)	165 400 (not NI 43-101 compliant)	22 000 (in 2010)	

add to gold-copper resources

- 8) GJ – copper-gold project optioned by Teck Resources
- 9) Silverhope – porphyry copper-molybdenum discovery
- 10) Bell Copper – Xstrata reconsiders deep copper resource
- 11) Lone Pine – new molybdenum zone
- 12) Silvertip – acquired by Silvercorp; major exploration program
- 13) BA – exploration of new silver volcanogenic prospect
- 14) Chist Creek – new volcanogenic massive sulphide zone
- 15) Coles Creek – significant gold intercept

MINES AND QUARRIES

MAJOR METAL MINES

The **Endako** open-pit molybdenum mine (MINFILE 093K 006) is 75% owned and operated by Thompson Creek Metals Company. Sojitz Corporation, a major Japan-based molybdenum-trading company, holds 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. Decreased metal output compared with 2008 resulted from lower grade ore and lower throughput. Molybdenum recovery was 78.4%. The mine employs 265 people. In-situ and stockpile ore reserves on the property at the beginning of 2010 were 280.1 Mt grading 0.047% Mo at a cut-off grade of 0.02% Mo. Thompson Creek forecasts Endako production in 2010 will be 4230 tonnes of molybdenum. Cost of molybdenum production was \$6.13 per pound in 2009 and is estimated at \$9 in 2010. Ore is mined from the West Denak pit located 3.5 km from the mill along the arcuate trend of the ore zone (Figure 4). The ore passes through an in-pit crusher and is delivered to the mill via a 3 km conveyor. Recurring problems with the conveyor resulted in periodic trucking of ore.



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

Construction is underway to modernize and expand capacity of the Endako mill from 28 000 to 52 000 tonnes of ore per day (Figure 5). The company estimates capital expenditure in 2010 to be \$240 million. A total of \$85.2 million was spent in the two preceding years. The Endako mine and mill began operation (at 16 000 tonnes per day) in 1965 at a cost of just \$22 million; completion of the \$498 million expansion and modernization project will



Figure 5. Endako molybdenum mine; mill, commissioned in 1965 continued in operation in June, 2010 while a new mill was under construction.

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 at about 5000 tonnes Mo, increasing to 6800 tonnes in 2012 when benefits of the expansion and modernization project are realized.

Endako is a porphyry molybdenum deposit within the early Cretaceous Francois Lake granite batholith. The ore body is a 3.5 km long vein system that changes in strike along its length from west-northwest in the Endako pit to northerly in the Denak pit, resulting in an arcuate shape. The zone is 400 m wide and extends more than 400 m below surface at a moderate southerly dip. Mineralization is related to intrusion of the Casey aplite which domed and fractured the older and coarse grained Endako phase of the batholith. Post-mineral cross faults segment the ore zone into the Endako, East Denak and West Denak pits. In the long-term mine plan these will merge into a large '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. 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. The mine is located 123 km by road south of Houston at the foot of Huckleberry Mountain and employs 275 people including camp and trucking contractors. Copper concentrate is trucked to the port of Stewart for shipment to Japan and molybdenum concentrate is trucked to Vancouver. 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 (Figure 6). 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 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.

Huckleberry is a porphyry copper deposit related to the late Cretaceous Bulkley intrusions. In the Main zone, copper mineralization occurs in hornfelsed and fractured Hazelton Group volcanic rocks adjacent to a 500 m diameter granodiorite stock. The arcuate ore zone is 150 to 200 m wide by 600 m long and rims the contact of the stock. The mined-out East zone was larger, measuring 150 m wide by one km long, and centred on a fault-controlled 40 m wide granodiorite dike that trends at 105°. Ore in both zones is a stockwork of quartz, pyrite and chalcopyrite, crosscut by gypsum-filled fractures (Figure 7). The Main and East zones are disrupted by the



Figure 6. Huckleberry copper mine; mining in the MZX pit in September 2010, low grade stockpile and mill in the background.



Figure 7. Huckleberry copper mine; ore from the MZX pit, biotite hornfels with chalcopyrite and gypsum filling fractures.

reactivated 105 fault which resulted in 100 m of right lateral offset of ore. MZX is the faulted portion of the Main zone north of the 105 fault. Instability in the MZX pit results from splays of the 150 fault, which is located behind and oblique to the high wall.

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 Saddle zone is a ridge of bedrock left between the MZX and Main pits. 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. To mine this material will require the removal of 40 Mt of waste rock and tailings from the Main zone pit and construction of a new tailings impoundment. Both of these, in turn, require geotechnical assessment, engineering design and permit amendments, resulting in a near-term ore shortfall. A 4400 m drilling program was undertaken to locate ore that is readily accessible. Targets included the areas immediately east and west of the MZX pit, and a low hill that lies on trend

with the 60° to 70° south plunge of the Main ore zone. 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) located 125 km east of Watson Lake. Fireside Minerals, a private company, relocated its office from Red Deer, Alberta to Kelowna, British Columbia. The company reduced its reliance on contractors by purchasing most mining equipment it requires, including a new dozer, excavator, blast-hole drill and several ore trucks. Mining of 22 000 tonnes of rock from the Bear Pit yielded 16 000 tonnes of barite recovered from jigs at the minesite (Figures 8, 9). 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 (A. Allan, personal communication, 2010). At the south end of the Bear pit, the barite vein was found to be discontinuous and diamond drilling is proposed to evaluate this area prior to mining in 2011.

Vertically dipping barite veins at Fireside are associated with a gabbro dike of inferred Paleozoic age that was emplaced into strata of the Kechika Group (Figure 10), and may be related to rifting of the early Paleozoic North American continental shelf (see Wojdak, 2008). 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. Disseminated barite occurs locally along the margin of the Bear vein but is not included in the resource estimate. The specific gravity for sales specification was lowered to 4.1 from 4.2, enabling the processing of lower grade ore.



Figure 8. Fireside barite mine; benching south wall of the Bear pit, July 2010.



Figure 9. Fireside barite mine; ore truck on the 4.2 km haul from the Bear pit to the processing plant.



Figure 10. Fireside barite mine; Keith McLeod (General Manager) against a bench of Kechika siltstone, host to the West Bear vein.

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, located 80 and 90 km respectively east of Dease Lake, the jade that is recovered occurs equally as “placer” boulders in glacial till and as lenses in bedrock. Angular boulder

trains in the till are traced using an excavator to their source in bedrock. Nephrite jade is formed at the contact between tectonically emplaced serpentinite and argillite of the Cache Creek terrane east of Dease Lake, and of the Slide Mountain terrane at Cassiar. 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.

MINE DEVELOPMENT PROJECTS

No new major mines are in development in the region. The expansion project at the operating Endako mine is described above. Dome Mountain, a new small gold mine began construction and is described in this section. The status of two other small, permitted gold mines is reported below. And lastly, the **Tulsequah Chief** development project 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 (T. Chandler, personal communication, 2010).

Metal Mountain Resources Inc began development of the **Dome Mountain** underground gold mine 35 km east of Smithers, through its wholly-owned subsidiary Gavin Mines Inc. A \$12 million staged financing agreement was struck with Minex Minerals Ltd. Minex is a private company with a corporate focus of acquisition, exploration and development of natural resources worldwide. Gavin Mines has a Mines Act permit to operate at a rate of 205 tonnes per day; 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 m and 1370 m levels (Figure 11). Surface work comprised realignment and upgrade of the mine access road, site preparation for a sediment control pond, purchase of a modular steel building to house the water treatment plant and pouring the concrete foundation for its installation. Capital expenditure is estimated at \$4.3 million and start-up of underground development is scheduled for April 2011.

The probable mineral reserve (including dilution) in the Boulder and Boulder footwall veins (MINFILE 093L 276) is 135 131 tonnes grading 11.2 g/t Au at a diluted cut-off grade of 7.9 g/t Au. The undiluted indicated resource is 144 144 tonnes grading 17.7 g/t Au at the same cut-off. The inferred resource is 113 671 tonnes at 13.6 g/t Au. Dome Mountain comprises eight (or more) gold-bearing orogenic quartz veins within volcanic and

sedimentary rocks of the Hazelton Group. The mine operated during 1991-92 and produced 361.4 kg of gold (11 621 oz) from 30 890 tonnes of ore. The Boulder quartz-sulphide vein is in a fault and itself shows evidence of shearing. Principal ore minerals are pyrite and sphalerite with minor chalcopyrite, galena, arsenopyrite and tetrahedrite (Figure 12). Gold occurs in native form but is rarely visible and generally associated with pyrite.

Thirty-three exploration holes totalling 4724 m were drilled to explore for east and west extensions of the



Figure 11. Dome gold mine in September 2011, portal of the refurbished 1290-level, to be the main production level.



Figure 12. Dome gold mine; Boulder shear vein, consisting of quartz, pyrite, sphalerite and tetrahedrite in sheared maroon volcanic wallrock.

Boulder vein system beyond the underground workings. To the east, significant gold intercepts were obtained in a 300 m extension of the Boulder Footwall vein over a 140 m vertical extent. Holes were drilled on sections 40 m apart and further drilling is required to prove grade and continuity for a resource estimate. Drilling to the west on 20 m spaced sections confirmed continuity of the Boulder vein with significant gold content, but additional drilling is required to confirm grade for a resource estimate.

Eagle Plains Resources Ltd purchased 100% interest in the **Yellowjacket** gold property (MINFILE 104N 043), facilitating a resumption of work in September 2010. 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 (refer to *Exploration and Mining in BC – 2008* and *2009*). In order to define a resource for the next phase of mining, 64 reverse circulation holes were drilled in a 40 m by 100 m area, to an average depth of 35 m. The truck-mounted drill rig was able to do angle holes (Figure 13), important to assess gold content of the vertical quartz vein and listwanite zone along the 20 m wide Pine Creek fault. A resource estimate is not yet available. The tightly-spaced drilling and GPS-linked orthophoto mapping will be used in grade control during mining, expected to recommence in 2011.

Placer mining 700 m west of the Yellowjacket drill area by Cobalt Mining, under a lease agreement with Eagle Plains, exposed the historic Rock of Ages shaft. The much-storied shaft was sunk by placer miners in the early 1900s and was subsequently filled in and lost during natural and mining-assisted reworking of the creek gravels. Stripping and washing of the bedrock surface was followed by low-level aerial photography and detailed mapping and sampling (C. Gallagher, personal communication, 2010). Visible gold occurs in the same structure as at Yellowjacket (C. Downie, personal communication, 2010) and a channel sample returned 51.36 g/t Au across 5.2 m (Figure 14).

The **Cassiar** gold project was largely inactive in 2010. Hawthorne Gold Corporation was unable to continue development and exploration work it began in 2008 but in late October commenced a 7200 line-km airborne EM, magnetic and radiometric survey. The Cassiar project is a consolidation of several small closed or shut-down mines comprising (from north to south over a 10 km distance): underground workings of the Taurus, Sable and Plaza mines; the Table Mountain (Erickson) mine comprising a dozen adits and underground workings and 270 tonne per day gravity flotation mill; and the Cusac mine consisting of several more adits and underground workings. The mill requires restoration. Lode mining in the district produced 350 500 ounces (10 905 kg) of gold; placer mining contributing an additional 74 500 ounces (2317 kg) of gold. A discussion of property geology is given in *Exploration and Mining in BC – 2009*.



Figure 13. Yellowjacket gold project; reverse circulation drill on an angle hole in the historic placer channel of Pine Creek.



Figure 14. Yellowjacket gold project; stripped bedrock in the Pine Creek fault zone, visible gold was found near the Rock of Ages shaft.

MINE EVALUATION PROJECTS

At the **Red Chris** copper-gold project, a 55 000 m program of deep exploration drilling continued throughout the year (Figures 15, 16) while Imperial Metals Corporation developed the details of its mine plan for regulatory authorizations. Red Chris is located on a sub-alpine plateau 20 km southeast of the settlement of Iskut and 80 km south of Dease Lake. 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 cut-off 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



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



Figure 16. Red Chris copper-gold project; new core shack under construction, the old core shack is in the area of proposed pit development.

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

Red Chris (MINFILE 104H 005) comprises the adjoining Main and East deposits, porphyry copper-gold zones developed in a monzodiorite stock dated at 204 Ma. The stock intrudes Stuhini Group volcanic rocks to the north and is overlain by, and faulted against, Bowser Lake Group sedimentary rocks to the south. Both ore zones

were drilled to a depth of 400 m by previous operators and in 2007 Imperial Metals commenced deeper drilling to expand the mineral resource. In 2010 Imperial used mainly 1000 to 1200 m deep holes to assess the higher grade deep resource at Red Chris, less than the 1500 m depth of its initial drillholes. The vertical holes drilled have negligible deviation. Mineral potential of the planned mill and tailings sites northeast of the deposit were assessed by, respectively, 13 and 10 drillholes. The plant site is underlain by pyroxene diorite to gabbro and the tailings impoundment by massive andesite, wacke and siltstone of the Stuhini Group; both areas are devoid of mineralization.

The East zone (EZ) fault controls both the east-northeast trending Red stock and the most intense quartz vein development, which, in turn, corresponds with the best copper and gold grades. At depth in the porphyry system, alteration comprises K-feldspar, biotite, magnetite and anhydrite. Closer to surface, *i.e.* within the planned open pit, alteration comprises sericite, pyrite, quartz, hematite, ferrodolomite and chlorite (C. Rees, personal communication, 2010). Study of molybdenite distribution, a minor ore component, is ongoing. Rafts of volcanic rocks between the Main and East zones suggest the Red stock has at least two intrusive centres. Zoning of gold to copper ratio and interpretation of a deep penetrating IP survey suggest a third intrusive centre may lie west of the Main zone, beneath the Gully zone (J. MacPherson, personal communication, 2010).

Redesign of the **Galore Creek** copper-gold project 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. Eight holes were drilled to upgrade the mineral resource and to obtain rock to assess metallurgy of low grade ore (0.2-0.4% Cu equivalent). Geotechnical holes were drilled at either end of the proposed 12 km tunnel to link the mine to the proposed mill site (Figure 17). These encountered volcanic and sedimentary rocks, including limestone, of



Figure 17. Galore Creek copper-gold project; bluff of Paleozoic limestone, where the east portal of the proposed 12 km access tunnel is to be located.

the Paleozoic Stikine assemblage. Kilometre 91.5 marks the east end of the tunnel leading to Galore Creek valley. Other geotechnical and hydrological holes were drilled at the proposed plant site and in the valley. Reactivation of mine development depends on the results of a new feasibility study and involvement with the Environmental Assessment Process. Galore Creek (MINFILE 104G 090) is a porphyry copper deposit associated with alkalic intrusive rocks of late Triassic age. Measured and indicated resources total 785.7 Mt grading 0.52% Cu, 0.29 g/t Au and 4.87 g/t Ag.

Seabridge Gold Inc completed a preliminary feasibility study on its **KSM (Kerr-Sulphurets-Mitchell)** gold-copper project and anticipates submitting a joint application under the BC Environmental and Canadian Environmental assessment acts by June 2011. Of the 28 000 m drilled at KSM in 2010 more than half (15 400 m in 41 holes) was dedicated to the new Iron Cap deposit (Figures 18, 19). Mineralization at Iron Cap (MINFILE 104B 173) was known from five holes drilled 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 tonne per day open pit mine at a currently estimated capital cost of \$3.4 billion. The site is 30 km southwest of Highway 37 near Bell II and 28 km southeast from the end of the Eskay Creek mine road.

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 (see table below for individual zone resource estimates).

In addition to Iron Cap, 6500 m of drilling at the western limit of the Sulphurets zone enlarged the resource area 700 m to the west, linking it with the Canyon zone. Results from the Canyon zone include 0.61 g/t Au and 0.13% Cu over 234.7 m. A lesser amount of drilling was done in the Mitchell (2600 m) and Kerr (1450 m) zones. The proposed development could involve a 23 km twin tunnel to link the mine to a mill and tailings site in Teigen

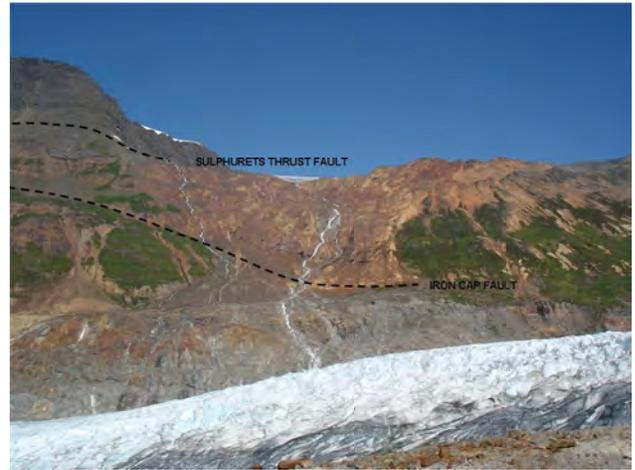


Figure 18. KSM copper-gold project; the Iron Cap zone above Mitchell glacier where most 2010 drilling was conducted. Major faults identified by Mike Savell.



Figure 19. KSM copper-gold project; Mike Savell (Project Geologist) overlooks the Iron Cap zone.

valley near Highway 37. One tunnel would transport crushed ore from the mine in a slurry pipeline and return water, diesel fuel and electrical power; the other would transport personnel and supplies.

The KSM porphyry deposits are associated with the Mitchell intrusions, high level diorite to monzonite plugs and dikes that intrude folded and faulted volcanic and sedimentary rocks of the Hazelton and Stuhini groups.

Zone	Reserve Category	Tonnes (millions)	Gold (g/t)	Copper (%)	Silver (g/t)	Molybdenum (ppm)
Mitchell	Proven and Probable	1335.4	0.61	0.16	2.93	60.4
Sulphurets	Probable	142.2	0.61	0.28	0.44	101.8
Kerr	Probable	125.1	0.28	0.48	1.26	Nil
Total	Proven and Probable	1602.7	0.59	0.20	2.58	59.4

The principal Mitchell zone is exposed in an erosional window below the Mitchell thrust fault; the upper fault sheet contains the displaced segment of the deposit, the Snowfield zone, 2 km east on the adjoining property. The Mitchell zone comprises schistose rocks with abundant sericite, disseminated pyrite and a strongly deformed quartz-pyrite-chalcopyrite stockwork containing remarkably uniform copper and gold grades. This phyllic assemblage appears to be superimposed on earlier chloritic and potassic events also with stockwork mineralization.

Iron Cap is in the upper sheet of the Mitchell thrust fault, and below the Sulphurets thrust (refer to geological map in EMBC-2009, Figure 1.12). Geological work on Iron Cap in 2010 identified two altered diorite to monzonite plutons (M. Savell, personal communication, 2010): an intensely silicified body containing 10% relict hornblende (altered to chlorite), and a mafic body with 30% relict hornblende and 5% potassium feldspar phenocrysts (Figure 20). Both phases are mineralized but chloritization dominates in the mafic phase. Chalcopyrite occurs finely disseminated and in veins with quartz and pyrite. Mineralization of epithermal character, with higher gold and silver grades, is also present at Iron Cap as quartz stockwork and breccias comprising more than 90% quartz in which the hostrock texture is obliterated. This mineralization is similar to zones on the nearby Brucejack property and demonstrates the transition from porphyry to epithermal styles in the Sulphurets district. Geological work at Iron Cap by Mike Savell has identified the distinctive ignimbrite breccia of the Mount Dilworth Formation, an important marker horizon in the Hazelton Group (Figure 21).

Other diverse studies conducted at KSM include structural geological mapping at the proposed tunnel portal and dam sites, bulk samples from Iron Cap drill core for metallurgical testing, radar surveys over glaciers and moraines in regard to waste rock placement, investigation of rhenium recovery from Mitchell ore, geotechnical drilling in Mitchell valley, high-pressure



Figure 20. KSM copper-gold project; K-feldspar intrusive rock in the Iron Cap zone.



Figure 21. KSM copper-gold project; new outcrop of Dilworth Formation felsic ignimbrite exposed by ablation of the Mitchell glacier, west of the Brucejack fault.

grinding test-work aimed at reducing power consumption and environmental baseline characterization.

There was a major program at the **Schaft Creek** copper-gold-molybdenum project by Copper Fox Metals Inc to gather information required for a feasibility study and to submit a project application to the BC Environmental Assessment Office. Work comprised geologic modeling that included re-logging and assaying of historic core, a three-dimensional IP and magneto-tellurics survey, and geotechnical, resource and ‘condemnation’ drilling. The feasibility study will evaluate a proposed 150 000 tonne per day open pit mine (Figure 22). A positive analysis will trigger a time-limited option for Teck Resources to earn back a larger share of the project from Copper Fox. Resource drilling focused on definition of higher grade material in the Liard zone for a starter pit. The mill and tailings impoundment are proposed to be located 5 km northeast of the deposit near Skeeter Lake. 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 cut-off. The ultimate pit features a 1700 m northern high wall



Figure 22. Schaft Creek copper project; view south over the Liard zone.

and an overall 1.9:1 strip ratio. Additional targets were drill-tested based on results of the IP survey and a new resource estimate is expected in early 2011.

Schaft Creek (MINFILE 104G 015) is a calcalkalic porphyry copper deposit formed near the eastern contact of the Hickman granodiorite batholith with Stuhini Group mafic volcanic rocks. The Galore Creek deposit is developed in alkalic rocks near the western margin of the Hickman batholith. Schaft Creek mineralization is dated at 222 Ma, nearly identical to the age of the batholith. Although not an alkalic porphyry deposit, Schaft Creek is similar to Galore Creek in that the deposit occurs in a unique part of a subhorizontal volcanic sequence consisting of tuff, breccias and epiclastic rocks. The principal Liard zone is fault-bounded by a steep structure to the east and by a 45° east-dipping structure to the west. Recent drilling has linked the Liard and northerly Paramount zones so they are considered now to be a single zone. The West Breccia zone lies further west, associated with a subvertical fault. The West Breccia zone is 30 to 200 m wide, extends more than 1000 m and consists of angular hematized fragments in a matrix of quartz, tourmaline, chlorite, specularite and sulphide minerals (Figure 23). The Liard zone comprises a subhorizontal quartz vein stockwork that is developed in volcanic rocks and less abundant granodiorite sills; this vein orientation accounts for the flat copper grade contours that characterize the deposit. Potassium feldspar alteration is pervasive in intrusive rocks and less intense in volcanic rocks where it is restricted to vein envelopes. Veins in the Liard zone are broken and disrupted on a small scale; veins commonly do not extend 10 cm without being segmented by fault-fractures (Figure 24).

Bornite is finely disseminated within pervasive potassium feldspar alteration and occurs coarse grained in quartz veins in the K-feldspar zone (Figure 25). Chalcopyrite accompanies bornite but only exceeds bornite in abundance in less altered rocks, typically chlorite-altered andesite, and in the West Breccia where it is the predominant copper mineral. Pyrite is a minor constituent of the Liard zone, far subordinate to bornite and chalcopyrite. Calcite is common in the Liard zone, both dispersed in andesite and as a constituent of late quartz veinlets in intrusive rocks. Pyrite is prominent in the West Breccia zone but because the Liard zone accounts for a large majority of the deposit tonnage, the overall acid generation potential is low. Epidote alteration overprints potassium feldspar in intrusive rocks marginal to copper mineralization. Chlorite and epidote are developed in volcanic rocks marginal to the copper zone.

The past-producing **Kitsault** molybdenum mine (MINFILE 103P 120) is located 140 km north of Prince Rupert. Avanti Mining Inc plans to open a new 40 000 tonne per day mine to exploit the same deposit at an estimated capital cost of \$837 million. Kitsault received its "Section 11 order" under the BC Environmental Assessment Process, which defines the scope of the project to be assessed and the potential



Figure 23. Schaft Creek copper project; West Breccia zone in hole CF-326, angular hematite-altered fragments.

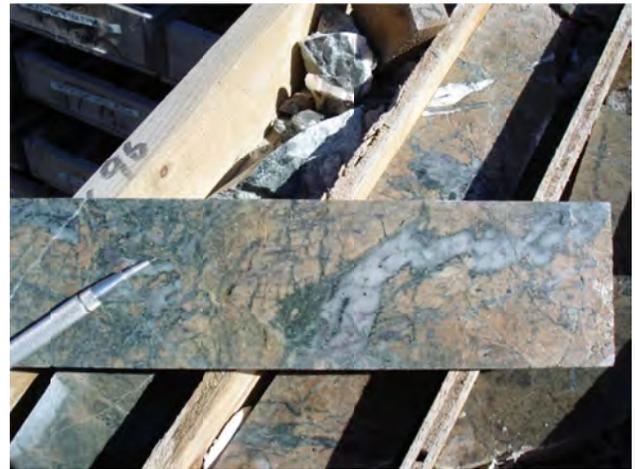


Figure 24. Schaft Creek copper project; Liard zone, quartz-bornite vein and pervasive K-feldspar alteration in hole CF-347, showing tectonic disruption of veins.



Figure 25. Schaft Creek copper project; Liard zone, altered feldspar in an intrusive rock with quartz-bornite vein, hole CF-347.

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. Molybdenite occurs in an annular zone around an early Tertiary quartz diorite to quartz monzonite stock that intruded Bowser Lake Group greywacke and siltstone. Two other stocks with associated molybdenum mineralization are known on the property: Bell Moly and Roundy Creek.

The old mill location in the tight valley of Patsy Creek is considered too constrained for the new mill. The currently preferred new mill location is 1.5 km northeast of the open pit, atop the 160 m thick Widdzech basalt lava (Figure 26). A conveyor would transport crushed ore over the 200 m elevation difference between the pit and the mill. The columnar basalt, dated at 0.62 and 1.6 Ma, abuts the proposed adjacent tailings impoundment site at the head of non fish-bearing Patsy Creek (Figure 27). Bowser Lake Group rocks, partly covered by a thin veneer of peat and glacial deposits, underlie most of the planned tailings site. Detailed geological mapping, supplemented by magnetic data, was used to assess potential for a molybdenum-bearing intrusion. A monzonite dike was found and evaluated by one drillhole; the rock is altered but not veined or mineralized. Geotechnical drilling around the mine, mill and tailings sites amounted to 27 holes totalling 1500 m.

A site near Clary Lake, 5 km northeast of the Kitsault deposit, was considered and then rejected as a tailings site because its use could compromise possible future development of a currently sub-economic molybdenum resource at **Bell Moly** (MINFILE 103P 234), and because Clary Lake has a resident stocked trout population. In 1979 Bell Moly was estimated to contain 19.6 Mt grading 0.084% Mo (not NI 43-101 compliant). Avanti expended considerable effort to successfully salvage and re-box drill core that was left at the site of two separate exploration camps in 1967 and 1977 (Figure 28).

Roundy Creek (MINFILE 103P 113) lies 5 km west of Kitsault and comprises three contiguous zones of molybdenum mineralization that were explored by four companies between 1956 and 1983. Their work included 750 m of underground workings on two levels and 157 drillholes from surface and underground. In 1983 AMAX Mining Corp calculated resources of 1.45 Mt grading 0.180% Mo in the Sunshine Creek zone, 2.74 Mt grading 0.10% Mo in the Roundy zone and 50 000 tonnes grading 0.321% Mo in the Sunlight zone. The mineralized area lies near the head of steep north-flowing forks of Roundy Creek and despite detailed historic work is not well



Figure 26. Kitsault molybdenum mine; proposed mill site is on top of basalt bluff on the skyline.



Figure 27. Kitsault possible tailings impoundment area, showing Patsy Lake and bluff of columnar basalt.

understood (Figure 29). Two granite stocks are present; the western body contains an internal zone of ‘alaskite’ which comprises crowded quartz porphyry, silicified quartz-feldspar porphyry and minor, but very important, banded feldspar-molybdenite rock. This is likely an unusual form of unidirectional solidification texture (UST) that occurs in some molybdenum deposits but typically consists of alternating quartz and feldspar layers. The extremely high grade material at Roundy Creek is discontinuous and varies in attitude. Molybdenite is also present in a quartz stockworks. Avanti drilled 6 holes



Figure 28. Kitsault project; re-boxing and salvaging historic drill core at Bell Moly, a satellite prospect.



Figure 29. Roundy Creek prospect; geologists Bob Blair, Steve Maynard and Chris Atkins examine quartz-molybdenite veins in Sunshine Creek.

totalling 912 m at Roundy Creek; RC10-02 assayed 0.383% Mo over 81.0 m, including a 21.0 m interval grading 1.212% Mo.

At the **Kutcho Creek** copper-zinc project, located 100 km east of Dease Lake, Capstone Mining Corporation completed another preliminary economic assessment that built upon the 2009 study by focusing on a possible early production phase using high grade ore from the Esso deposit. The Esso ore lens is the smallest, deepest (at 450 to 500 m below surface) and least well defined of three

volcanogenic massive sulphide deposits (MINFILE 104I 060). Consequently, a major drilling program was undertaken to improve the understanding of the Esso lens resource. Thirty-four holes totalling nearly 18 000 m were drilled on the property. The most notable hole returned 10.30% Cu, 19.77% Zn, 2.86 g/t Au and 666.4 g/t Ag over a true thickness of 10.2 m. This material consists of crudely layered sphalerite, chalcopyrite, bornite and pyrite. The Esso lens was upgraded to an indicated resource; 1.816 Mt grading 2.69% Cu, 6.18% Zn, 0.66 g/t Au and 64.8 g/t Ag at a cut-off 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 tonnes per day mine at an estimated capital cost of C\$133.5 million. The project continues in the pre-application stage of the Environmental Assessment Process. Geologically, the Kutcho deposits are arranged en echelon over a strike length of 3.5 km within schistose felsic volcanic rocks of early Triassic age (Figure 30). The geology and mineral potential of the Kutcho area is under investigation by the British Columbia Geological Survey (Figure 31).

The amended application to review proposed development of the **Morrison** copper-gold project was accepted by the BC Environmental Assessment Office in 2010. It is located 70 km northeast of Smithers. The review will be coordinated with federal agencies. Pacific Booker Minerals Inc proposes to build an open pit mine to operate at 30 000 tonnes per day. Twelve holes were drilled to provide 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. The inferred resource stands



Figure 30. Scott Caldwell and Paul Schiarizza (British Columbia Geological Survey) mapping structure and stratigraphy in the Kutcho Creek volcanogenic massive sulphide district.



Figure 31. Kutcho Creek; deformed conglomerate with felsic volcanic cobbles at the base of the sedimentary succession that overlies volcanic rocks of the Kutcho Formation.

at 56.524 Mt grading 0.40% Cu, 0.21 g/t Au and 0.005% Mo. The deposit is developed in a biotite-feldspar porphyry stock, one of the Babine intrusions of Eocene age.

For the **Mount Klappan** anthracite coal project, 150 km northeast of Stewart, 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.

MINERAL EXPLORATION

Table 2 lists significant exploration projects in Skeena region. The locations of porphyry copper-gold, copper-molybdenum and molybdenum projects are shown on a map, Figure 32.

PORPHYRY COPPER PROJECTS

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

Stikine district have an extremely high gold to copper ratio, *i.e.* greater than 1 g/t gold for 1% copper. Depending on metal recoveries and relative prices, gold may be more economically important than copper in some deposits and occurrences that can be referred to as porphyry gold-copper projects. This includes the Mitchell, Sulphurets, Snowfield and Bronson Slope deposits.

Porphyry copper-molybdenum prospects predominate in the Skeena district. Some copper-gold prospects occur but the gold content is appreciably less than in the Iskut-Stikine district. Skeena district porphyry prospects are all contained in post-accretion intrusions comprising the extensive late Cretaceous Bulkley, and more localized Eocene Nanika and Babine calcalkaline intrusions. The three suites have separate distribution patterns but all occur within a transverse geologic feature known as the Skeena Arch. Bulkley and Babine intrusions are generally intermediate in composition; medium to coarse granodiorite is typical of the Bulkley suite and biotite-feldspar porphyry is characteristic of the Babine suite. Nanika intrusions contain more quartz and potassium feldspar, and comprise pink granite and quartz porphyry rhyolite dikes. The Huckleberry deposit is related to a Bulkley intrusion.

Porphyry Copper-Gold Projects in Stikine terrane, Iskut District

Silver Standard Resources Inc continued a major program on the **Brucejack-Snowfield** property, employing up to eight drill rigs and 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 and West zones (Figure 33; 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

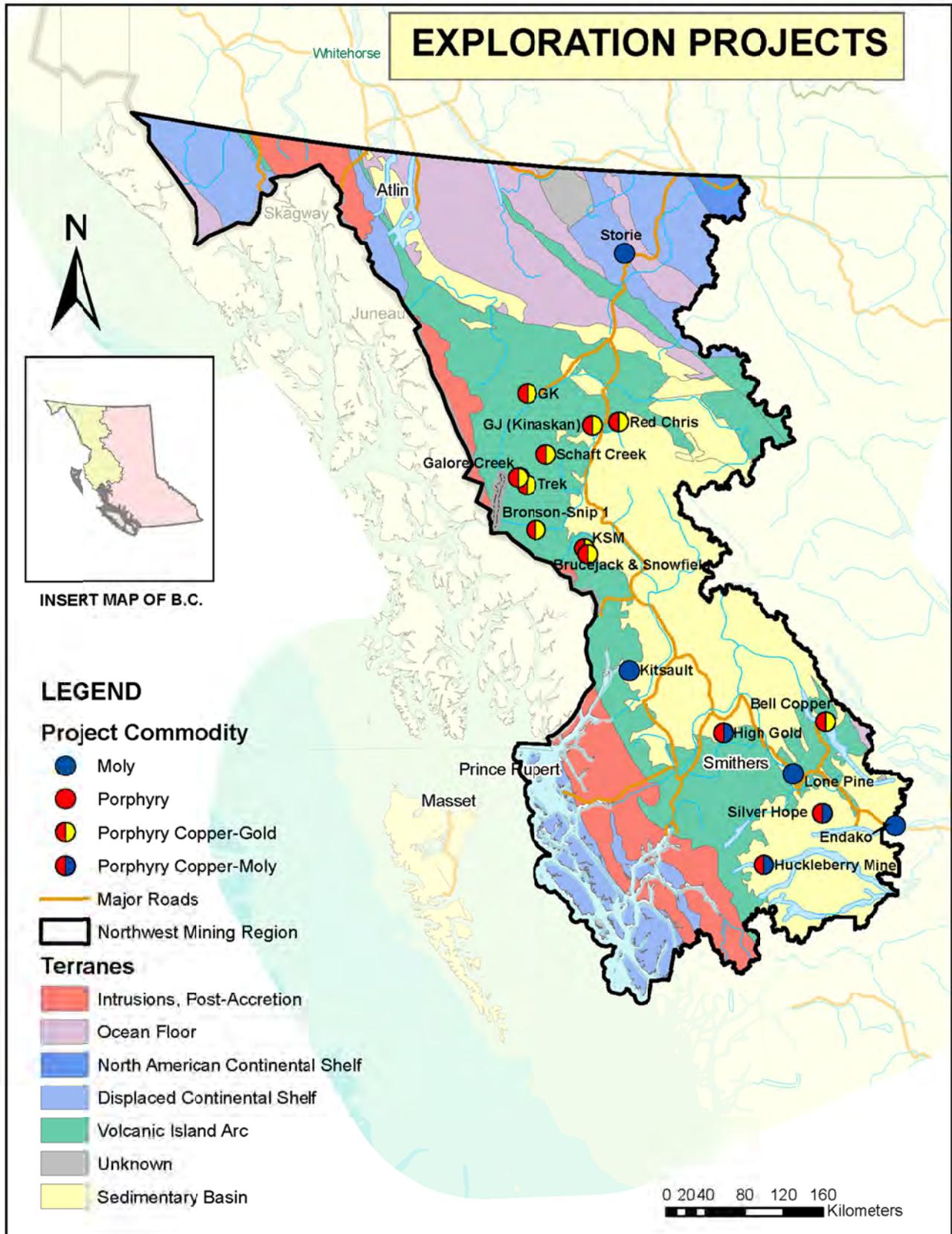


Figure 32. Porphyry-type exploration projects (copper, gold, molybdenum) in Skeena Region.

TABLE 2. MAJOR EXPLORATION PROJECTS, SKEENA REGION

Property	Operator	MINFILE (or NTS)	Commodity	Deposit Type	Work Program
American Boy	TAD Capital Corp	093M 047	Ag, Au	Intrusion Vein	DD (703 m, 8 holes)
Atlin Gold	Blind Creek Resources Ltd	104N 044	Au	Orogenic Vein	DD (1568 m, 11 holes)
BA	Great Bear Resources Ltd	104A 178	Ag, Zn, Pb	VMS	G; AB-EM (1000 km) ; DD (15,000 m, 85 holes)
Bear	Auramex Resource Corp	104A 024	Au	Vein	DD (1295 m, 3 holes)
Bell Copper	Xstrata Copper Canada Ltd	093M 001	Cu, Au	Porphyry	DD (3400 m, 6 holes)
Bonsai	Copper Creek Gold Corp	104B 383	Au, Ag, Zn, Cu	VMS	3D-IP (10.6 km); DD (3461 m, 11 holes)
Bronson	Skyline Gold Corp	104B 077, 004	Au, Cu, Fe	Porphyry, Vein	G; DD (3144 m)
Brucejack	Pretium Resources Inc	104B 193, 196	Au, Ag	Epithermal, Porphyry	G; DD (33,100 m, 73 holes)
Cassiar Gold	Haw thorne Gold Corp	104P 012	Au	Orogenic Vein	AB-EM
Cassiar Moly	Velocity Minerals Ltd	104P 035	Mo	Porphyry	DD (1398 m, 3 holes)
Chist	Paget Minerals Corp.	103I 185	Cu, Zn, Au, Ag	VMS	G; P
Clone	Canasia Industries Corp	103P 251	Au	Shear Vein	DD (1354 m, 16 holes); BU (34 tonnes)
Coles Creek	Callinan Mines Ltd	93E 041	Au, Ag	Epithermal	GC; IP (60 km); DD (7069 m, 20 holes)
Delta	Frontline Gold Corp	104A 165, 166	Cu, Zn, Au, Ag	VMS	GC; AB-EM (1421 km)
Big Missouri & Dilworth	Ascot Resources Ltd	104B 044, 092	Au, Ag	Epithermal Vein	DD (21,711 m, 68 holes)
Dome	Gavin Mines Ltd	093L 022	Au	Orogenic Vein	DD (4724 m, 33 holes); A; FS
Dunwell	Mountain Boy Minerals Ltd	103P 052	Ag, Au	Vein	DD (8021 m, 50 holes)
Elsiar	Eagle Plains Resources Ltd	103I 229	Au	Intrusion Vein	G; GC
Endako	Thompson Creek Metals Company Inc	093K 006	Mo	Porphyry	DD (13,778 m, 91 holes)
Engineer	BCGold Corp	104M 014	Au	Epithermal Vein	DD (1308 m, 13 holes)
Eva Lake	New Pacific Metals Corp	104N 017	Zn	Unknown	G; AB-EM
Fireweed	Shamrock Enterprises Inc	093M 151	Ag, Zn, Pb	Manto, Vein	DD (1854 m, 11 holes)
FR	Mountain Boy Minerals Ltd	104A 112	Au, Ag	Vein	DD (695 m, 5 holes)
Galore Creek	Galore Creek Mining Corp	104G 090	Cu, Au	Porphyry	EN; MS; GD (4531 m)
Georgie River	Auramex Resources	103O 013	Au	Vein	G; AB-EM (681 km)
Gin	CJL Enterprises Ltd	104H 031	Cu, Au	Porphyry	P; GC; IP
GJ	Teck Resources Limited	104G 034	Cu, Au	Porphyry	G; IP (27 km)
GK	Strategic Metals Ltd	104G 003	Cu, Au	Porphyry	GC; DD (928 m)
Granduc	Castle Resources Inc	104B 021	Cu, Ag, Au	VMS	DD (8223 m, 18 holes)
Grouse Mtn	Bard Ventures Ltd	093L 026, 251	Cu, Mo, Au	Porphyry ?	G; GC
Harry	Teuton Resources Corp	104B.020	Au	Vein	DD
Reed	Pacific Bay Minerals Ltd	104P 021	Zn, Pb, Ag, Mo	Skarn	TR (107 m)
High Gold	Argonaut Exploration Inc	093L 076	Cu, Mo, Au	Porphyry	G; IP (13 km); TR (171 m); DD (2542 m, 9 holes)
Homestake	Bravo Gold Corp	103P 216, 091	Au, Ag, Cu	Epithemal Vein	GC; DD (17,924 m, 48 holes)
Huckleberry	Huckleberry Mines Ltd	093E 037	Cu, Mo	Porphyry	GC, IP; DD (4400 m, 21 holes)
Indi	Nanika Resources Inc	104B 402	Au, Ag	Epithemal Vein	DD
Kalum	Eagle Plains Resources Ltd	103I 228	Au	Intrusion Vein	G; DD (420 m, 6 holes)
KSM	Seabridge Gold Inc	104B 103, 176	Au, Cu, Mo, Re	Porphyry	EN; MS; FS; DD (28,209 m, 90 holes)
Kitsault	Avanti Mining Inc	103P 120	Mo	Porphyry	G; A; EN; PF; DD (2412 m)
Kutcho Creek	Capstone Mining Corp	104I 060	Cu, Zn, Au, Ag	VMS	DD (17,970 m, 34 holes); PF
LCS	W. Lychak Contracting Ltd	093L.094	Cu	Redbed	DD (300 m, 6 holes)
Lone Pine	Bard Ventures Ltd.	093L 027, 028	Mo	Porphyry	A; DD (3427 m, 9 holes); PE A
Maroon	WCB Resources Ltd	103I 030	Au	Vein	TR; DD (599 m, 6 holes)
Morrison	Pacific Booker Minerals Inc	093M 007	Cu, Au	Porphyry	DD (1451 m, 12 holes)
Poly	Frontline Gold Corp	104A 177	Au, Ag	VMS	AB-EM (305 km); GC
Porphyry Creek	Duncastle Gold Corp	093M 061	Cu, Au	Porphyry	AB-EM, MG, RD (514 km); DD (1360 m, 3 holes)
Red Chris	Imperial Metals Corp	104H 005	Cu, Au	Porphyry	CD; GD; DD (55,000 m); FS

TABLE 2. CONTINUED

Property	Operator	MINFILE (or NTS)	Commodity	Deposit Type	Work Program
RC South	Bolero Resources Corp	104H 011	Cu, Au	Porphyry	GC; IP (55 km)
Red Cliff	Mountain Boy Minerals Ltd	104A 033	Au	Vein	DD (8929 m, 57 holes)
Red Cliff East	Nanika Resources Inc	104A 035	Au	Vein	8 ddh, 1100 m
Rock and Roll	Pacific Northwest Capital Corp	104B 377	Ag, Au, Zn, Cu	VMS	G
Schaft Creek	Copper Fox Metals Inc	104G 015	Cu, Mo, Au	Porphyry	IP (66 km); EN; GD; DD (6400 m)
SIB	Eskay Mining Corp	104B 376	Au, Ag, Zn, Cu	VMS	G; DD (3857 m, 5 holes)
Sidina	TAD Capital Corp	093M 038	Au, Ag	Vein	DD (804 m, 6 holes)
Silver Coin	Jayden Resources Inc	104B 150	Au, Ag, Pb, Zn	Epithermal Vein	DD (2801 m, 18 holes)
Silver Hope	Finlay Minerals Ltd	093L 256	Cu, Mo, Ag	Porphyry	DD (2036 m, 6 holes)
Silver Queen	New Nadina Explorations Limited	093L 002	Cu, Zn, Au, Ag	Porphyry, Vein	GP; DD (4110 m, 26 holes)
Silvertip	Silvercorp Metals Inc	104O 038	Ag, Pb, Zn, Au	Manto	G; AB-EM (4114 km); DD (10,913 m, 36 holes); EN
Snowfield	Pretium Resources Inc	104B 179	Au, Cu, Mo, Re	Porphyry	GD; MS; PF; DD (17,976 m)
Storie	Columbia Yukon Explorations Inc	104P 069	Mo	Porphyry	EN; DD (763 m, 3 holes)
Sweeney	Nanika Resources Inc	093E 076	Cu, Mo	Porphyry	DD (718 m, 2 holes)
Tatsamenie	Nanika Resources Ltd	104K 137	Au	Carlin	G; GC
Ted	Nanika Resources Inc	093E 086	Cu, Mo	Porphyry	DD (1274.8 m, 4 holes)
Tennyson	Teuton Resources Corp	104B 167	Cu, Au	Porphyry	DD (1698 m, 10 holes)
Todd Creek	Orestone Mining Corp	104A 001	Cu, Zn, Au, Ag	VMS	AB-EM (2172 km)
Trek	Romios Gold Resources Inc	104G 022	Cu, Au	Porphyry	G; GC; 3D-IP; DD (3975 m, 8 holes)
Turnagain	Hard Creek Nickel Corp	104I 119	Ni, Co, Pt	Magmatic	MS; PF; DD (410 m, 2 holes)
Voigtberg	BC Gold Corp	104G 146	Au, Cu	Porphyry	G; GC; P
Wann	Blind Creek Resources Ltd	104M 026	Au	Vein	G; P; TR
Wedeeene	Decade Resources Ltd	103I 169	Cu, Au	Vein, Porphyry	DD (5325 m, 19 holes)
Yellow Chris	Teuton Resources Corp	(104H.061)	Cu, Au	Porphyry	AB-EM
Yellow Jacket	Eagle Plains Resources Ltd	104N 043	Au	Orogenic Vein	G; RC (2206 m, 64 holes)
Zymo	Eastfield Resources Ltd	093L 324	Cu, Au	Porphyry	P; GC; IP (25 km)

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)

extent of the deposit. The program is expected to outline an inferred resource, rather than delineating measured and indicated resources. Gold tenor in the Bridge zone was found to increase to the southeast under an ice cap and to depth, so that some 2009 holes were deepened. Thickness of the Bridge zone ice cap increases southeast to a maximum drilled depth of 80 m. Holes collared on the ice were angled at -70° (instead of -50°) to avoid breaking the drill stem when the enclosing ice melted away (Figure 34).

The Brucejack area is underlain by Stuhini and Hazelton Group volcanic and sedimentary rocks that strike north-northwest, dip and face to the east, and are intruded by the Mitchell-Sulphurets monzonite stocks, dated at 192.7 Ma. The mineralized area, except the Bridge zone which is described separately below, is underlain mainly by andesitic tuff and flow rocks of the Unuk River Member (of the Betty Creek formation) and

underlying sandstone (Jack Formation). The volcanic-sedimentary sequence is cut by several east-trending zones of intense, pervasive quartz-sericite-pyrite alteration containing gold-bearing quartz veins, stockworks and breccias (Figure 35). In a few areas, sedimentary and volcanic horizons can be identified within the strongly altered zones, but commonly the parent rock cannot be identified (Figures 36, 37). The quartz-sericite zones form a 3 km long north-south arcuate belt within 500 to 800 m of the prominent Brucejack fault. Geological mapping determined that alteration and gold-silver mineralization follow the Stuhini-Hazelton contact zone but the relationship and timing with respect to the Mitchell-Sulphurets intrusions remains unclear (G. Febbo, personal communication, 2010).

The Bridge zone is underlain by a hornblende-feldspar monzonite stock (Figure 38) with an exposed

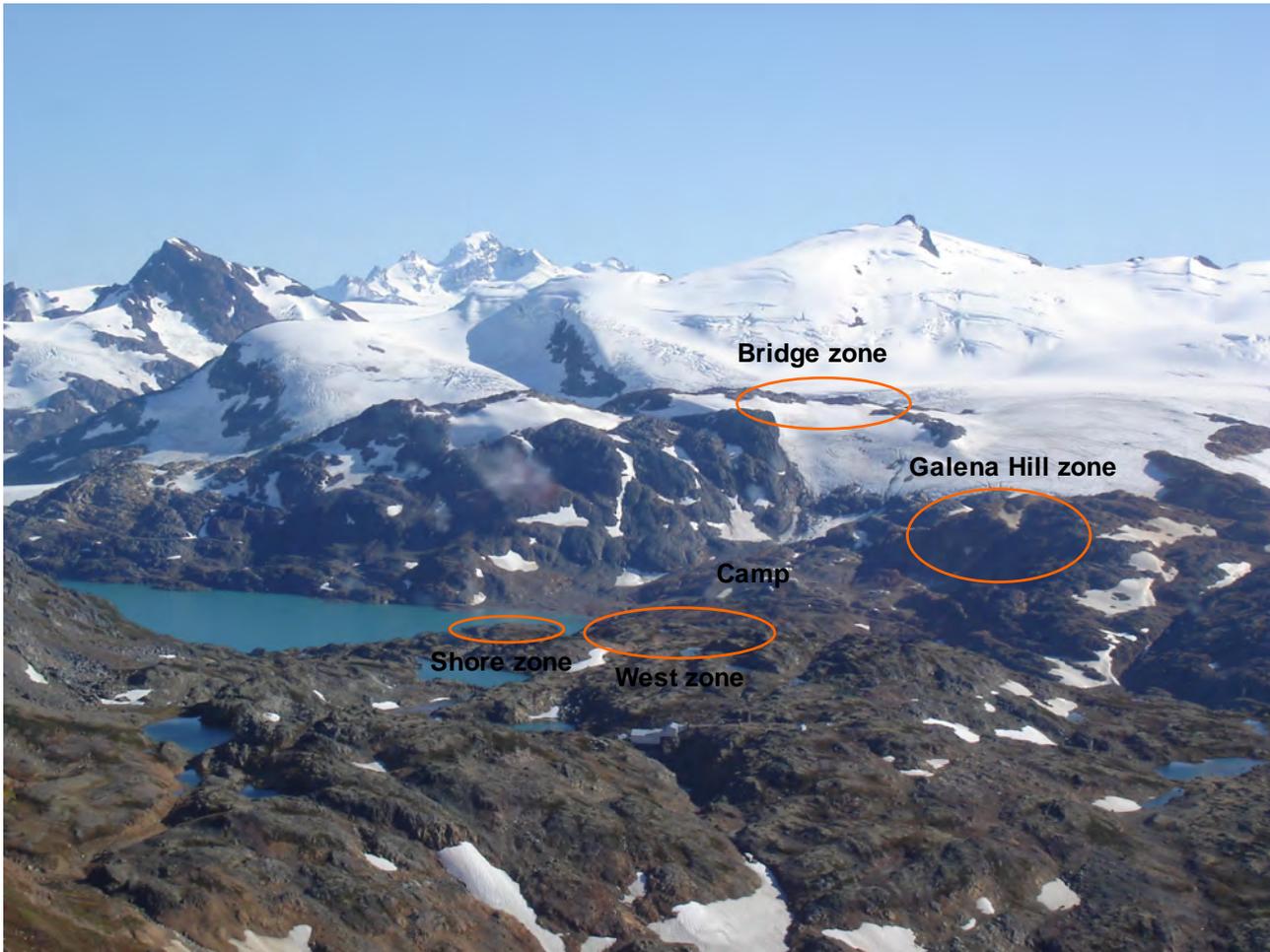


Figure 33. Brucejack project; southeast view toward Shore, West, Galena Hill and Bridge zones located sequentially south of the west end of Brucejack Lake toward the ice cap.



Figure 34. Brucejack project; Gayle Febbo mapping in the Bridge zone while (in the background) drilling proceeds on the ice cap.



Figure 35. Brucejack project; Galena Hill zone as seen from the exploration camp.

diameter of one kilometre, and is characterized by porphyry-style assay results. For example, SU-10, a deepened hole in the Bridge zone, graded 0.76 g/t Au over 601 m and ended in mineralization. Mineralization in the

Galena Hill, West and Shore zones has a more “transitional” to epithermal character and includes bulk tonnage and bonanza-grade intercepts (Figures 39, 40). For example, SU-106 in the Galena Hill zone encountered



Figure 36. Brucejack project; Shore zone SU-105, foliated quartz-sericite-pyrite alteration, protolith unknown.



Figure 37. Brucejack project; West zone SU-100 at 535 m, quartz-sericite-pyrite alteration, with relict sedimentary bedding?.



Figure 38. Brucejack project; intrusive rock texture in the Bridge zone outcrop with relict phenocrysts.

three separate intervals:

- 72.47 m grading 1.37 g/t Au and 15.0 g/t Ag,

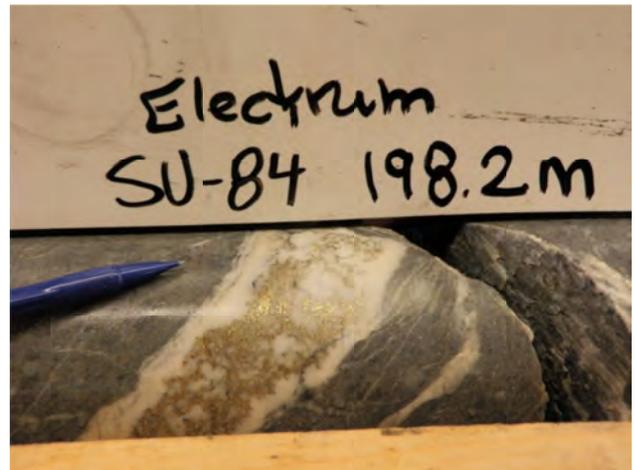


Figure 39. Brucejack project; Galena Hill zone SU-84, quartz-electrum vein grades 5480 g/t Au and 2140 g/t Ag over 0.44 m.



Figure 40. Brucejack project; geologists enjoy a lighter moment.

- 48.62 m grading 1.06 g/t Au and 25.75 g/t Ag; including 0.69 m with 1710 g/t Au and 1080 g/t Ag that was cut to 31.1 g/t Au, and
- 24.42 m grading 0.77 g/t Au and 7.31 g/t Ag

Silver Standard drilled 45 holes totalling nearly 18 000 m to upgrade and expand resources in the **Snowfield** gold-copper porphyry deposit (Figure 41), located 4 km north of Brucejack. The purposes of the drill program were to: (a) obtain geotechnical data; (b) obtain a metallurgical sample by recovering P-size core; (c) convert the inferred resource to measured and indicated; and (d) to better define the west, east and south margins of the Snowfield zones. Snowfield comprises two separate mineral zones:

- the Main (or North) copper-gold zone that is the upper portion of the Mitchell deposit which has been displaced 2 km east by the Mitchell thrust fault (see KSM above). Like Mitchell, the Main zone is characterized by an intense quartz-pyrite-chalcopyrite stockwork that is strongly crenulated by penetrative deformation (Figure 42). Gold occurs mainly in chalcopyrite; and



Figure 41. Snowfield project; drill camp on the gossan of the Upper Snowfield gold-molybdenum zone.



Figure 42. Snowfield project; intense and deformed quartz stockwork of Main (North) Snowfield gold-copper zone, PQ core from a metallurgical hole.

- the upper gold-molybdenum zone 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, so that the eastern limit of the zone corresponds approximately to the Brucejack fault. A representative hole, MZ-116, intersected 83 m grading 0.44% Cu and 1.45 g/t Au. At its southeast extent the Snowfield Main zone is an undeformed weak quartz stockwork (Figure 43). 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). Evidence shows the Upper zone to be younger than the Main zone (Figure 44) but otherwise the relationship between the two sub-zones is unknown.

The **Glenora King** (GK) property (MINFILE 104G 003) near Telegraph Creek was drilled by Strategic



Figure 43. Snowfield project; MZ-117 at 228 m, quartz-sulphide veins in chlorite alteration, interval grades 0.44 g/t Au, 0.13% Cu, at southeast margin of the Main zone.



Figure 44. Snowfield project; fragment of deformed stockwork typical of the Main zone in the non-strained Upper zone. Implies a post-deformation origin to the Upper zone.

Metals Ltd. Volcanic rocks near the contact of a diorite to monzonite pluton contain shear and replacement zones with significant copper and gold values over a two kilometre-long trend along Winter Creek. Three holes tested bedrock below the showings (Figures 45, 46).

The **Red Chris South** property of Bolero Resources Corp was explored by an MMI geochemical survey and a 55 line km IP survey. The property includes the Ram showing (MINFILE 104H 011). The company plans to test porphyry copper-gold targets by drilling in 2011. Also to the south of Red Chris, Teuton Resources Corp completed a VTEM survey over its **Yellow Chris** property. And 20 km northwest of Red Chris, Solitaire Minerals carried out geological mapping and a geochemical survey on the **Summit B** (Kitty) claim (MINFILE 104H 015), one of four properties it holds in the district. The geology of Summit B property is not related to Red Chris geology.

Soil geochemical and IP surveys were carried out on the **Gin** property (MINFILE 104H 031), located 5 km



Figure 45. Drill set up on a ridge crest for the first hole on the GK (Glenora King) project to test below copper-gold showings on Winter Creek.



Figure 46. GK project; geologists Doug Eaton, Sarah Eaton and Richard Phillips inspect copper mineralization.

west of Red Chris, by Brett Resources. Brett relinquished its option from CJL Enterprises Ltd. The claims are underlain by propylitic altered volcanic rocks containing pyrite fracture veinlets.

Exploration of the **GJ** property (also known as **Kinaskan**) was reactivated by Teck Resources (Figure 47). The Donnelly zone (MINFILE 104G 086, 034) has a measured and indicated resource of 153.3 Mt at a grade of 0.321% Cu and 0.369 g/t Au. Mineralization is related to the east-northeast trending Groat stock, closely



Figure 47. GJ (Kinaskan) project; new camp construction on the alpine plateau that overlies the Donnelly porphyry copper-gold deposit.

comparable to the geologic setting at Red Chris 25 km to the northeast. The initial 27 km of a planned 180 line-km IP survey was completed, while core re-logging focused on alteration; both studies are designed to develop new targets on the poorly exposed alpine plateau (Figure 48). The area of interest extends 11 km north to the Quash showing (MINFILE 104G 161).

On the **Trek** property (MINFILE 104G 022), located 12 km southeast of Galore Creek, Romios Gold Resources Inc completed a small Titan-24 IP survey and nearly 4000 m of drilling on the North zone. Named for its location north of Sphaler Creek, the North zone consists of chalcopyrite-bearing veins and fracture zones (Figure 49) associated with northeast trending pink monzonite dikes that are from 0.2 to 10 m wide. The dikes cut Stuhini Group mafic volcanic, plagioclase and/or pyroxene-phyric, flows and breccias. TRK10-03 intersected 3.84% Cu, 1.82 g/t Au and 8.52 g/t Ag over 4.6 m. TRK10-05 returned a 10.0 m interval grading 0.76% Cu, 0.99 g/t Au and 1.30 g/t Ag. Thirty kilometres southeast, across an icefield, syenite and pseudoleucite volcanic rocks were mapped that closely resemble rocks at Galore Creek (Figure 50).

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). 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 hostrock is volcanic-derived greywacke with an overturned, near-vertical dip (D. Yeagher, personal communication, 2010). Mapping in the Johnny Creek gorge located the mineralized zone in outcrop with a true width of 15 m and a dip of 85° northeast. The new



Figure 48. Angular unconformity between Stuhini Group sedimentary rocks and Hazelton Group volcanic strata, north of GJ camp.



Figure 49. Trek project; chalcopyrite vein in mafic volcanic rock.



Figure 50. Dirk zone southeast of Trek; K-feldspar porphyry syenite (with epidote) and pseudoleucite porphyry are associated with copper mineralization.

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 deposit consists of a quartz-magnetite replacement and stockwork zone in the cupola of the Red Bluff syenite stock. 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 cut-off and with a 0.77 strip ratio. Drilling is planned on a third target area, the Snip North porphyry system located north of the Iskut River (MINFILE 104B 312).

Paget Minerals Corporation prospected on its **Mount Dunn** prospect (MINFILE 104B 079), 70 km northwest of Stewart. Paget extended copper-gold mineralization south of where it drilled in 2009. Fourteen rock chip samples across quartz-chalcopyrite veins in a dike-like monzonite porphyry averaged 0.22% Cu and 0.44 g/t Au.

Teuton Resources Corp drilled 11 short holes on the **Tennyson** property, 40 km north of Stewart (MINFILE 104B 167). Three holes reportedly intersected porphyry-type copper-gold mineralization. TN10-05 intersected, over its full 88.4 m length, 0.32% Cu and 0.25 g/t Au.

At **Voigberg** (MINFILE 104G 146), BCGold Corp performed geological mapping and prospecting over coincident gold-in-soil (greater than 300 ppb Au) and IP chargeability anomalies. The area is modeled to be a copper-molybdenum porphyry system.

Porphyry Copper-(Molybdenum-Gold) Projects in the Skeena Arch

High Gold is the new name given by Argonaut Exploration Inc to a porphyry copper-molybdenum prospect originally called Hidden Valley, located 45 km west of Smithers (MINFILE 093L 076, Figure 51). Argonaut completed an IP survey, hand trenching and a 2500 m drilling program (Figure 52). A Bulkley granodiorite stock intrudes Hazelton Group volcanic rocks to the south and argillaceous sedimentary rocks of the Skeena Group to the north. Emplacement of the stock was controlled by an east-west, south-dipping fault. Vertical displacement on north-south block faults exposes different structural levels in the stock and its mineralized system (R. Cook, personal communication, 2010). Biotite and chlorite-biotite hornfels are developed in the country rocks and there is a pronounced pyrite halo to the north, in the sedimentary rocks. Fracturing is extensive and strongly developed. Early veins of quartz, molybdenite and local anhydrite have K-feldspar alteration envelopes. Later, orthogonal veinlets of pyrite, sparse chalcopyrite and chlorite have texturally destructive envelopes (Figure 53). Lastly, veins of quartz, barite and ferruginous carbonate are interpreted as an epithermal overprint (J. Nebocat, personal communication, 2010). The trench sample averaged 0.14% Cu, 0.007% Mo and 0.04 g/t Au over 172 m. Hole HG10-02 intersected 0.10% Cu, 0.020% Mo and 0.027 g/t Au over 156.3 m from the top



Figure 51. Drill core logging area on the High Gold project at the head of Kitsuns Creek, west of Smithers.



Figure 52. High Gold project; geologist Dan Meldrum logging drill core.

of bedrock.

Finlay Minerals Ltd discovered copper-molybdenum porphyry mineralization on its **Silverhope** property 36 km southeast of Houston, and 3 km south of Equity Silver mine (Figure 54). Drilling targeted Equity Silver style copper-silver mineralization as had been found in the nearby Gaul zone (MINFILE 093L 256), but testing of a strong IP chargeability anomaly encountered biotite quartz monzonite with a well-developed vein stockwork of chalcopyrite and molybdenite, accompanied by quartz



Figure 53. High Gold project; fracture-veined hornfels and granodiorite, containing quartz, sulphides and purple anhydrite.



Figure 54. Silverhope copper-molybdenum porphyry discovery team in the core shack; John Barakso, Gayle Febbo and Warner Gruenwald.

in some intervals. The intrusion resembles a Nanika quartz monzonite stock mapped nearby to the north. Fracture-controlled mineralization extends into the country rocks; biotite hornfels developed in a bedded tuff sequence and intercalated chert pebble conglomerate. These rocks are typical of the Skeena Group succession on the Equity Silver property. 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). Copper mineralization and alteration are characterized by potassium feldspar and secondary biotite (Figure 55).

A modest 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 (Figure 56). The deposit is developed in a biotite-feldspar porphyritic granodiorite stock of early Tertiary age, assigned to the Babine suite of plutons. When the mine closed in 1992, a

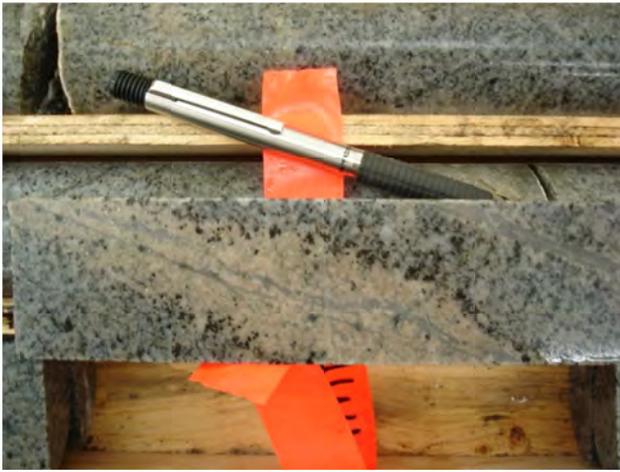


Figure 55. Silverhope project; quartz vein with K-feldspar-chalcopyrite envelope and margin of secondary biotite.



Figure 56. Closed Bell Copper mine on Newman Peninsula of Babine Lake.

resource of 70.4 Mt grading 0.44% Cu, 0.20 g/t Au located below the open pit and with a strip ratio of 1.9:1 was determined to be uneconomic at the prevailing copper price. Results have not been disclosed of the six holes (3400 m) that were completed in 2010.

The **Porphyry Creek** property of Duncastle Gold Corp, located 20 km northwest of Smithers, was explored by an airborne EM, magnetics and radiometric survey (514 line km), a ground geological follow-up and subsequent drilling. Three holes tested for a porphyry copper-molybdenum system near the Sultana prospect (093M 061) at the eastern contact of the Rocher Deboile granodiorite stock, a Bulkley pluton. Results of the October drilling program were not available at time of writing.

Zymo (MINFILE 093L 324) is a copper-gold prospect discovered in 2007 about 45 km west of Smithers. Eastfield Resources Ltd prospected the 2 km by 4 km porphyry system (as defined by IP chargeability, magnetics and soil geochemistry) west of previous drilling and found a mineralized float boulder that assayed 0.74% Cu and 0.70 g/t Au, providing incentive for further work on the property.

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 26-hole, 4100 m program (Figure 57). A single hole that tested an IP anomaly intersected a quartz-pyrite vein stockwork over 125 m. The company also placed covers over historic mine workings for safety reasons (Figure 58).

In early 2010, Nanika Resources Inc drilled two holes on the **Sweeney** property, 3 km north of the Huckleberry copper mine. Sweeney is also known as Ted and Wee (MINFILE 093E 076). S10-2 intersected strongly geochemically anomalous copper (the highest value was 1493 ppm Cu) over its 276 m length in propylitic-altered volcanic rock, an assemblage of chlorite, epidote, magnetite and pyrite.

Planned drilling of the **Poplar** copper-molybdenum prospect (MINFILE 093L 239) was delayed because of a social issue but is planned to commence in early 2011. The Poplar property is under exploration by Lions Gate Metals Inc and located 45 km southwest of Houston.

Gold Reach Resources Ltd flew a 1325 line km geophysical survey over its **Ox** and **Seel** properties in late 2009 (MINFILE 093E 101 and 105). A permit allowing a 50 line km IP survey was received in October, too late to begin the work in 2010.

PORPHYRY MOLYBDENUM PROJECTS

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



Figure 57. Silver Queen project; Mine Inspector Doug Flynn (white hat), Ellen Clements (pink hat) and Jim Hutter (blue hat) review procedures with the drill crew (dark hats).



Figure 58. Silver Queen project; covers were installed on historic underground workings for safety reasons.

occurs mainly in late Cretaceous batholiths, the Surprise Lake and Cassiar batholiths in particular, and also in Tertiary stocks.

Molybdenum deposits can be divided into batholith-hosted and stock-hosted types based on host intrusion, deposit morphology and alteration (Wojdak, in press). Those found in granite batholiths consist of a wide spaced molybdenite vein network that contains little quartz and developed in a passive environment. Deposits are laterally extensive, forming a tabular or blanket shape. Examples are the Endako mine and the Ruby Creek and Storie deposits. Molybdenum deposits associated with small, intermediate to silicic intrusions formed in a high energy, commonly explosive environment. An intense quartz stockwork developed above the intrusion or as a vertical annular zone around it. Multiple stages of mineralization are common and can lead to higher grade and stacked mineral zones. These include the Davidson, Lucky Ship, Lone Pine, Mount Haskins and the Alice Arm deposits including Kitsault.

Molybdenum in the Atlin - Cassiar District

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 BC 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. Mineralization is concentrated in a subhorizontal tabular zone between texturally distinct phases of the Troutline stock, a distinct body within the Cassiar granite batholith. Molybdenite occurs as fracture coatings associated with muscovite, as disseminations and in narrow quartz veinlets (Figure 59).

Velocity Minerals drilled three holes at the **Cassiar Moly** prospect (MINFILE 104P 035) to test mineralization between a surface showing and underground workings it reopened and sampled in 2009. The property is 4.4 km south of the Storie prospect and is underlain by granite and quartz-feldspar porphyry phases of the Troutline stock. All three holes intersected several 30 to 80 m wide zones grading 0.02% to 0.03% Mo.

Jennings is a recently discovered molybdenum skarn and porphyry deposit on the British Columbia – Yukon border 14 km northeast of the Silvertip silver manto prospect. The discovery hole was drilled in 2006 in the Yukon by Cumberland Resources Ltd, and was subsequently acquired by Agnico-Eagle Mines Ltd. Currently the property is accessed from the Silvertip road at a point in British Columbia. The property comprises three target areas; the most southerly is largely in British Columbia. Some 18 000 m of resource drilling took place on the central target, which lies north of the border (Figure 60). A granodiorite stock with quartz and feldspar phenocrysts intrudes thin bedded limy siltstone of the Kechika Group. Actinolite-garnet skarn, retrograde epidote-magnetite skarn and biotite hornfels are developed up to 100 m wide outboard of the stock. Early actinolite-molybdenite fractures are cut by quartz-molybdenite veins; the latter contain sparse green fluorite. Veins with wolframite and lesser ferberite occur peripherally to molybdenum mineralization.



Figure 59. Storie molybdenum project; the causative quartz-feldspar porphyry granite intrusion.



Figure 60. Jennings molybdenum discovery 500 m north of the BC-Yukon border.

Molybdenum in the Skeena Arch

Bard Ventures Ltd intersected a new molybdenum zone on its **Lone Pine** prospect (MINFILE 093L 027, 028) located 15 km north-northwest of Houston. Drilling of 9 holes (3427 m) targeted on a soil geochemical anomaly resulted in discovery of the 61 zone along the northern contact of the quartz-feldspar porphyry granite, 500 m northeast of the Alaskite zone (Figure 61). Mineralization at Lone Pine is developed in the quartz-porphphy marginal phase of a granite stock (Figure 62). 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 cut-off of 0.04% Mo. The company retained P&E Consultants Inc to complete a NI 43-101 compliant Preliminary Economic Assessment. Preliminary findings indicate a significant decrease in the open pit stripping ratio from that previously reported (R. Kemp, personal communication, 2010). The results of P&E's economic evaluation are anticipated by late February 2011.

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, and 0.04% Mo over 58.1 m beginning at 255.4 m. Significant silver values were also obtained; 12.51 g/t Ag over 37.2 m from 253.2 m depth. Perhaps of greater significance are the multiple intrusive phases (coarse granite, aplite to quartz porphyry and orthoclase porphyry), quartz stockworks and hydrothermal breccias that the hole intersected (Figures 63, 64, 65). Such features can characterize major molybdenum deposits. The best assay interval was from Hole BD-10-66, which averaged 0.05% Mo over 112.4 m. Further drilling in this promising target area is anticipated in early 2011.

Bard Ventures Ltd also explored **Grouse Mountain** which adjoins Lone Pine to the north (MINFILE 093L 026, 251). Ten polymetallic mineral occurrences,



Figure 61. Drilling in the 66 zone on the Lone Pine molybdenum project.



Figure 62. Lone Pine; quartz porphyry in the Alaskite and 66 molybdenum zones.

primarily veins, are associated with dikes and small stocks of the late Cretaceous Bulkley intrusions, and might be related to an underlying porphyry copper-molybdenum system. Geological and soil geochemical surveys were performed.

Exploration of the **Mac** prospect (MINFILE 093K 097) is being reactivated by AZ Copper Corp. The Mac property is located 75 km north of Burns Lake and contains an inferred resource of 100 Mt grading 0.07% Mo (not compliant with NI 43-101). Work is planned but had not begun at time of writing. The deposit is in a



Figure 63. Lone Pine; fractured granite porphyry and quartz-molybdenite veins in the 66 zone.

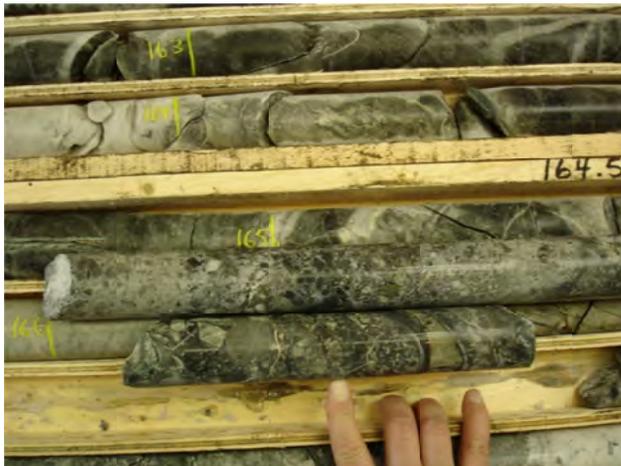


Figure 64. Lone Pine molybdenum project; hydrothermal breccia in the 66 zone.



Figure 65. Lone Pine molybdenum project; intramineral K-feldspar porphyry.

satellite stock of the Jurassic Francois Lake granite batholiths that hosts the Endako molybdenum mine 100 km to the southeast.

On the **Shan** property, BCM Resources Corp began an evaluation of re-opening an historic adit at about 470 m elevation to further explore the deposit (MINFILE 103I 114). Molybdenum fractures on the Shan property were determined to have two orientations: 340° with a subvertical dip; and a 010° set with a 50° east dip. The Shan prospect is in the Carpenter Lake batholith. It is described by Venable and Wojdak, 2009.

The long-inactive **Pitman** molybdenum prospect (MINFILE 103I 046) was acquired by Tajiri Ventures Corp. Molybdenite-bearing fractures and quartz veins occur in the Carpenter Lake granite batholith, dated at 53 Ma. An historic drillhole intersected 0.08% Mo over 55 m. Preliminary geological, geochemical and VLF surveys were carried out.

NICKEL IN ULTRAMAFIC ROCKS

The locations of nickel, massive sulphide and gold-silver projects are illustrated on a map, Figure 66.

Turnagain is a bulk-tonnage nickel prospect in a zoned ultramafic complex, located 70 km east of Dease Lake and owned by Hard Creek Nickel Corporation. Measured plus indicated nickel sulphide resources are estimated at 695 Mt at a grade of 0.174% Ni and 0.014% Co. From 2008 to mid-2010 the company envisaged production of a low grade concentrate to feed a proposed on-site hydrometallurgical facility. This scenario has a very large capital cost and large power requirement. Hence, recent work has focused on production of a direct-shipping concentrate. Metallurgical test work was performed on core from two new HQ holes drilled for that purpose. The 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.

The **Letain** nickel property of First Point Minerals Corp is located 85 km east of Dease Lake. The property is underlain by an oceanic crustal sequence of the Cache Creek Group including serpentinite. Awaruite, a nickel-iron alloy, is documented in some placer gold workings in the area (*e.g.* Wheaton Creek) and is the target of First Point's exploration. Geological mapping and sampling confirmed the presence of nickel-iron alloy and sought to outline areas of coarser grain size.

MASSIVE SULPHIDE PROJECTS

Massive sulphide deposits in Northwest region comprise volcanogenic deposits, skarns, mantos, and some of uncertain deposit type. Volcanogenic deposits occur in strata of varying ages and terrane affiliation. The Tulsequah Chief deposit is in Paleozoic strata; Kutcho Creek is in rocks of early Triassic age and important deposits in the Stewart district are in Jurassic volcanic

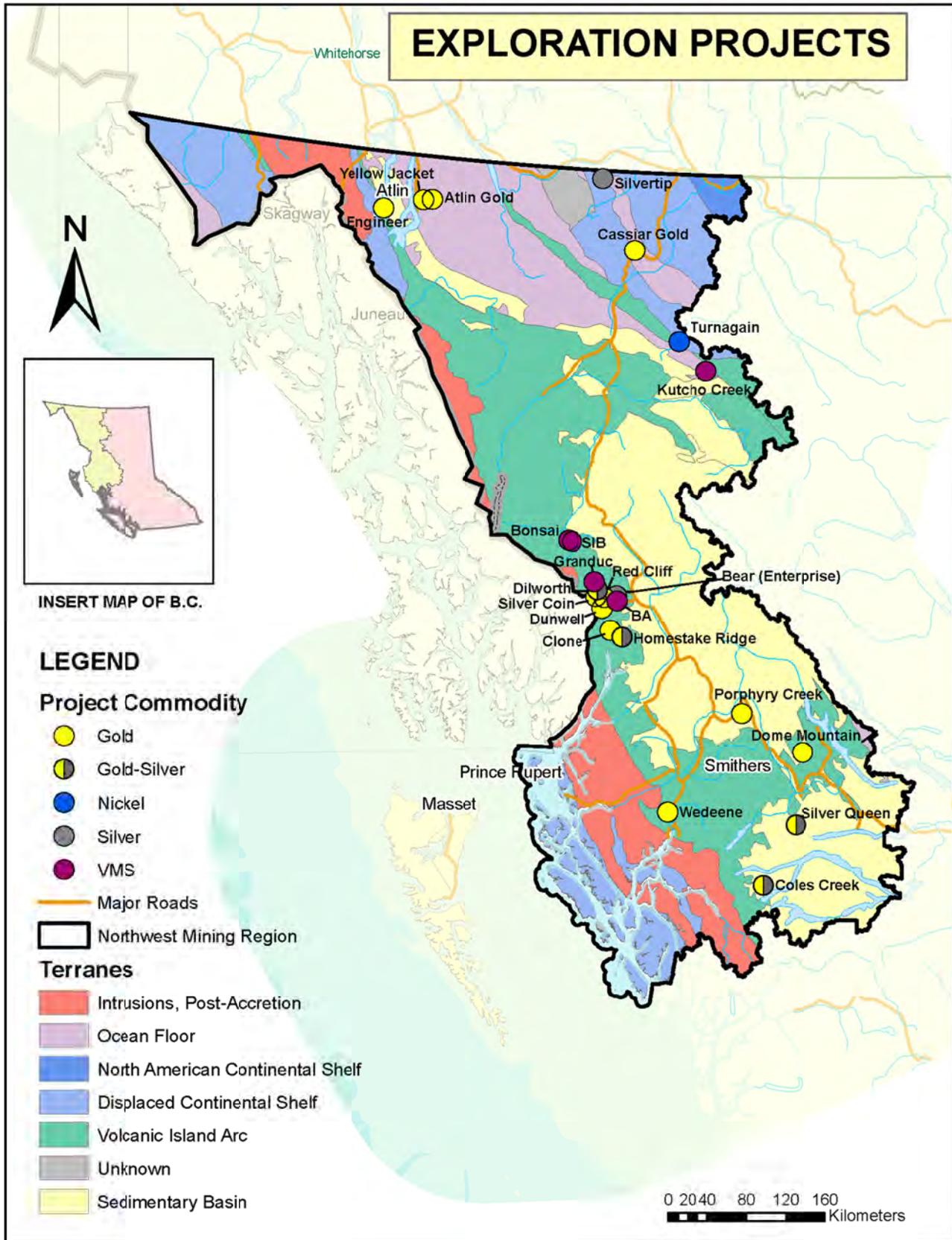


Figure 66. Polymetallic massive sulphide, gold-silver vein and nickel exploration projects in Skeena Region.

rocks. The latter include Eskay Creek, Granduc and Anyox.

Atlin - Cassiar District

New Pacific Metals Corp acquired the **Eva Lake** zinc property based on work by Noranda Mines Limited, which reported a drillhole in 1980 with a visual estimate of 20 to 50% sphalerite over 5.6 m at Weir Mountain (MINFILE 104N 017; ARIS 8638) located 40 km east of Atlin. Mineralization is of unknown deposit type but Sander Wang states that it is not a vein (personal communication, 2010). New Pacific conducted a VTEM survey but ground geophysics and drilling were deferred until 2011.

The **Silvertip** high-grade silver manto prospect was purchased by Silvercorp Metals Inc for \$15 million; installation of an all-season 49-man camp and a major exploration program followed (Figures 67, 68). Mineral resources calculated in March were derived from historic work; 71 472 m of drilling in 491 holes and 2400 m of trackless underground workings (at a 200 g/t Ag equivalent cut-off), and are as follows:

- Indicated - 2 349 055 tonnes at 352 g/t Ag, 6.73% Pb, 9.41% Zn and 0.54 g/t Au
- 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 (4114 line km) and nearly 11 000 m of surface drilling focused on the east and south margins of the resource area (Figure 69). Silvercorp is conducting all necessary baseline and engineering studies necessary to submit an application for a small mine by mid-2011 (200 tonnes per day) with plans for construction to begin in mid-2012. The company's stated intent is to fund concurrent exploration from cash flow to increase reserves. This is a business model it has followed with considerable success in China.

Silvercorp report there are three types of mineralization on the property: contact, reef and exhalite. The most important type is massive sulphide bodies at the contact between Devonian limestone of the McDame Group and overlying black siltstone and grit of the Earn Group. Massive sulphide consists of sphalerite, galena, pyrrhotite and pyrite. Four mineral zones are identified from prior work: Discovery, Discovery North, Silver Creek and 65-zone. Reef-style mineralization occurs in limestone below the contact. Exhalite-type mineralization comprises stratiform, chert-sulphide-barite beds in the Earn succession; it is under evaluation as a low grade resource. 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. 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



Figure 67. Silvertip; a new 49-man camp was installed on the silver manto prospect that is suitable for exploration and, in the future, a mining crew.



Figure 68. Drilling east on the Silvertip project to extend the Discovery zone eastward.

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.

The **Haskins-Reed** lead-zinc skarn prospect (MINFILE 104P 021) was excavator trenched by Pacific Bay Minerals Ltd. The skarn is developed in lower Cambrian Rosella Formation limestone, and likely related to a Tertiary granitic stock. The mineral zone ranged from 4 to 24.7 m wide; trench 4 averaged 1.21% Pb, 3.67% Zn,



Figure 69. Silvertip project; geologist Sheila Ulansky reviews galena-sphalerite drill intercept.

57.1 g/t Ag and 0.29 g/t Au over 24.7 m. Previous work by Pacific Bay shows that molybdenum and tungsten also occur locally in the skarn system.

Stewart - Iskut District

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 of Salmon River formation rhyolite and mudstone, 7.7 km along strike and directly correlative with the rich Eskay Creek deposit. Lulu zone mineralization is in the hangingwall of the Coulter Creek thrust, and is truncated along strike and down dip. The company states that some 130 holes have explored the hangingwall sequence but only 8 explored below it. All five 2010 holes were collared from the stratigraphic footwall; four penetrated the thrust fault and intersected the Eskay sequence of rhyolite, mudstone and pillow basalt. 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) located 6 km southwest of the closed Eskay Creek mine. Stratabound massive to

framboidal pyrite at Bonsai is associated with rhyolite and Salmon River formation mudstone, a similar stratigraphic position to mineralized zones at Eskay Creek. However, previous drilling did not find significant gold or silver content. Eleven deep holes in the 2010 program tested a strong conductivity anomaly coincident with three-dimensional IP high chargeability anomalies and MMI soil survey results. Flow banded, brecciated rhyolite containing disseminated sulphide and geochemically anomalous silver was intersected.

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 in the 1970s and 1980s, 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. Pyrite, pyrrhotite and chalcopyrite comprise sulphide facies iron formation that occurs near the contact between mafic pillow lava and tuff with overlying chert and argillite. 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. A new resource estimate is anticipated. Partial rehabilitation of the 17 km access tunnel is planned in 2011 that will enable underground exploration.

Great Bear Resources Ltd has an option earn up to 70% interest in the **BA** project from Mountain Boy Minerals Ltd. The BA property (MINFILE 104A 178) is located 30 km northeast of Stewart near the head of the Bear glacier and is underlain by volcanic and sedimentary rocks of the Hazelton Group. 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 (Figures 70, 71). Project geologist Andrew Wilkins reports that most of the property is underlain by fragmental volcanic rocks of mafic to intermediate composition. These are overlain by felsic pyroclastic rocks, perhaps correlative with the Mount Dilworth Formation, which are in turn overlain by thin bedded to laminated mudstone, siltstone and chert of the Salmon River formation that includes the mineralized sequence. Salmon River sedimentary rocks are unconformably overlain by dark grey to black silty mudstone of the Bowser Lake Group.

Silver and base metal mineralization in the Barbara zone occurs in a sequence of grey, felsic volcanoclastic rocks, iron-rich mudstone, chert, jasper and finely laminated pyrite up to 100 m thick (Figure 72). Jasper is always accompanied by magnetite. Chert is commonly spheroidal and exhibits drusy cavities. The fine clastic and exhalite sequence is underlain by feldspar-phyric andesite, interpreted to be a subvolcanic intrusive body, and a distinctive heterolithic andesite breccia that is 5 to 10 m thick (A. Wilkins, personal communication, 2010). These are overlain by a local volcanic cobble



Figure 70. Drilling on the BA project, a volcanogenic massive sulphide project near Bear glacier and Cambria icefield.



Figure 71. BA silver project; geologists Andrew Wilkins and Lucia Theyn inspect drill core.

conglomerate and capped by more Salmon River mudstone. Mineralization comprises carbonate, quartz, sphalerite, galena and barite veining and replacement within the chert-jasper (exhalite) sequence, as breccia infilling within the subvolcanic andesite and as matrix replacement in the volcanoclastic unit. Surface work resulted in discovery of the North Extension, Wet Willy and Bod mineral zones located 300 m, 600 m and 2000 m, respectively, to the north of Barbara and in the same succession. Drilling highlights include:



Figure 72. BA silver project; folded chert and jasper of the mineral sequence within the Salmon River Formation, broadly correlative with the Eskay Creek deposit.

- 401.0 g/t Ag, 0.46% Cu, 4.14% Pb and 0.46% Zn over 3.05 m in BA-2010-82
- 69.8 g/t Ag, 0.01% Cu, 0.57% Pb and 1.53% Zn over 35.69 m in BA-2010-83
- 117.5 g/t Ag, 0.02% Cu, 1.18% Pb and 2.81% Zn over 15.24 m in BA-2010-147

At the **Rock & Roll** prospect (MINFILE 104B 377) Pacific North West Capital Corp conducted geologic mapping and relogging of core in order to prepare a new resource estimate. Stacked sulphide lenses occur within a sequence of argillite, siltstone and andesite of probable Triassic age. An historic inferred resource in the Black Dog zone contains 580 044 tonnes grading 2.4 g/t Au, 335.9 g/t Ag, 0.64% Cu, 0.79% Pb and 3.1% Zn. A new resource estimate is in progress.

The **Delta** (Stewart) property (MINFILE 104A 165, 166) was explored by Frontline Gold Corporation in search of an Eskay Creek-type massive sulphide deposit. A 1421 line-km VTEM survey and a mobile metal ion (MMI) soil geochemical survey were performed. The claims are underlain by a window of Stuhini and Hazelton group rocks surrounded by Bowser Lake Group sedimentary rocks. Frontline Gold Corporation also covered the **Poly** property in Bear Pass with a 2172 km VTEM survey and an MMI survey. These enlarged the previously known base and precious metal anomaly and identified four targets for further work.

At **Todd Creek** in the Stewart district, Orestone Mining Corp assumed control of the project by its acquisition of Intuitive Exploration Inc. An extensive VTEM survey (2172 line km) was carried out in search of volcanogenic massive sulphide mineralization.

Terrace - Smithers District

Chist Creek is a large volcanogenic alteration zone 15 km east of Lakelse Lake found by a British

Columbia Geological Survey mapping crew in 2007. The Barresi zone was discovered by Paget Resources Corp during follow-up mapping and prospecting. It is described as semimassive lenses and stringers of pyrite-sphalerite-chalcocopyrite-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-chalcocopyrite-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.

Exploration of the **Fireweed** silver-lead-zinc prospect (MINFILE 093M 151) was reactivated by Shamrock Enterprises Inc. The property is near Babine Lake, 50 km northeast of Smithers. Fireweed is a massive and disseminated sulphide deposit that is stratabound within Skeena Group sedimentary rocks and associated with rhyolite sills and dikes that are probably correlative with the Rocky Ridge volcanic sequence. The historic resource estimate is 580 000 tonnes grading 342 g/t Ag, 1.34% Pb and 2.22% Zn. Mineralization occurs preferentially in grey sandstone interbeds within a thick sequence of black siltstone and shale. During November, Shamrock completed eleven holes that mainly tested IP anomalies. A few holes tested continuity of previous intercepts. There were no results at time of writing.

GOLD – SILVER PROJECTS

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

Epithermal and Orogenic Veins in the Atlin District

The historic **Engineer** gold mine (MINFILE 104M 014) on Tagish Lake was explored by BCGold Corp (Figure 73). Engineer comprises epithermal veins near the Llewellyn fault (Figure 74) that produced 560 kg of gold mainly in the 1920s. Ore grade was 39 g/t Au. In 2010,



Figure 73. Historic Engineer gold mine on Tagish Lake.



Figure 74. Engineer epithermal quartz-calcite-gold vein, on 5-level of Engineer mine.

underground drilling (Figure 75) was conducted from 5-level, the principal mine access; lower levels of the mine are flooded. Nine holes tested the Engineer vein between 5 and 6-level elevations. One of the holes intersected coarse electrum in a quartz-calcite breccia vein, returning a grade of 129.0 g/t Au and 121.6 g/t Ag over 1.0 m. One of four holes that explored the Double Decker vein also intersected coarse gold, grading 22.32 g/t Au and 17.59 g/t Ag over 0.96 m. The intercept is in the vicinity of 8-level, the lowest mine working. Work will resume in early 2011, including underground rehabilitation, bulk sampling and drilling. BCGold increased its land position



Figure 75. Underground at Engineer mine; geologists Gary Sidhu and Bruce Coates at the drill.

around the Engineer mine.

Blind Creek Resources Ltd drilled an additional eleven holes totalling 1568 m on its extensive property in the Atlin gold camp. The target of the **Atlin Gold** project is the source of placer gold deposits in the district (Figure 76). The holes were drilled along Otter Creek and along the Snake-Rant-Dominion lineament. Blind Creek is a private company and the results of drilling were not disclosed.

Wann River is a grassroots gold project of Blind Creek Resources Ltd located on the important Llewellyn fault near the south end of Tagish Lake (Figure 77). Numerous gold prospects occur along the 200 km length of the Llewellyn fault. At Wann River splays of the fault across a 1000 m wide zone segment intrusive, metamorphic, volcanic and sedimentary rocks of diverse age. Mapping and prospecting focused between the Brown showing (MINFILE 104M 026) and an historic trench on the lakeshore, a 500 m distance. Tracking auriferous boulders led to discovery of a 2 m wide quartz shear vein that was traced for 130 m along strike (Figure 78). The best sample returned 15.9 g/t Au and 440 g/t Ag



Figure 76. Placer gold mining on upper Otter Creek; the Atlin gold project drilled nearby for the source of two 60 oz gold nuggets found in 2009.

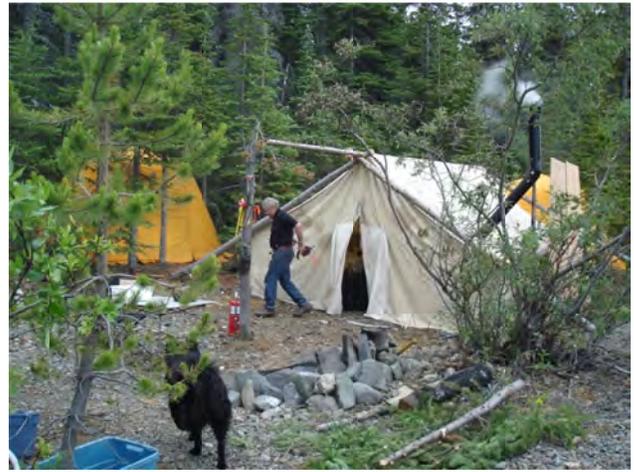


Figure 77. Prospecting camp on the Wann River gold project, shore of Tagish Lake.



Figure 78. Wann River project; geologist Clive Aspinall at the adit of the Brown gold vein showing.

(C. Aspinall, personal communication, 2010). Gold values were confirmed at the Brown showing, and two other gold-bearing quartz veins were found along with old trenches not listed in MINFILE. Further work is anticipated in 2011.

Troymet Exploration Corporation commenced an IP survey on the **Golden Eagle** property 50 km northwest of Atlin. The property is underlain by the Llewellyn fault and an intrusion that grades upward from granite to rhyolite. The area of the survey is along the Ben fault and

in the West Gully zone where drilling in late 2009 showed interesting mineralization (MINFILE 104M 044).

Constantine Metal Resources Ltd conducted a geological assessment of its newly acquired **Trapper Lake** gold project located 140 km south of Atlin and 45 km north of the Golden Bear mine road. Historic work delineated a 5 kilometre long alteration zone and a strong 2 km-long gold-in-soil anomaly with gold locally visible in soil (MINFILE 104K 078). Work in 2011 will be conducted by joint venture partner, Ocean Park Ventures Corp.

Epithermal and Intrusion-related Veins in the Stewart District

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

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) where 27 holes were drilled tracing the zone over a strike length of 1350 m and to 250 m below surface. Ascot reports the zone is 100 to 200 m wide and contains 100 to 2000 ppb Au with narrow higher grade zones. One of the best intercepts graded 8.99 g/t Au over 14.5 m. The Unicorn zone is described as a west dipping, structurally controlled epithermal system with previously unrecognized extensive high level "Premier porphyry" dikes and stocks. The Premier porphyry is a two-feldspar rock of granodiorite composition. The Province zone (MINFILE 104B 147), located 300 m southwest of Unicorn, was tested over an 800 m length by 17 holes drilled to 200 m depth. The zone is 50 to 200 m wide and contains 100-2000 ppb Au with narrow, steeply west-dipping quartz breccias containing higher gold grade.

Auramex Resource Corp worked in the Stewart district exploring the **Bear River, Georgie River and Tide North** properties. The work focused on the Enterprise zone (MINFILE 104A 024) north of Bear River, where a 742 km VTEM and magnetic survey was conducted and three holes totalling 1295 m were drilled. All three holes encountered faults with highly pressurized water and failed to find significant gold, silver or base metals. At the Georgie River gold vein prospect (MINFILE 103O 013), 681 line-km of VTEM-magnetic survey were flown. Geological ground work appraised targets for drilling. Similar geological work was done at Tide North to investigate anomalies from a 2009 airborne survey. Auramex increased its land position in the district

by purchase of the Ashwood property 17 km south of Stewart.

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), located 24 km northwest of Stewart. 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 occur in Hazelton Group andesitic volcanic rocks. The deposit is 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 cut-off 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.

Teuton Resources Corporation drilled several holes on the **Harry** property, located below the Granduc Road on the margin of the Salmon Glacier. The location is less than 1 km northwest of the historic Yellowstone occurrence (MINFILE 104B 039)

Decade Resources Ltd completed 57 core holes totalling nearly 9000 m in the Montrose zone on the **Red Cliff** property 25 km north of Stewart. The property is situated near the base of the extremely steep west wall of American Creek (Figure 79). Green and maroon andesite of the Hazelton Group is cut by a quartz vein and breccia zone. Early, weakly banded white quartz is brecciated and healed by fine grained grey quartz with pyrite and chalcopyrite. Holes are drilled in a series of tightly spaced fans at 5° increments of dip on lines of azimuth spaced 15° apart. Fifty tonnes of gold ore were shipped from Montrose in 1940 and 1941 (MINFILE 104A 033).

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. No results were released and a ground survey will be done to locate the property boundary before further drilling is undertaken. Extreme terrain requires careful work.

The historic **Dunwell** silver-gold mine (MINFILE 103P 052), which operated in the 1930s, was revived as an exploration project by Mountain Boy Minerals Ltd. The Sunbeam and Dunwell quartz veins are developed in a north-northeast fault, a splay of the prominent Portland Canal fault system. The veins dip steeply west and are mineralized with pyrite, galena, sphalerite, tetrahedrite and local native silver and argentite. Black pyritic shale to siltstone and purplish sandstone host the veins. Above the portal these rocks are cut by a pair of intermediate dikes. Mountain Boy explored below the underground workings over a 250 m strike length by drilling 50 close-spaced holes totalling over 8000 m (Figure 80).

The **FR** property of Mountain Boy Minerals Ltd is located 35 km north of Stewart and covers a polymetallic



Figure 79. Red Cliff gold project above American Creek north of Stewart; a steep slope drill set up.



Figure 80. Dunwell project; drill set up at the portal of the past-producing silver-gold mine.

quartz-carbonate vein (MINFILE 104A 112). The Liliane vein was tested by five holes.

The **Clone** gold property (MINFILE 103P 251), located 16 km west of Stewart, was drilled (16 holes) by Canasia Industries Corporation under option from Teuton Resources Corp. In addition, the company reported the extraction of a 34 tonne bulk sample with an average grade of 68.65 g/t Au. The location of this material is unclear; 9 tonnes were reported to have been transported by helicopter to Stewart. The property has been the subject of close-spaced drilling for many years but a

resource estimate has not been published. Shear-controlled quartz veins cut Hazelton Group volcanic rocks and contain disseminated native gold and sulphide minerals.

Bravo Gold Corp continued its aggressive exploration of the **Homestake** gold-silver prospect (MINFILE 103P 216) 35 km southeast of Stewart, 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. An Aerotem survey performed in 2009 showed a close coincidence between Th/K anomalies with both mineral zones, so other radiometric anomalies were targeted by 2010 drilling. Mineralization on the property consists of complex quartz-calcite veins and breccia, with associated sphalerite, galena, pyrite and chalcopryrite, in structures that are interpreted to be coeval with Hazelton Group volcanism. Vertical zoning is comparable to the epithermal Premier gold-silver mine: high silver near surface and high gold at depth. In May, prior to the drill season, Bravo announced a new resource estimate calculated at a 3 g/t Au cut-off:

- 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)

Nanika Resources carried out prospecting and rock and soil sampling on the **Bulldog** Creek property, located 10 km south of Stewart. A zone of silicification, typically 5 to 10 cm wide quartz veins and breccia, was traced 1.5 km within granitic rocks. Silver and gold are associated with sporadic pyrite, sphalerite and galena.

Intrusion-related Gold in the Skeena Arch

On the **Kalum** property, 30 km north of Terrace, Windstorm Resources Ltd carried out a 6-hole 420 m drilling program on the Cirque and Tuppie gold zones (MINFILE 103I 228). The holes tested gold-bearing quartz veins in a granite batholith. The veins, typically 30-40 cm wide, are discontinuous along strike and to depth. There were no significant intercepts.

Eagle Plains Resources Ltd and a 0802906 BC Ltd performed geological mapping and a soil geochemical survey on the **Elsiar** property 40 km north of Terrace. Elsiar (MINFILE 103I 229) is an early-stage intrusion-related gold prospect.

The **Maroon Mountain** gold vein prospect (MINFILE 103I 030) 35 km north of Terrace was drilled by WCB Resources Ltd. The Bear vein was tested over a 323 m strike length by 600 m of drilling in six holes and

20.7 m of channel sampling (Figure 81). The best hole, WCB-01, intersected 18.9 g/t Au, 117 g/t Ag, 0.29% Cu, 6.20% Pb and 3.89% Zn over 0.3 m (Figure 82). Conglomerate and siltstone of the Bowser Lake Group host the shallow dipping Bear vein. Nearby aplite dikes from 1 to 5 m thick suggest the vein is derived from an intrusion.

TAD Capital Corporation used a truck-mounted rig to drill eight core holes on the historic **American Boy** (MINFILE 093M 047) prospect 7 km northeast of Hazelton (Figure 83). The holes tested three of seven quartz veins mineralized with arsenopyrite, sphalerite and galena (Figure 84). Vein textures are consistent with a low temperature of formation peripheral to a Bulkley granodiorite stock. Gold and silver are the metals of most interest, but no assay results were announced.

Tad Mineral Exploration Inc drilled six holes (800 m) on the **Sidina** property, 20 km northeast of Hazelton, to test gold-bearing quartz veins. The veins occur over a 30 to 40 m interval near the contact of a Bulkley granodiorite stock and Bowser Lake Group sedimentary rocks, and in particular are associated with late dikes that parallel the intrusive contact (Figure 85). Individual veins are 10 to 30 cm wide and contain pyrite, arsenopyrite, sphalerite and minor galena and tetrahedrite. Several samples returned over-limit tungsten values from geochemical analyses; assays were pending at time of writing. Drill core was logged and split in Smithers (Figure 86).



Figure 82. Maroon Mountain project; drill intercept of the auriferous Bear quartz-galena-sphalerite vein.

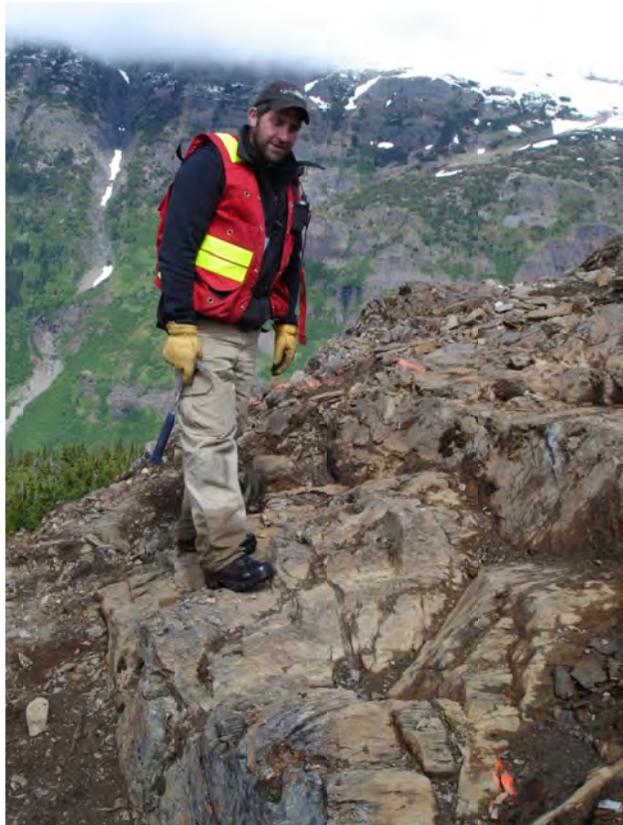


Figure 81. Maroon Mountain project north of Terrace; geologist Daithi MacGearailt views hand trench on the Bear gold vein.



Figure 83. Truck-mounted diamond drill on the American Boy silver-gold project, north of Hazelton.



Figure 84. American Boy project; geologist Andris Kikauka (purple fleece) inspects drill core to advise Dwight Harvey (driller, white hat) if the hole is terminated. Crew members Otto Paeseler and Neil Johnson look on.



Figure 85. Sidina gold project; quartz-sulphide vein at the contact between biotite hornfels and granodiorite.



Figure 86. Sidina core logging was relocated to Smithers after an early-winter storm.

At **Kisegas Mountain**, or KM project (MINFILE 093M 126), Rio Minerals Limited carried out geological mapping and trenching of gold-bearing quartz-base metal

veins related to Bulkley stocks. Kisegas Mountain is 60 km north of Hazelton.

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, Figure 87), 90 km south-southwest of Houston. 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. Both intervals also contain over 10 000 ppm Mn (V. Sidic, personal communication, 2010). The mineralized zone lies within a fault graben (caldera?) of gently dipping Kasalka Group strata. Drill holes have penetrated more than 400 m of ignimbrite and epiclastic breccias. Clasts are predominantly rhyolite ranging from 1 to 3 cm in size; minor mudstone clasts are mainly in the same size range but locally can be up to 10 cm (Figure 88). Rare basalt clasts can also be up to 10 cm in size. Apparently discontinuous sphalerite-galena veins have irregular margins and occur within an interval of pervasive silicification.

Callinan Mines optioned the **Troitsa** property, a porphyry copper-molybdenum prospect 6 km west of Coles Creek, (MINFILE 093E 005).

No work was done at **Deer Horn** in 2010, but Golden Odyssey Mining Inc announced a resource estimate derived from its work in 2009 and historic work. The



Figure 87. Drilling on the Coles Creek gold-silver project, south of Tahtsa Reach.



Figure 88. Coles Creek project; rhyolite epiclastic breccias with locally abundant mudstone cobbles in the Kasalka Group.

indicated resource is 129 000 tonnes at an average grade of 5.71 g/t Au and 182.3 g/t Ag at a cut-off grade of 1 g/t Au. At the same cut-off, the inferred resource is 202 000 tonnes at a average grade of 6.06 g/t Au and 186.4 g/t Ag. Tellurium content of Golden Odyssey's drill intercepts ranged from 86 to 665 g/t, sufficient to be of economic interest.

OUTLOOK FOR 2011

Issuance of multi-year exploration permits to many projects in 2010 will enable more effective planning and a timely start to fieldwork for many operators. Government continues to make a concerted effort to consult with First Nations: seeking to learn about their concerns regarding mineral exploration and mine development, while communicating to them the impacts and benefits. If successful, these consultations will expedite resource decisions from a proponent and First Nation perspective.

Continued high copper and gold prices are expected that will provide incentive to mineral exploration. The trend of other commodity prices from coal to zinc is also favourable, so that the high levels of exploration and development activity are expected to continue in 2011. Porphyry copper projects in the Iskut-Stikine district, several uncommonly enriched in gold, will feature prominently in exploration, evaluation and development of new mines. A start on construction of the Northwest Transmission Line may trigger a construction decision by Imperial Metals on the Red Chris copper-gold project. Reactivation of the Galore Creek project may also occur, with Galore Creek Mining conducting a feasibility study of the redesigned project while applying for an amendment to its environmental assessment certificate.

Seabridge Gold Inc is anticipated to submit a project report to provincial and federal environmental assessment offices for the KSM gold-copper project. New ownership of the important Snowfield-Brucejack property may lead to stronger interest in development of its large gold-

copper resources. From a logistical perspective, the Snowfield-Brucejack project and adjoining KSM properties could work together to benefit from development and operational synergies. The projects share very challenging site conditions so that economic viability is not assured. There will be substantial lead time prior to development.

Other companies will continue to evaluate precious metal projects in the Stewart, Atlin, Cassiar and Skeena Arch districts for opportunities to develop small gold and silver mines in the near-term, building on the experience of the Yellowjacket and Dome Mountain projects. Silvertip is a prime example. These projects contain high grade mineralization that, when brought into production, have the ability to generate cash flow quickly to offset development costs.

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EXPLORATION AND MINING OVERVIEW FOR NORTHEAST AREA, BRITISH COLUMBIA

By David V. Lefebure, PhD, PGeo
Chief Geologist, Victoria

SUMMARY

The Peace River coalfield in the northeastern part of British Columbia continues to attract significant investment in exploration, mining and mine development. Exploration expenditures are expected to be similar to those in 2009, while mine capital expenditures will be up at as all four operations in the area are making significant investments to increase their capacity and make their operations more cost effective. Coal production is expected to be between 4 and 5 Mt for the region in 2010.

This is an abbreviated description of the mineral industry activity that took place in northeastern British Columbia as there was no regional geologist for this region in 2010.

COAL MINES

The Willow Creek mine reopened in early June, 2010. It is located 45 km west of Chetwynd. 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 (Figures 1 and 2). In September, 2010 the mine made amendment applications to expand the mine and increase production to 1.7 Mt of coal per year. The Willow Creek mine currently employs approximately 140 people with this number expected to increase to 300. There was exploration drilling south of the mine in 2010.



Figure 1. Metallurgical coal awaiting shipment at the Willow Creek mine near the rail loadout. Willow Creek reopened in June 2010.



Figure 2. John Stokmans, mine geologist, proudly showing off a coal seam at the Willow Creek mine.

At Western Coal's Brule mine, located 45 km south of Chetwynd, PCI coal production is anticipated to be approximately 1.2 Mt in 2010. The company is investing significant capital over the next year to upgrade their haul trucks and other equipment on site. The Brule mine employs approximately 180 people. The PCI coal produced at Brule is exported primarily to Korea.

Work is underway on the Falling Creek Connector gravel haul route that will connect the Brule mine to the Willow Creek mine. 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. The Willow Creek mine is on the CN rail line and has coal loading facilities. The Falling Creek Connector Coal is expected to be completed by the end of 2010, at which time, facilities for washing some of the Brule coal are expected to be operational at Willow Creek.

The Wolverine mine of Western Coal Corp is located just west of the town of Tumbler Ridge. It employs approximately 300 people. The mine is involved in a

recapitalization project this year. 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) 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 is located about 25 km south of Tumbler Ridge. Metallurgical coal is being mined from the Gates Formation with a cumulative coal thickness of approximately 15 metres from a narrow pit that exploits a steep limb of a fold (Figure 3). Production in 2010 is targeted at approximately 1 Mt of mostly metallurgical coal with a small amount of thermal coal. 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. Peace River Coal's work force increased from 80 to about 330 in 2009 as the company moved from contractor mining to owner-operated mining. The company has been investing in the mill infrastructure in 2010 with upgrades to mill and maintenance workshop. 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.

Teck Coal Ltd has committed to completing a feasibility study by late 2011 regarding the possible reopening of their Quintette mine in 2000 (Figure 4). They are also reviewing the status of the infrastructure on site, including their wash plant, 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.

COAL EXPLORATION PROJECTS

There are a number of other coal exploration programs by other companies in the Peace River Coalfield. For example, Canadian Dehua International Mines Group Inc is completing one of the larger programs with more than 20 holes planned on their Murray River property (Figure 5). Should an economic resource be discovered, these metallurgical coal seams would only be accessible by underground mining techniques.



Figure 3. Trend mine - looking southeast from approximately the centre point of the pit towards the Horizon deposit in the background.



Figure 4. 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.



Figure 5. Drill on the Murray River property of Canadian Dehua International Mines Group Inc.

ACKNOWLEDGMENTS

The author appreciates the support provided by the coal companies, particularly Peace River Coal and Western Coal, in the northeast during his short fall visit. Any errors or omissions are the responsibility of the writer.

EXPLORATION AND MINING IN THOMPSON-OKANAGAN-CARIBOO REGION, BRITISH COLUMBIA

By Bruce Madu, PGeo
Regional Geologist, Kamloops

SUMMARY AND TRENDS

Exploration activity in Thompson-Okanagan-Cariboo Region¹ in 2010 amounted to approximately \$50 million (Figure 1). This cannot be directly compared to levels of previous years, but an approximation is shown in Figure 1 of the net increase resulting from the boundary changes. On a property by property basis the worst of the financial crisis seems to be behind the industry. A slow start to 2010 exploration budgets eased as the year advanced and companies began undertaking financings as the markets began to improve. New funding has meant that programs cut short in 2008-2009 are being restarted and in several cases untested core that has been stored is now being sent for analyses. It is predicted that significant late 2010 expenditures will be reported in 2011 and they will be reflected in that year's expenditures.

This year's total for drilling at 163 000 m (Figure 2) also reflects an increase due to the boundary change and should not be interpreted as a large increase over 2009. It can be stated though, that there were several more very large resource definition drill programs compared to last year.

Evaluating the exploration expenditures by project stage (Figure 3) provides an overview of where projects lie along a path to production. This is the third year of reporting expenditures in this manner and trends are appearing. Grassroots exploration spending has ranged from 3-7% and the 4% this year reflects what appears to be a typical investment level. Early stage spending this year at 22% is typical with the previous years' range of 22-30%. Advanced exploration project spending this year has dipped for the third consecutive year to 20% (from 51 and 44% consecutively in the two previous years) and reflects projects maturing to mine evaluation stages. The mine evaluation stage is characterized as 37% of this year's expenditures: a near doubling from previous years' results. A large increase to 17% is seen at onsite mine lease exploration as operating mines look for more resources to support either ongoing mining or expansion plans. Previous mine lease exploration has been between 1-2%. Characterizing exploration expenditures by project stage in this region over the three previous years

¹ Government reorganization of British Columbia natural resource sector ministries in late 2010 resulted in changes to the regional boundaries used for the Exploration and Mining volume. The South-Central Region is now part of the Thompson-Okanagan-Cariboo Region and this new boundary is utilized in this paper.

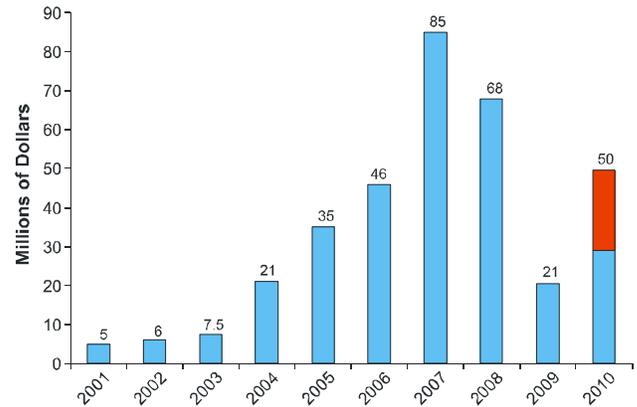


Figure 1. Annual exploration spending, in millions of dollars, Thompson-Okanagan-Cariboo Region (Note: Boundary changes have led to this figure being higher as more projects are now reflected in the data: pre-2010 boundary expenditures in blue and impact of additional projects in red).

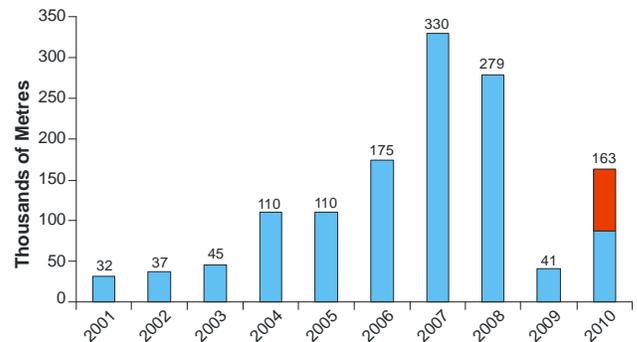


Figure 2. Annual exploration and development drilling, in thousands of metres, Thompson-Okanagan-Cariboo Region (see note in Figure 1 regarding this data).

shows significant projects advancing to subsequent evaluation stages such as pre-feasibility and feasibility studies. It will bode well for the future of the mining industry if several of these projects advance to become the next producers in the province.

The Thompson-Okanagan-Cariboo region saw significant capital investment at mine and mine development projects. At **Highland Valley Copper** the mine life extension to 2020 involves a pit expansion which this year alone consumed over \$130 million costs

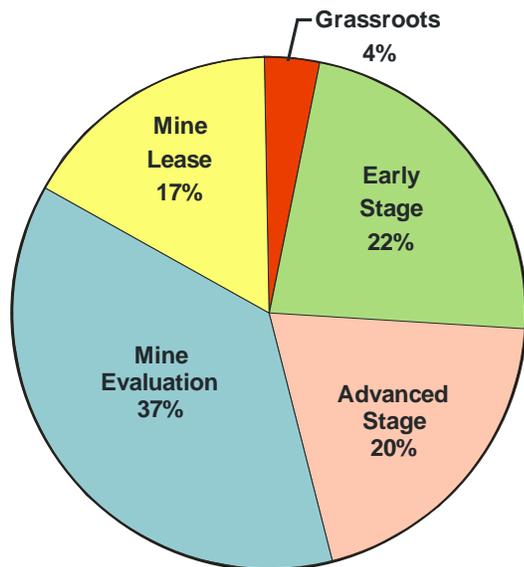


Figure 3. Annual exploration expenditures divided by exploration stage, Thompson-Okanagan-Cariboo Region (see note in Figure 1 regarding this data).

in preparatory stripping. Mine development at the **New Afton** project continued with an investment of approximately \$70-80 million onsite with full production anticipated in late 2012. Development at the **Copper Mountain** project is progressing rapidly with an estimated \$240 million capital investment this year to complete the mill, purchase mining equipment and for pre-mining stripping. The **Gibraltar** mine has nearly completed a \$300 million modernization that started 5 years ago. The **Mount Polley** mine has invested in intense exploration for resources aimed at extending its mine life which might include some underground mining. The **QR** mine is operational again and investing in exploration, mill process upgrades and bringing the **Bonanza Ledge** project into production.

Three projects are in the permitting process: **Harper Creek** (copper), **Ruddock Creek** (zinc, lead, silver) and **Bonanza Ledge** (gold) projects. Both the Harper and Ruddock Creek projects have undertaken new financial arrangements this year and are being advanced. The Bonanza Ledge project is moving through permitting and may see mining start in late winter 2011. Work at the **Prosperity** project (copper-gold) is underway to address a federal decision to not allow the project to proceed as proposed.

Metal prices are driving exploration trends with gold and copper attracting most of the exploration budgets. Zinc and lead are seeing some renewed interest, but prices and exploration interest seems to be lagging behind that of copper. Rising silver prices are not always reflected in an uplift in expenditures for silver-yielding projects in this region because silver is more commonly a by-product of the mines, but this may change.

Owing to this region's blessing of high quality, bulk mineable, porphyry-style deposits this target remains a

favorite. Copper-gold projects remained the most significant of these, with major programs being undertaken at the **Ajax**, **Woodjam North**, and **Woodjam South** projects. Significant exploration programs were undertaken as well at the **Lac La Hache**, **Miner Mountain**, and **Tas/Verde** projects. At the **Newton Mountain** project epithermal gold mineralization is the current target at this property which has traditionally been characterized as a porphyry-style deposit. Copper-molybdenum and molybdenum targets were more active this year. The Highland Valley camp was very active with significant programs being completed at the **Rateria**, **Logan Copper**, and **Dot** projects. The **Luxor** project discovered new molybdenum-porphyry mineralization in the North Thompson River area where several other molybdenum projects are relatively idle.

Development of high-grade gold-silver veins occurred at the **Bralorne** Mine project where the company is test mining the BK and North zones and stockpiling ore in preparation for restarting its mill. Preliminary economic assessments of the **Elk** and **Blackdome/Elizabeth** projects have set a proposed pathway to resume mining at these past producers of gold and silver. Both projects saw large programs aimed at improving resource confidence and quantity. At the **Thunder Ridge**, **Bonanza Ledge**, **Golden Ledge**, and **Prospect Valley** properties, higher grade gold-silver veins are present within broad zones of low-grade gold mineralization that are under exploration for bulk tonnage gold mineralization. High grade gold-silver veins were explored for at the **Cariboo Gold Quartz** and **Bonaparte Gold** properties.

Relatively new styles of gold mineralization for British Columbia are under exploration at the **Spanish Mountain** and **Spanish Mountain (Acrex)** projects where low-grade gold is hosted in near-surface sedimentary rocks. At the **Raft** project intrusive-hosted gold has been discovered following progressive grassroots exploration.

It remained a quieter year for stratiform polymetallic massive sulphide deposits in the Shuswap and North Thompson River areas, but accelerated activity at the Harper Creek project may change this. A modest program was completed at the **Moore** whilst many other worthy projects were idle.

At the **Treasure Mountain** project, silver-lead-zinc veins are the target for a proposed seasonally operated high-grade, low-tonnage, underground operation.

Rare metals continue to be of keen interest to the industry this year. At the **Blue River Carbonatite** project (tantalum and niobium) a significant drilling program will support a preliminary economic assessment which is anticipated shortly.

MINES AND QUARRIES

All of the operating mines in the region are listed in Table 1 and their locations are shown on Figure 4.

Metal Mines

Highland Valley Copper, 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 2020. This includes push backs of the east and west walls of the Valley pit. The company has been fully engaged in preparatory stripping for the last two years, increasing its fleet of equipment and staff complements to manage the expansion (Figure 5).

The mine has encountered slope stability issues on the east wall as they exposed the apparent trace of the Lornex fault, a property scale feature named after the Lornex pit located roughly 3 km to the south where it was first observed. 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. Measures to address these include expanded overburden waste stripping and installation of a dewatering system. The installation of a buttress is expected to finalize these efforts and allow the mining of higher grade ore from this zone later in 2011. Combined with west pit overburden stripping the company will likely spend over \$130 million in preparatory stripping in 2010.

Average mill throughput is estimated to be slightly less than 2009 levels at 115 000 t/d or approximately 42 Mt for the year (Table 1). Copper production is estimated at 100 000 tonnes compared to an actual production of 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 of Taseko Mines Limited and Cariboo Copper Corp is nearing completion of a \$300 million modernization that has occurred over the last 5 years. Most recently this includes a new in-pit crusher, tailings systems improvements, filter press and direct mill feed system that collectively will boost production levels by 50% over historical levels. Production is from a copper-molybdenum sub-alkalic porphyry locally called "mine series tonalite". 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 (Table 1). Copper concentrate and cathode production is estimated at 42 000 tonnes compared to an

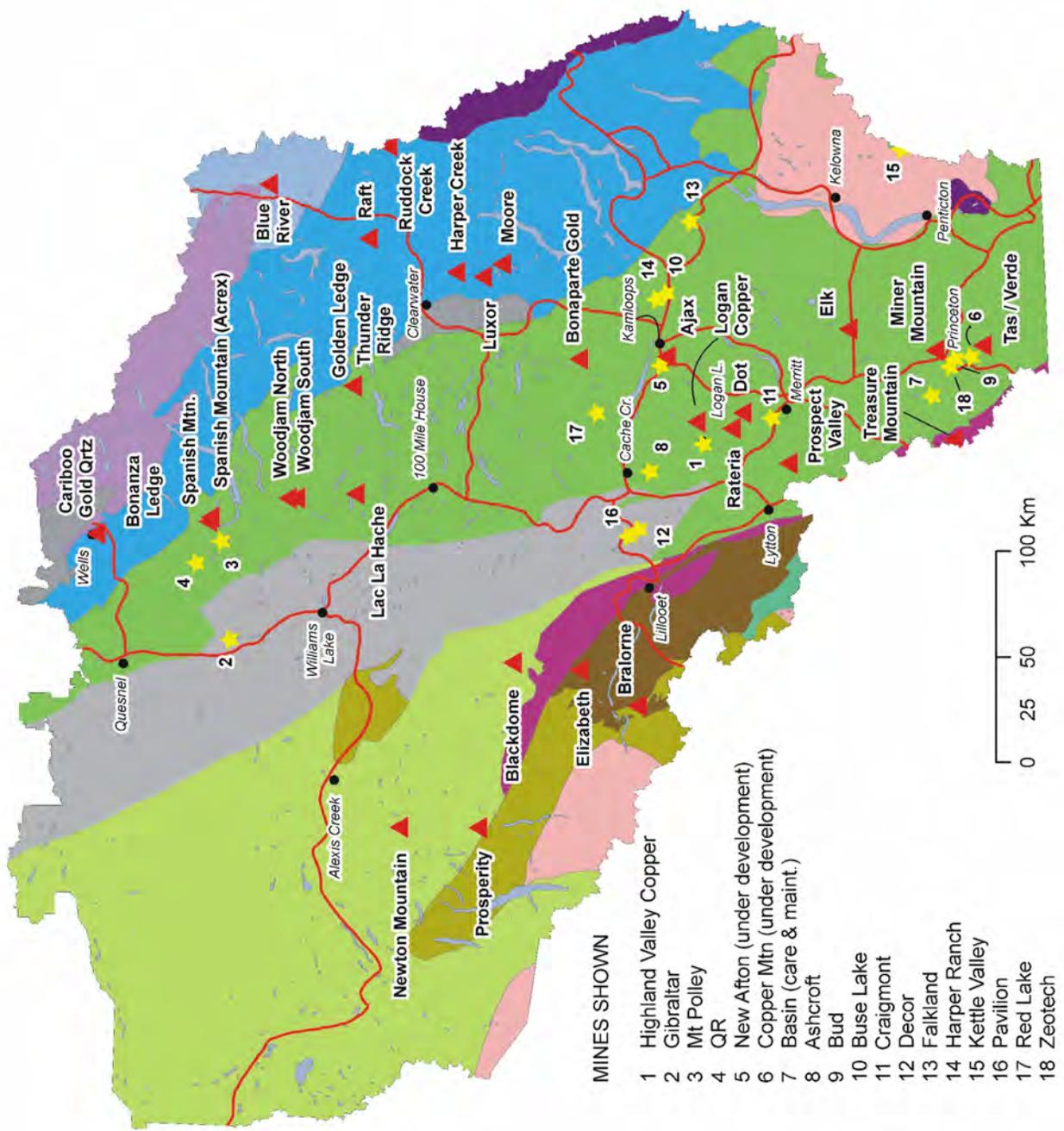
actual production of 31 888 tonnes for 2009. Molybdenum production is forecast at around 400 tonnes, substantially greater than the actual production of 285 tonnes in 2009. The company has forecasted continued increases in output for 2011 with annual production levels for copper to approach 52 000 tonnes and molybdenum 635 tonnes. Mill throughput levels are expected to approach 55 000 t/d.

At the **Mount Polley** mine, 56 km northeast of Williams Lake, Imperial Metals Corporation produced copper, gold and silver from an alkalic porphyry-related orebody. The operation is forecast to produce 16 150 Mt of copper in 2010 compared to an actual production figure of 15 358 Mt 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 (Figure 6) 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 restarted the **QR** mine in the middle of the year after it acquired the operation in early 2010. The underground gold mine is located about 17 km north of the Mount Polley mine and 58 km southeast of Quesnel. The deposit is hosted in propylitically-altered basaltic fragmental rocks primarily of the Late Triassic Nicola Group associated with an Early Jurassic diorite stock. The majority of the gold occurs in propylitically altered carbonate-rich rocks associated with pyrite mineralization and the deposit is generally thought of as a skarn. The company moved quickly to resume mining operations and poured the first gold bar on September 8 (Figure 7). Current production levels are at about 2/3 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 bring the operation closer to full production. A *Mines Act* permit has been applied for to develop an open pit at the company's **Bonanza Ledge** project. Ore would be trucked around 100 km to the QR mill for processing. The company envisions a 4 year supply of ore from Bonanza Ledge at a mining rate of 70 000 t/y. Of note at the QR operation is an effort to eliminate the use of the cyanide and carbon-in-pulp circuit and extract gold by simple gravity separation. The company is installing new plant facilities to further enhance recoveries by this method: early indications are that high recovery rates are achievable while lower chemical costs could help reduce production costs.

TABLE 1. THOMPSON-OKANAGAN-CARIBOO REGION FORECAST MINE PRODUCTION, 2010

Mine	Operator	Deposit Type / Commodity	Forecast Production in 2010 (tonnes or kilograms)	Number of Employees	Proven and Probable Reserves (at Jan. 1, 2010)
Metals					
Highland Valley Copper	Teck / Highmont Mining Company Lt	Sub-alkalic porphyry Cu, Mo	100 000 Mt Cu, 2950 Mt Mo, minor Au and Ag	1015	440 000 000 Mt at 0.35% Cu and 0.008% Mo
Gibraltar	Taseko Mines Limited / Cariboo Copper Corp	Sub-alkalic porphyry Cu, Mo	42 000 Mt Cu, 400 Mt Mo	~325	459 000 000 Mt at 0.32% Cu and 0.008% Mo
Mount Polley	Imperial Metals Corporation	Alkalic porphyry, Skarn Cu, Au, Ag	16 150 Mt Cu, 1516 kg Au, 5897 kg Ag	~350	40 500 000 Mt at 0.32% Cu, 0.28 g/t Au and 0.61 g/t Ag
QR	Barkerville Gold Mines Ltd	Skarn Au		60	193 470 tonnes at 4.84 g/t Au (West zone)
Coal					
Basin	Compliance Energy Corp	Thermal coal	0	On care and maintenance	
Industrial Minerals					
Ashcroft	IG Machine and Fiber Ltd (IKO Industries Ltd)	Basalt (roofing granules)	~350 000 Mt	55 (plant & quarry)	
Bud	Absorbent Products Ltd	Bentonite		see Red Lake	
Buse Lake	Lafarge Canada Inc	Volcanic ash (alumina-silica)		see Harper Ranch	
Craigmont	Craigmont Mines Joint Venture	Magnetite tailings	60 - 70 000 Mt	~30 (plant; seasonal)	
Decor	Pacific Bentonite Ltd	Alumina, landscape rock		~2 (including trucking)	
Falkland	Lafarge Canada Inc	Gypsum	6 000 Mt	see Harper Ranch	
Harper Ranch	Lafarge Canada Inc	Limestone	~220 000 Mt	32 (plant & 3 quarries)	
Kettle Valley quarries	Kettle Valley Stone Company	Ashlar, flagstone, thin veneer		~40 (plant & quarries)	
Pavilion	Graymont Western Canada Inc	Limestone	190 000 Mt	~34 (plant & quarry)	
Red Lake	Absorbent Products Ltd	Diatomaceous earth		40 (plant & 3 quarries)	
Zeotech Bromley Creek	Heemskirk Canada Ltd	Zeolite			



LEGEND

- ▲ Major Exploration Project
- ★ Mine / Quarry

TERRANE

- Bridge River
- Cache Creek
- Cadwaller
- Cariboo
- Coast Complex
- Cratonal North America
- Kootenay
- Methow
- Monashee
- Post Acretionary Plutons
- Quesnellia
- Shuksan
- Slide Mountain
- Stikinia

MINES SHOWN

- 1 Highland Valley Copper
- 2 Gibraltar
- 3 Mt Polley
- 4 QR
- 5 New Afton (under development)
- 6 Copper Mtn (under development)
- 7 Basin (care & maint.)
- 8 Ashcroft
- 9 Bud
- 10 Buse Lake
- 11 Craigmont
- 12 Decor
- 13 Falkland
- 14 Harper Ranch
- 15 Kettle Valley
- 16 Pavilion
- 17 Red Lake
- 18 Zeotech

Figure 4. Mines, quarries and major exploration projects, Thompson-Okanagan-Cariboo Region, 2010.



Figure 5. Break time for a 240-tonne haul truck driver at Canada's largest metal mine, the Highland Valley copper mine near Logan Lake.

Coal Mines

There is one potential coal producer in the Thompson-Okanagan-Cariboo region, the **Basin** mine of Compliance Energy Corporation near Coalmont. The mine contains thermal coal but has been on care and maintenance since 2007. Jameson Resources Limited of Australia has not continued with an option to purchase the

property and the project will be returned to private company Pacific West Coal (U.K.) Ltd. Feasibility studies by Jameson reported resources of 87 Mt in the measured and indicated category plus 36.7 Mt in the inferred category.

Industrial Mineral Quarries and Aggregates

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

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

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

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



Figure 6. 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.



Figure 7. Production resumed at the QR gold mine southeast of Quesnel in the summer of 2010 and viewing a pour is always an exciting event at a mine.

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

Imperial Metals Corporation has installed a recovery plant at its **Mount Polley** concentrator to capture magnetite from its tailings stream (Figure 8). The operation is expected to commence late in 2010 and provide dense media for coal washing operations. Craigmont Mines Joint Venture operates the **Craigmont** magnetite operation located near Merritt where tailings from the old Craigmont copper mine are processed. These are forecast to be exhausted shortly.

American Creek Resources Ltd reported on further test work on its **Iron Mist** property located 60 km north of Kamloops. The company is evaluating the iron content of what appears to be a magnetite skarn at the contact of a gabbro-diorite intrusion and metamorphosed sedimentary rocks of the Harper Ranch Group. Drilling last year produced results such as IM09-05 that intersected 23.1 m grading 36.2% Fe_2O_3 , 2.7% TiO_2 and 0.3% V_2O_5 and IM09-07 that intersected 43.9 m grading 31.6% Fe_2O_3 , 2.4% TiO_2 and 0.3% V_2O_5 . Metallurgical testing to date has indicated that a clean magnetite concentrate could be produced as the silica is not bound with magnetite and there are low levels of phosphorous, titanium and sulphur.

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

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



Figure 8. A newly installed magnetite recovery circuit at the Mount Polley mine will provide magnetite for a variety of uses, including the cleaning of coal.

near Princeton. The material is transported to its plant in Lethbridge.

Opal Resources Canada Inc produces attractive fire opal gemstones and jewelry from the **Klinker** property, located west of Vernon. Opal occurs as fracture and vesicle-fillings in andesitic to basaltic laharc breccia of the basal Kamloops Group (Eocene). Presently, the gemstone jewelry 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, Kettle Valley, Canyon** and **Gemini** quarries. Kettle Valley's workforce has grown to about 40 people year round, mainly employed in the Kelowna processing facility. The products include dacite ash, gneiss and basalt, and are mainly used in high-end residential and commercial developments in the western United States of America (U.S.A.) and central and western Canada.

MINE DEVELOPMENT PROJECTS

The locations of mine development projects in the region are shown on Figure 4.

The **New Afton** mine development project of New Gold Inc continues on a schedule that will see production in 2012. Minor surface work was undertaken during the year and most of the work occurred underground. The mill building is completed and some mill components are installed (Figure 9). The company expected to complete around 3000 m of underground development this year and by the third quarter 2479 m were completed. This included the ongoing development of five conveyor legs, conveyor transfer stations, boring of ventilation raises and the development of the first extraction drift in the orebody



Figure 9. A partially installed 28 foot SAG mill at the New Afton gold-copper project near Kamloops awaits a mid-2012 start-up.

at the mining level horizon. Having two access points (base of Afton pit and from the surface) to the underground workings has helped increase productivity as extraction work can occur at the bottom and top of some of the developments (Figure 10). 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 – a steady, focused, effort will be required to accomplish the remaining work prior to production.



Figure 10. The Afton pit access to almost 11 km of underground development at the New Afton gold-copper project near Kamloops.

The capital expenditures on the project were estimated by the company to be \$119 million for the year. Given they did not undertake some of the proposed surface work the final numbers will likely be closer to \$70-80 million. They anticipate being able to bring the project into production from internal funding (likely to approach \$350 million).

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 company has yet to release updated resources for the property from previous years' drilling of zones beneath the currently blocked out reserves.

The plans for resumption of mining at the **Copper Mountain** project 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 has completed the mill building (Figure 11a), the truck maintenance shop, begun assembling the SAG and ball mills (Figures 11b, c), commissioned a Komatsu shovel (Figure 12) and seven haul trucks. The company has begun 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 t/y for the first 12 years and a 17-year mine life.



Figure 11a. Flying steel for the new mill building at the Copper Mountain copper-gold project near Princeton started in April 2010.



Figure 11b. By the fall of the year major mill components were installed at Copper Mountain (photo courtesy of Copper Mountain Mining Corporation).



Figure 11c. Fitting a bearing on a mill (photo courtesy of Copper Mountain Mining Corporation).



Figure 12. 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).

MINERAL EXPLORATION HIGHLIGHTS

Major exploration projects are listed in Table 2 and their locations are shown on Figure 4.

The 2009 announcement of the Geoscience BC QUEST-South Project signaled a major investment in public geoscience and has provided a huge amount of new information to guide exploration in the region. The \$2.5 million program of geophysics and geochemistry spans from Williams Lake to the U.S.A. border and incorporates the Kamloops, Merritt and Princeton regions (Figure 13).

In 2010 significant data releases were made. The results of a 45 000 square km airborne gravity survey, which included 25 010 km of flight lines at a 2000 m spacing, were published. The reanalysis of 8256 archived drainage samples by inductively coupled plasma mass spectrometry to give 37 new analytical attributes and improved detection levels was completed. Analytical results for 800 new stream sediment and water samples and 200 new basal till samples collected over a 1000 square km area were published.

TABLE 2. MAJOR EXPLORATION PROJECTS, THOMPSON-OKANAGAN-CARIBOO REGION, 2010

Property	Operator	MINFILE (NTS ref.)	Commodity	Deposit Type	Work Program
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
Blackdome Mine	Sona Resource Corp.	092O 053, 051, 052	Au, Ag	Vein / Breccia	DD, G, GC, PFS
Blue River Tantalum/Niobium (Upper Fir)	Commerce Resources Corp.	083D 005, 035	Ta, Nb	Magmatic	DD (~7000 m), G, PFS, MS
Bonanza Ledge	Barkerville Gold Mines Ltd.	093H 019	Au	Vein / Breccia	ES, DD (~3000 m), TR, MS,
Bonaparte Gold	Encore Renaissance Resources Corp	092P 050	Au	Vein / Breccia	UG, BS
Bralorne Camp	Bralorne Gold Mines Ltd.	092JNE164, 001	Au, Ag	Vein / Breccia	UG, G
Cariboo Gold Quartz	Barkerville Gold Mines Ltd.		Au	Vein / Breccia	DD
Copper Mountain (Exploration)	Copper Mountain Mining Corporation	092HSE001, 024	Cu, Au	Porphyry	DD (~10 000 m)
Dot	Dot Resources Ltd.	092ISE023, 019, 063, 156	Cu, Au, Ag	Porphyry	DD (~1000 m)
Elizabeth	Sona Resources Corp.	092O 012	Au, Ag, Cu, Mo	Vein / Breccia	R, DD (~3000 m), UG
Elk (Siwash North)	Almaden Minerals Ltd.	092HNE096	Au, Ag	Vein / Breccia	DD (~8000 m), PEA
Golden Ledge (Art-DL, Deception Ledge)	Happy Creek Minerals Ltd.		Au, Ag	Vein / Breccia	G, GC, DD (11 holes ~2000 m)
Harper Creek	Yellowhead Mining Inc.	082M 008, 009	Cu, Ag, Au, Zn, Mo	Massive Sulphide	PFS, ES, DD (~4000 m)
Highland Valley Mine (Exploration)	Teck Highland Valley Copper Partnership	092ISE013	Cu, Mo	Porphyry	DD (~7000 m)
Lac La Hache (Aurizon, Peach L)	GWR Resources Inc.	092P 001, 002, 034, 035	Cu, Au, Fe, Ag	Porphyry	DD (~7000 m), TR, GC, GP-MAG, G
Logan Copper (Dansey)	Logan Copper Inc.	092ISE012, 190	Cu, Mo, Ag	Porphyry	DD (~1500 m)
Luxor	Kingsman Resources Inc.	082M 062,	Mo	Porphyry	R, TR, DD (1066 m), P, GC
Miner Mountain	Sego Resources Inc	092HSE078, 203	Cu, Au, Ag	Porphyry	TR; DD (~1500 m)

TABLE 2. CONTINUED

Property	Operator	MINFILE (NTS ref.)	Commodity	Deposit Type	Work Program
Moore	Almo Capital Corp	082M 051	Cu, Pb, Zn, Ag, Mo	Massive Sulphide	DD (~3500 m)
Mount Polley (Exploration)	Mount Polley Mining Corporation	093A 008, 164	Cu, Au	Porphyry	DD (~45 000 m), TR, G, UG
Newton Mountain	Amarc Resources Ltd	092O050	Au, Cu	Porphyry	DD, GC, GP-AB
Prospect Valley (Discovery South)	Altair Ventures Incorporated		Au, Ag	Vein / Breccia	DD (~3000 m), G, P
Prosperity (Exploration)	Taseko Mines Ltd	092O 041	Cu, Mo, Au	Porphyry	FS, ES, MS
QR (Exploration)	Barkerville Gold Mines Ltd	093A 121	Au	Skarn	DD:UG, DD, FS
Raft (Ready Mix)	Newmac Resources Inc	082M 056	Au, Ag, W	Magmatic	GC, P, GP-EM, TR, DD (1500 m)
Rateria	Happy Creek Minerals Ltd	092ISE092, 150, 060	Cu, Mo	Porphyry	DD (~3000 m)
Ruddock Creek (Exploration)	Imperial Metals Corp	082M 082, 83	Zn, Pb, Ag	Massive Sulphide	DD (~1800 m), UG (400 m)
Spanish Mountain	Spanish Mountain Gold Ltd	093A 043	Au	Vein / Breccia	DD (~5000 m), MS, GD
Spanish Mountain (Acrex)	Acrex Ventures Ltd		Au	Vein / Breccia	TR (6), DD (~1500 m), GC
Tas / Verde	Supreme Resources Ltd	092HSE193, 192	Cu, Ag, Au, Zn	Porphyry	DD (~662 m); GC, G, TR, GP-IP
Thunder Ridge (Spanish Creek)	Spanish Mountain Gold Ltd		Au	Vein / Breccia	DD (1797 m)
Treasure Mountain (Exploration)	Huldra Silver Inc	092HSW016 , 018	Ag, Pb, Zn	Vein / Breccia	TR, PFS, DD (~600 m)
Woodjam North	Gold Fields Horsefly Exploration Corporation		Cu, Au	Porphyry	DD (14 613 m), GP-IP,
Woodjam South	Gold Fields Horsefly Exploration Corporation	093A 078	Cu, Au	Porphyry	DD (7295 m), GP- IP, GP-MAG

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; PP = Pilot Plant; 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)

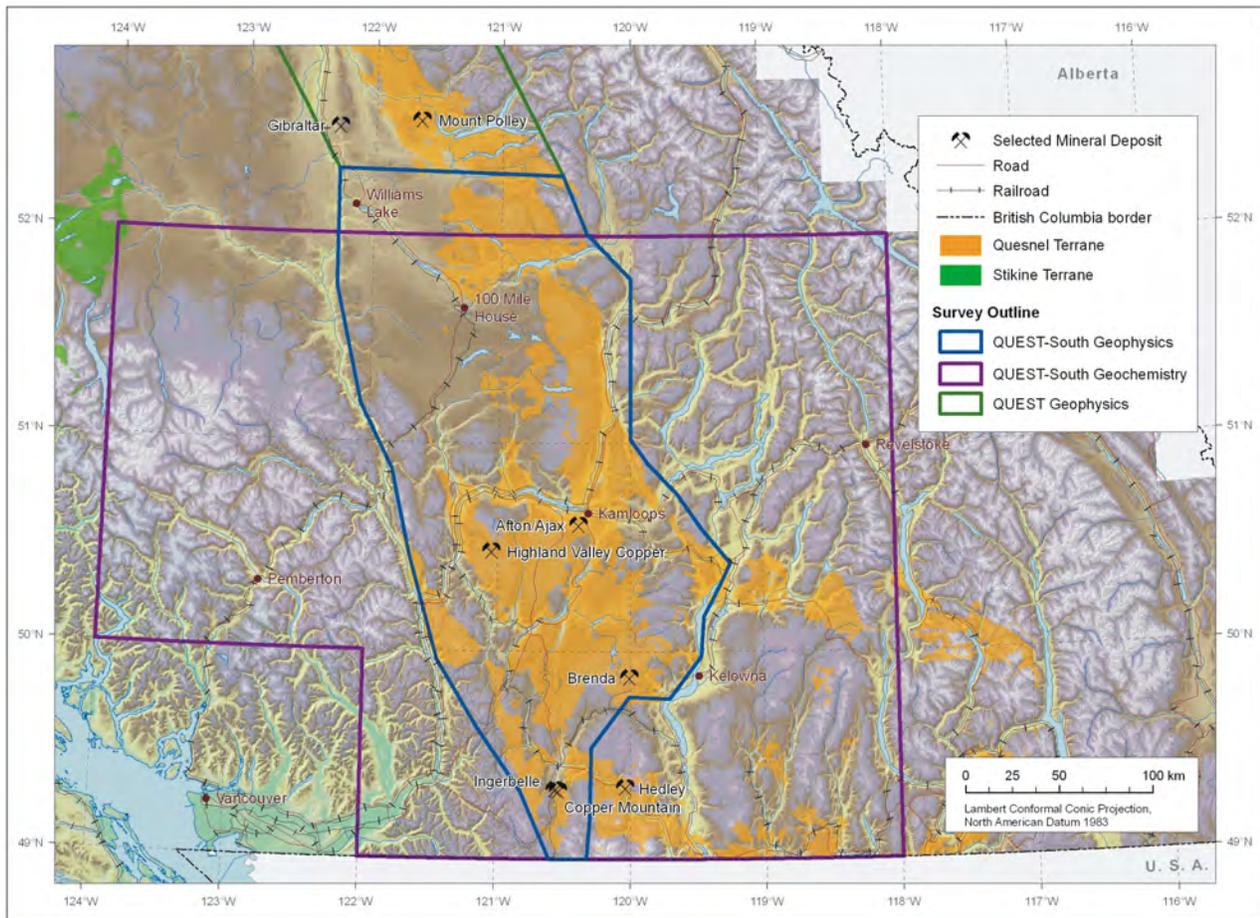


Figure 13. Location of Geoscience BC's QUEST-South geophysical and geochemical surveys: a major addition to the province's information databases (image courtesy of Geoscience BC).

Porphyry Projects

THOMPSON RIVERS AND SHUSWAP LAKE

Abacus Mining and Exploration Corp welcomed its new joint venture partner this year at the **Ajax** copper-gold porphyry project near Kamloops. Looking to expand its business outside continental Europe, KGHM Polska Miedz S.A. is the world's ninth largest copper producer and second largest silver producer. The company's success has been won from the Kupferschiefer shales of southwestern Poland where it produced almost 500 000 Mt of copper in 2009. The joint venture will see the companies take the project through to a bankable feasibility study at which point KGHM can increase its share in the project and continue through to production (Figure 14). 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. 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. Other holes east of the Ajax East pit are testing displacements of prospective Sugarloaf diorite along both the East Pit fault and other postulated offsetting structures. Infill drilling has also been significant in and around the Ajax East and West pits in order to upgrade resources (Figure 15). 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, 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 delineating the resources of the Lornex Extension.



Figure 14. Exciting projects attract tours. Here, a large group from a tour organized by the Geological Association of Canada is hosted at the Ajax East pit.



Figure 15. 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).

Happy Creek Minerals Ltd continued its successful exploration at the **Rateria** porphyry copper-molybdenum property, strategically located about 12 km southeast of the Highland Valley mine (Figure 16). 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. Hole R10-12 almost started in mineralization and yielded 254 m grading 0.26% Cu - which compares favorably to production grades at Highland Valley. Similar grades were reported from Hole R10-18 where 248 m grading 0.19% Cu was intersected with mineralization starting at the surface. The northernmost hole, by 100 m, was R10-25 which intersected 177.5 m grading 0.18% Cu. Drilling at Zone 2 has encountered mineralization over an area of 1000 by 600 m and appears enriched in rhenium where molybdenum values are elevated. A selection of drill results over the last 3 years has given intersections of 1.5-6.4 m where rhenium values have ranged from 2.25-19.37



Figure 16. Geologists Sassan Liaghat and Dan Meldrum looking over plans at the Rateria property of Happy Creek Minerals Ltd. The project is located south of the Highland Valley mine and has produced numerous long copper and molybdenum drill intersections in prospective phases of the Guichon batholith.

g/t. Prospecting has discovered mineralization beyond the currently explored areas: grab samples from mineralized quartz veins located 1.5 km southwest of Zone 1 gave results between 1.04-3.34% Cu and 500 m northeast of Zone 2 other grab samples over a 200 by 300 m area gave results that ranged from 0.05-3.21% Cu.

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, such as in hole WV10-1 that intersected 1.2 g/t Au over 2.5 m. The West Valley property is crossed by the Lornex fault, considered by some as an important control on mineralization at the Lornex and Valley pits in the Highland Valley camp. The company undertook grassroots-level exploration around its **Sho** prospect located in the southern extents of the Rateria property. A combination of historical results and this year's success at the prospect has encouraged the company to plan further exploration in the area.

Just north of the Highland Valley mine, Getty Copper Inc announced it has brought on joint venture partner Effisolar Energy Ltd to advance its **Getty North** and **Getty South** porphyry copper project. The companies have in hand a pre-feasibility study that contemplates a 15 000 t/d operation that would produce cathode copper and molybdenum trioxide over a period of 17 years. Current plans are to undertake a comprehensive Titan 24 geophysical survey of the key portions of the properties.

Further south in the Guichon batholith and 17 km south of the Highland Valley mine, Dot Resources Ltd completed a winter drill program at the **Dot** property, which contains the former producing Aberdeen Mine and Vimy showings. Drilling tested extensions and continuity of porphyry copper-gold-silver mineralization at the Southeast and Northwest zones as well as induced polarization chargeability anomalies. A highlight hole

was DOT-09-SE-09 which cut 50.35 m grading 0.71% Cu, 0.092 g/t Au and 7.24 g/t Ag. 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 cut-off.

SNL Enterprises Ltd drilled at the **Logan Copper** project located 6 km east of the Highland Valley Copper mine again this year. This 55 000 ha property covers the eastern flanks of the Guichon batholith and is reported to include the Bethsaida phases of the intrusion. Results from last year's drilling at the Midway zone produced a deep intersection in hole 09-SND-14 which yielded 168.3 m grading 0.17% Cu including 85 m grading 0.24% Cu. Zinc values from a variety of intervals in the hole ranged from 0.02-0.28% Zn.

This year's drilling was focused at the Dansey and Midway areas and completed late in the season; results are not released yet. The company also completed a ground magnetic and VLF-EM survey over key areas of the project.

At the **Luxor** project northeast of Barriere, Kingsman Resources Inc encountered a new area of molybdenum mineralization in a road construction effort (Figure 17). 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. Molybdenite mineralization was found in quartz veinlets, stockworks, fractures, as rosettes and disseminations in altered granitic rocks that are likely part of the Cretaceous Baldy batholith. The company drilled the new zone late in the fall and have not received results.

CARIBOO-CHILCOTIN PLATEAU

The **Prosperity** gold-copper porphyry project of Taseko Mines Ltd attained a mix of milestones during the year. In January it received the provincial government environmental assessment certificate. In June it was granted a 25 year mining lease: the tenure security for the project to proceed. In November, however, the federal Minister of Environment did not grant federal authorization to proceed with the project as proposed. The company reports it 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, a "gold stream" agreement with Franco-Nevada Corporation for 22% of the gold produced, and financial assets from other business arrangements.

At the **Mount Polley** Mine Imperial Metals Corporation was very aggressively exploring its properties with a large surface drill campaign. Exploration



Figure 17. Checking out new molybdenite mineralization discovered during a trail building program at the Luxor property northeast of Barriere.

was conducted at the Junction, WX/C2 Springer, Pond and Southeast zones. The Junction zone is located northwest of the main producing Springer pit and boasts higher gold-to-copper ratios, such as those seen in hole JZ10-46 which intersected 109 m grading 0.19% Cu and 0.28 g/t Au. Similarly the company encountered gold-enriched mineralization at the WX and C2 zones, which are located immediately to the south of the Springer pit. At the WX zone, hole WX10-06 cut 190 m grading 0.53% Cu and 0.86 g/t Au. Drilling at the Springer zone is demonstrating strong vertical continuity of mineralization: a feature of many of the alkalic porphyry copper-gold deposits of the province. 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. Hole PZ10-55 intersected 90 m grading 1.23% Cu and 0.6 g/t Au. The company is reporting success in delineating offsetting structures at these zones using a Titan induced polarization survey completed in 2009, particularly at the south end of the Pond zone which appears to be offset.

A 500 m underground ramp is being driven from the exhausted Wight pit to allow underground drilling of the Boundary and Zuke zones (Figure 18). 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 is expected to be completed late in 2010 and will allow the company to evaluate the feasibility of bulk underground mining. This is the first time that the company has undertaken underground development at the mine. Surface drillhole ND10-102 at the Boundary zone cut 111.4 m grading 0.97% Cu and 0.7 g/t Au.

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 45 km east of Williams Lake. These properties cover



Figure 18. 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.

56 150 ha (Figure 19). 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. The zone underlies a portion of an induced polarization anomaly measuring 2000 by 1000 m. Vein, fracture and disseminated porphyry-style mineralization consisting of chalcopyrite, molybdenite, minor pyrite and trace bornite associated with potassic and phyllic alteration zones is hosted by Takomkane quartz monzonite intrusive rocks and related aplite dikes (Figure 20). In 2008 Hole WJ08-84, which intersected 359.1 m grading 0.69% Cu and 0.27 g/t Au and 0.006% Mo, including 200.8 m grading 1.01% Cu, 0.44 g/t Au and 0.002% Mo, was pivotal in demonstrating the significance of this zone. Highlight holes from this year's drilling at the Southeast zone include: SE10-14 which was collared 200 m north-northwest of WJ08-84 and intersected 244 m grading 0.50% Cu, 0.04 g/t Au and 0.015% Mo and SE10-01 which was collared 200 m south-southwest of WJ08-84 and intersected 401 m grading 0.30% Cu, 0.07 g/t Au and 0.006% Mo. Other prospective targets at Woodjam South



Figure 19. The view from higher points at the Woodjam copper-gold project reveal it is within sight of the Mount Polley mine.



Figure 20. Potato-sized clots of epidote and tourmaline replacing bleached and altered volcanic rocks adjacent to the Takomkane batholith at the Woodjam property.

were tested with induced polarization and ground magnetometer surveys.

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 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.

Roughly one-third of the 2010 drilling at Woodjam North was centred on the Takom zone where copper-gold mineralization is associated with diorite, similar to the

Megabuck and Deerhorn zones. Hole TK09-001 returned 208.8 m grading 0.35% Cu and 0.4 g/t Au including 101 m grading 0.43% Cu and 0.58 g/t Au. Hole TK10-12 intersected 61.6 m grading 0.41% Cu and 0.82 g/t Au. These two holes are part of a northeasterly mineralized trend measuring over 500 m in strike length. Several other drillholes at Takom intersected strongly altered (epidote and tourmaline) and variably mineralized sections.

Other reconnaissance drilling was completed on the Spellbound and Deerhorn-Corner Lake areas at Woodjam North. The best assay interval from Spellbound was hole SB10-10 which intersected 7.7 m grading 0.34% Cu and 0.28 g/t Au.

Elsewhere at Woodjam North, reconnaissance surveys, including induced polarization, were completed on the Tisdall Lake, Antoine Lake and Horsefly Mountain areas. The company has been noted by the author as being an excellent steward of the land on which its operating (Figure 21).

Southeast of the Woodjam projects, Capstone Mining Corp optioned the **Tak** properties 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.

Candorado Operating Company Ltd holds ground south of the Woodjam South project at the **Murphy Lake** property and prepared for an induced polarization and resistivity survey with the establishment of 80 km of cut lines. Also active in the area is Tiex Inc with its very large holdings at the **Horsefly** property where the company is conducting grassroots-level work and identifying prospective copper-gold targets.

Amarc Resources Ltd undertook a major grassroots program at its holdings in the newly coined **Plateau Gold Copper Belt** project which includes its flagship **Newton** property. The Newton property is located 40 km north of the Prosperity project and southwest of Williams Lake. The current focus is on epithermal gold bulk tonnage-style mineralization. Late in 2009, the company announced vertical hole 9004 on the Newton property that cut 189 m of mineralization that graded 1.56 g/t Au, 7.9 g/t Ag, 0.08% Cu and 0.17% Zn starting at a core depth of 6 m. The company recognized it had a significant discovery and acquired 3300 square km of mineral tenure thereby solidifying its position in the area. An extensive grassroots level program was launched early in the year and a 7000 line km ZTEM and high-resolution magnetic airborne survey has been completed. This was followed by extensive prospecting, the collection of 12 000 soil samples and 170 line km of induced polarization survey.



Figure 21. Ongoing reclamation of drill pads at the Woodjam project is an important undertaking for the operator, especially for such large programs that can go on for several years.

This program has produced three new prospective porphyry copper-style targets that the company is pursuing. At the Newton property, the induced polarization survey and related surface programs have highlighted an area of approximately 8 km² where further efforts will be targeted. The company received drilling permits very late in the season and immediately began a program to explore the structure and extent of mineralization.

Strongbow Exploration Inc explored its **Piltz Mountain, Mons Creek** and **Raven** properties located 90 km southwest of Williams Lake. These grassroots prospects cover government regional geochemical survey multi-element anomalies and were acquired for their potential similarities to the Newton Mountain project.

At the **Taseko** porphyry copper, gold and molybdenum property, located 15 km south of the Prosperity project, Galore Resources Inc released results from two holes drilled in 2009 that confirmed a southwestern extension of mineralization at the Hub property. They reported long, low-grade, intersections for hole 09TSK-13, where 380.2 m graded 0.093% Cu and 0.0076% Mo, and 09-TSK-14 where 387 m graded 0.087% Cu, and 0.0058% Mo. This season the company undertook large airborne ZTEM geophysical survey over current exploration targets and under-explored alteration zones. Also completing an airborne survey and prospecting program in the area was private company Highpoint Exploration Inc on the **Tasco** property where they were searching for porphyry-style mineralization.

At the **Lac La Hache** porphyry copper-gold property, GWR Resources Inc continues to better its understanding of the geological environment through consistent and diligent reevaluation 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.

The company completed a MMI survey over most of the project adding another 2300 sample sites to its existing database. The survey revealed a large gold anomaly centered over the Aurizon Central zone and extending across the Aurizon South SuperGold zone and beyond by a substantial distance.

At the historical Spout Lake Skarn zone GWR announced the discovery of substantial new mineral potential largely reflected in very high amplitude ground magnetometer anomalies. Previous work focused largely on copper values and excluded the significance of the iron content. This year the iron potential attracted more interest. The skarn is magnetite-rich with hand sample assays ranging as high 66% Fe, 0.53 g/t Au and 3.05% Cu. The company undertook a large program of shallow holes to test the extent and grade of the zone. Assays are not yet reported.

Happy Creek Minerals Ltd continued to evaluate its extensive holdings northeast of Lac La Hache. At the **Fox** property, 30 km east of the past producing Boss Mountain mine, the company drilled the Nightcrawler-Discovery zone and trenched the Ridley Creek zone. The property geology comprises deformed, Paleozoic age, deformed metasediments and limestone that have been intruded by Cretaceous two-mica quartz-monzogranite. Skarn alteration assemblages include quartz, garnet, pyroxene, vesuvianite and variable concentrations of scheelite, pyrite, pyrrhotite, sphalerite and locally molybdenite. The primary target is tungsten-molybdenum mineralization but anomalous levels of zinc, cadmium, indium, silver, gold and bismuth are also reported. At the Nightcrawler-Discovery zone a small wide spaced drilling program had a highlight intersection at hole F10-1 of 0.2 m grading 1.37% WO₃. Hand trenching in the Ridley Creek zone along a 2 km trend produced chip sample intervals that ranged from 0.12-5.83% WO₃ with a highlight sample in BK-2 of 7.3 m grading 1.25% WO₃. The property continues to demonstrate potential for a sizeable mineralized body owing to the widespread occurrence of tungsten-molybdenum skarn mineralization.

GOLD BRIDGE-BRALORNE-LILLOOET

Cresval Capital Corp continued with grassroots-level geochemical surveys at its **Bridge River Copper** project, located 40 km west-northwest of Goldbridge. The property contains the Nichol, Russnor and BR showings which are calcalkaline porphyry copper-molybdenum-gold targets within the Bridge River pluton. Encouraging results are reported for the area around Windy Copper showing, a 300 by 150 m copper-mineralized area 3 km northwest of the Russnor showing.

Cresval completed an airborne ZTEM survey at the **Yalco** property near the Yalakom River and northwest of Lillooet. The property surrounds the Poison Mountain copper-gold-molybdenum porphyry deposit on three sides. Three target types are sought at the property: buried felsic intrusions similar to those that host the Poison Mountain deposit, peripheral base metal veins and replacement zones within host metasediments and high level precious metals zones in either intrusive rocks or metasediments.

SIMILKAMEEN RIVER

Despite most of the corporate efforts being focused on mine development, exploration resumed at the Copper Mountain project 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.

Supreme Resources Ltd trenched and drilled its **TAS** and **Verde** properties located south and east of the Copper Mountain project. Trenching at the TAS South area produced an average of 0.2% Cu and 2.2 g/t Ag from 43 channel samples and at the TAS North area produced an average of 0.1% Cu and 1.5 g/t Ag from 45 channel samples. At the Verde property trench 1 yielded a 14.5 m interval of 0.3% Cu, 4.5 g/t Ag and 0.3 g/t Au. Soil sampling programs were completed over both properties and an induced polarity survey is proposed for the TAS North, Central and South areas. The company also drilled both properties in a modest program and results are forthcoming. Last year's drill results were reported from the TAS property – although copper values were low, unexpectedly high zinc levels were encountered with lengths of 2.2-4.0 m and grades of 1049-14 000 ppm.

Approximately 5 km south of the Copper Mountain project, Anglo-Canadian Uranium Corp worked its **Princeton Copper** project this year. An area has been identified through historical data and recent soil surveys for an announced drill program to test the contact between Nicola Group rocks and the Copper Mountain stock.

Sego Resources Inc remained active at its **Miner Mountain** property located just 4 km to the northeast of Princeton. Mineralization is generally hosted within microdiorite of the Nicola Group and there may be a genetic link to Deer Valley fault to the west which juxtaposes these volcanic rocks with sedimentary rocks of the Eocene Princeton Group. The company released results from 2009 drilling that were not available at

publication time last year: one of the better results being hole DDH-MM-09 which intersected 96.6 m grading 0.31% Cu, 0.08 g/t Au and 1.76 g/t Ag at the Granby zone. A terrain study was completed at the property to better understand the source of the Regal zone, a gravity slide block of oxidized and sulphide mineralization that overlies younger Princeton Group rocks. The zone has traditionally been thought to have been sourced from the Granby zone owing to its position down slope from that area. Ministry records from the 1970s suggest several hundred thousand tonnes of up to 0.5% Cu, may exist at the Granby zone. The company has trenched to verify the terrain study results. The company also announced a late season program of further trenching and drilling at the Granby, Upper Regal, South and Miner zones.

Goldcliff Resource Corporation was active at its **Copper Mountain-Tulameen** project this year where it undertook grassroots level exploration at three targets: Whipsaw, Lamont and 15 Mile. A large airborne multi-sensor survey completed over the area in previous programs has indicated that favorable intrusive rocks found at the Copper Mountain mine development site continue southwest onto this property.

East of Kentucky Lake and 30 km southeast of Merritt, Victory Resources Corporation drilled the Wen prospect at the **Toni** property. The company has been trying to extend mineralization defined by historical hole W96-1 which cut 6.55 m grading 16.58 g/t Au and 0.75% Cu as well as the Adit zone which was discovered in 2008. The current target is mesothermal gold-copper mineralized quartz veins. Significant assay results from the program include hole 10-4 which intersected 1.22 m grading 240.5 ppb Au and 1.88% Cu and hole 10-5 which had two intersections (not true widths): 5.5 m grading 159.9 ppb Au and 2.62% Cu and 3.0 m grading 178.5 ppb Au and 1.36% Cu.

Candorado Operating Company Ltd announced a drill program for its **Man-Prime** property located 36 km north of Princeton. The company undertook a review and re-interpretation of previous geophysical data in order to better understand structures and mineralized zones at the project in preparation for this year's work.

OKANAGAN

Jasper Mining Corp has re-activated work at its **Isintok** molybdenum-copper-silver project after several busy years were interrupted by falling metal prices and weak markets. Located southwest of Summerland, the property has an historical resource of 23 Mt of 0.161% Cu and 0.04% Mo. The company reports the area of mineralization is approximately 1000 by 500 m and last year the near-surface nature of the mineralization was drilled on coincident IP and soil survey anomalies. The core was stored until this summer when it was finally prepared for analyses and results are pending.

Skarn Projects

OKANAGAN

Goldcliff Resources Corp reported results from a major drilling program it undertook at **Panorama Ridge** in 2008. The project is located just east of the historic Nickel Plate-Mascot mine which produced 2.5 million ounces of gold up to 1996. The target is bulk-mineable gold hosted in upper Triassic Nicola Group sedimentary and volcanic rocks that have been subject to pervasive silica-iron alteration. In this the 10th year of exploration at the project, the company has to date recognized 10 gold showings and 4 zones with significant potential: the York-Viking, Nordic, Thor and Tower zones (Figure 22). The 2008 program yielded highlight holes at the York-Viking zone where 28-190 intersected 44.2 m grading 1.55 g/t Au, at the Nordic zone where 28-121 intersected 25.62 m grading 1.54 g/t Au and at the Thor zone where the first holes ever drilled into the zone gave results such as hole 28-149 that intersected 1.36 m grading 6.35 g/t Au. Encouraging results at the Thor zone establish a continuity over 1 km length between the four significant zones at the project.

The company reports it has discovered a new zone this year called Winters East that is 2 km south of the other zones at the project. The company combined historical information, a 2009 airborne geophysical survey and ground work to generate three targets: the King, Queen and Prince. Early work at the King target has given grab sample results that range from 0.195 to 0.410 g/t Au.

At the **Gold Hill** project near Hedley, Vega Resources Inc, trenched for shear-hosted, vein-hosted gold mineralization along extensions of the Hed zone.

Vein and Breccia Projects

THOMPSON RIVERS AND SHUSWAP LAKE

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



Figure 22. Aerial view showing the relationship of the numerous zones at the Panorama Ridge gold project near Hedley (courtesy of Goldcliff Resource Corporation website).

The company previously shipped ore to the Kinross mill in Washington State, U.S.A. where this year, 330 tonnes was processed 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.

Newmac Resources Inc optioned the Ready-Mix property 35 northeast of Clearwater and now calls it the **Raft** property, given its proximity to its current Raft Molybdenum project. The property's history began in 1999 with the discovery of a highly oxidized boulder of intrusive breccia that assayed 29.3 g/t Au and 202 g/t Ag. Follow up surveys outlined further encouraging VLF-EM and gold-silver-in-soil anomalies. The company reports the target is intrusion-related gold, perhaps related to Cretaceous granites in the area. There are also several tungsten skarns in the area, and anomalous gold, tungsten, molybdenum and arsenic values are found in area stream sediments. Additional geophysical and geochemical surveys were completed this year that led to trenching. The company reports it has located a source for the gold anomalies at the property in Trench E where grab samples taken at 2 metre intervals assayed 46.9 g/t Au, 59.9 g/t Ag and 1.56 g/t Au and 3.9 g/t Ag. Buoyed by these results a drill program was started this fall aimed at the VLF-EM conductor associated with mineralization discovered in Trench E.

CARIBOO-CHILCOTIN PLATEAU

Barkerville Gold Mines Ltd has been very active at the **Bonanza Ledge** project at Wells where the company is proposing to open-pit mine the orebody and truck the ore to its QR mill for processing (Figure 23). The Bonanza Ledge property occurs within an overturned, northeast dipping sequence of metamorphosed turbidites, carbonates and tuffaceous rocks of the Hadrynian (?) to Paleozoic Snowshoe Group. Disseminated gold-sulphide mineralization is contained in the footwall of the historical BC vein and consists of multiple, semimassive to massive bands of fine to medium-grained pyrite that has preferentially replaced the carbonate layers within laminated, tan coloured muscovite-rich phyllite. 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 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. Early in the new year the company reported it had discovered a different style of mineralization which involved replacement textures in grey blocky quartzite with 1-3% pyrite found as



Figure 23. 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.

disseminations and blebs. This rock type has not previously been recognized as being auriferous in this camp. 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.

Next door to the Bonanza Ledge project is the Gemco Minerals Inc Burns Mountain property where the company planned on completing some trenching, geological and geophysical surveying this year.

Noble Metal Group Incorporated explored its holdings northwest of Cariboo Lake at the Cariboo Mineral Gold Property. Centered on the historical Keithly Creek area, the company is exploring for gold-bearing quartz veins hosted in Hadrynian (?) to Paleozoic aged metasedimentary rocks of the Snowshoe Group. This year the company focused on the Weaver Creek area where it completed trenching, geochemical and geophysical surveys.

Sona Resources Corp had an aggressive year at its complementary **Elizabeth** and **Blackdome** properties. Kicking off the season was the completion of a preliminary economic assessment which evaluated restarting the Blackdome 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; a wholly owned and independently operated economic development corporation of the Canoe Creek Indian Band.

The idle **Blackdome** gold-silver mine and mill anchors this duo and is located northwest of Clinton. This underground mine operated primarily between 1986-1991 and processed 340 000 tonnes of ore at a mill head grade of 20 g/t Au to produce almost 7 million grams of Au. Mineralization consists of narrow, high-grade epithermal quartz veins. 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. The company has also reported that an average grade of 1.47 g/t Au is contained within the tailings impoundment facility which is holding 298 389 tonnes of tails.

At the nearby **Elizabeth** property, bonanza-grade gold is hosted within northeast trending, steeply northwest dipping mesothermal veins that cross cut the Blue Creek diorite intrusion. Current inferred resources at the property include 522 900 tonnes of 12.3 g/t Au at a 5.0 g/t Au cut-off. 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 (Figure 24). Drilling the Southwest zone produced some high-grade intersections such as hole E10-69 which cut 85.4 g/t Au



Figure 24. Drilling the Southwest zone at the Elizabeth project near the Yalakom River, northwest of Lillooet. Note the burned area related to a 2009 fire which threatened the camp.

over 4.03 m and E10-65 which cut 6.5 g/t Au over 6.7 m. This season's drilling has extended the zone over a strike length of 325 m with most significant intersections being cut within 200 m of the surface. The No. 9 vein is located approximately 500 m north of the Southwest vein and has never been explored by the company. A small drill program yielded an intersection of 1.04 m grading 2.63 g/t Au in hole E10-70. At the Upper adit the company accessed the West vein and resampled it to confirm its tenor. Where the West vein outcrops the company trenched the Jewelry Box vein and collected grab samples that ran 144 and 51.1 g/t Au. When the company reaches the Southwest zone with the new adit sometime in 2011, it should be able to collect more representative sample from this zone which has produced spectacular bonanza-grade results.

FRASER RIVER

Altair Ventures Incorporated was active at the **Prospect Valley** property located 30 km west of Merritt. The target is bulk-mineable epithermal gold, hosted in silicified volcanic rocks that appear to be confined to the hangingwall of a normal fault. Pervasive stringers and veinlets of quartz host fine-grained disseminated pyrite reported to carry increasing gold values with depth, down dip along the fault. 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 of the controlling structure in the area – giving it a potential strike length of up to 3 km length. Called the Northeastern Extension zone, and discovered by Ed Ballon on behalf of the company, it 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 (Figure 25). The discovery is topographically lower than the South Discovery zone, teasing out a concept that it may be an exposure of deeper portions of the mineralizing system: a concept that is yet to be confirmed.

Fairmont Resources Inc have completed their first of work on the **Nicoamen River** and completed geological and geophysical surveys in anticipation of drilling. The property is located at the headwaters of the Nicoamen River where some of the first gold in the province was discovered. Previous work has identified gold values in float and outcrop hosted by the Spences Bridge Group.

Strongbow Exploration Inc continued to work on the **Shovelnose** property 30 km south of Merritt where it completed more trenching, soil surveying and ground magnetic surveying. Three areas are being explored: the Line 6 and Mik showings and the Anomaly B. In 2009 trenching at the Mik produced a chip sample of 2.9 m grading 2.7 g/t Au and 18.1 g/t Ag with a high grade interval of 12 cm grading 66.9 g/t Au and 75 g/t Ag. Gold mineralization is reported to be epithermal-style and related to shallow to moderately west dipping, colloform-banded quartz veins hosted within silicified and clay altered felsic volcanic rock of the Cretaceous Spences Bridge Group. Nearby at the **Gillis** property, Kiska Metals Corporation has proposed to trench the project in search of similar epithermal gold-silver mineralization. This grassroots discovery was made in 2008 by following up government regional geochemical survey data. The property hosts three areas of interest, the most significant to date being the Fort showing where a 30 cm grab sample assayed 19.65 g/t Au and 201 g/t Ag. At the Sav and South Side areas float and outcrop samples gave values ranging from 1-4 g/t Au and 65-213 g/t Ag.



Figure 25. 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).

GOLD BRIDGE-BRALORNE-LILLOOET

The most advanced project in the famous Gold Bridge mesothermal gold-quartz vein camp is at the **Bralorne** mine of Bralorne Gold Mines Ltd. It operated continuously from 1928 to 1971 and was the dominant contributor to 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.

The company was focused this year on preparing sufficient ore on surface and underground to restart the mill. Trial mining at the BK zone and North vein is close to stockpiling adequate tonnages of material to feed the mill for approximately one year (Figures 26, 27). 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. The company is currently awaiting waste management permitting prior to proceeding with mill start up.

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 the 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.

OKANAGAN

Almaden Minerals Ltd continues to evaluate the **Elk** mesothermal gold-quartz vein project 45 km southeast of Merritt, and just 2 km south of Highway 97. In the 1990s, 1.6 million grams of gold were produced from 16 700 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. The WD and B veins can contain bonanza-grade intersections such as seen in hole SND10-011 which cut 6.52 m grading 23.74 g/t Au. The company explored some of the other targets on the property as well, including at the South zone located roughly 2.5 km south of the Siwash North zone. At that zone, near surface intersections such as hole SSD 10-003 which intersected 3.2 m grading 1.14 g/t Au and hole SSD 10-004 that cut 7.81 m grading 1.04 g/t Au, have shown the property has significant potential outside the current focus area.

Bitterroot Resources Ltd was active on the **North Brenda** property near Peachland where the company is



Figure 26. Mining ore from the BK and North veins at the Bralorne underground gold mine in an effort to stockpile a year's feed and restart the mill.



Figure 27. Loading explosives into an ore cart at the Bralorne mine.

exploring for two styles of mineralization: porphyry copper-molybdenum mineralization similar to the closed Brenda Mine and structurally-hosted epithermal gold similar to the nearby Elk deposit. This year the company completed a high-resolution airborne magnetic survey and expanded its property to the west, acquiring ground with geological similarities to the Elk project which is located 6 km to the southwest. The company maintains a Memorandum of Understanding with the Westbank First Nation in support of establishing a positive long-term

relationship founded on respect, consultation and accommodation of the Nation's Aboriginal rights.

Partners Molycor Gold Corp and Goldrea Resources Corp released drill results from a late 2009 program at the **Flap** gold project located 45 km northwest of Kelowna. Previous work on the property in the late 1980s yielded erratic grades of gold mineralization within a quartz stockwork hosted in agglomerates and tuffs of the Devonian to Triassic Harper Ranch Group. Large diameter reverse circulation drilling was employed to reduce some of the nugget effect that seems to characterize the mineralization at the property. Results ranged from 0.31-1.47 g/t Au over intervals of 1.52-4.57 m and are being used to evaluate the potential for underground vat leach extraction.

SIMILKAMEEN RIVER

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. 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 cut-off 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 tonnes stockpile which gave averaged results of 645 g/t Ag, 5.05% Pb and 3.2% Zn. There is 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 had an exciting year in exploration as it 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. Results are pending.

Sediment-hosted Gold Projects

SOUTH CARIBOO-CHILCOTIN PLATEAU

Spanish Mountain Gold Ltd (formerly Skygold Ventures Ltd) made strides this year in bringing its **Spanish Mountain** project closer to feasibility stage. The company is exploring for bulk-mineable gold mineralization in a series of Triassic black phyllites and siltstones nearby the town of Likely. Positive results were reported for gold recovery test work whereby an optimized gravity concentration, flotation and cyanidation

process could produce recoveries of 90%. Early challenges to this work included the fineness of the associated sulphides and carbonaceous nature of the hostrocks. Work is ongoing to test the recovery of gold from concentrates using cyanidation. 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 g/y (213 800 oz/y) for the first 5 years at a cash cost of \$18.30/g (\$570/oz). A 10 year mine life is estimated at an initial capital cost of \$447 million (excluding leased mining equipment). A key assumption is the use of a gold value of US\$1100 /oz for this study. 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.

The company completed a drill program this year to explore for more resources and for geotechnical and metallurgical purposes. Some encouraging results from a series of holes yielded intersections of 26.5 to 82 m and grades of 0.62 to 1.21 g/t Au in areas outside the current resource area. In particular, hole 10-DDH-912 was collared 150 m west of the Main zone and intersected 26.5 m grading 1.18 g/t Au. This collection of results has demonstrated mineralization at the property can extend up to 350 m away from the Main and North zones. The company plans on following up these areas in 2011, as well as at its recently acquired Cedar Creek property, in an effort to expand known resources and confirm resources that lie within inferred category. Further metallurgical work and review of the proposed tailings storage facility will also be conducted in a push toward pre-feasibility and feasibility studies.

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 name sake neighbor, 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.

Spanish Mountain Gold Ltd also drilled the **Thunder Ridge** (Spanish Creek) property this year as part of its search for gold in similar geological settings to its flagship Spanish Mountain property. Located northeast of Canim Lake, the company has been exploring within a 1500 m by 500-600 m wide gold-in-soil anomaly. Gold mineralization appears to be associated with northeast dipping quartz veins, wallrock silicification, pyrite and

sphalerite. Highlight holes include 10-SC-31 which intersected 0.77 g/t Au over 54 m and 10-SC-27 which intersected 0.77 g/t Au over 20 m. In those same holes, there were high-grade intercepts of 19.15 g/t Au and 83.80 g/t Ag over 1.0 m and 1.97 g/t Au and 100.0 g/t Ag over 1.0 m, respectively. The anomalous high-grade silver values at this property and may differentiate it from the Spanish Mountain property.

Nearby, Happy Creek Minerals Ltd continued grassroots-level work at its **Golden Ledge** (Art-DL) property where the underlying geology is similar to the Thunder Ridge zone and the company reports positive gold and silver values in soil and rock samples over an expanded 5 km trend. Historical results at the property include a 1.0 m interval of 42.9 g/t Au and 34.7 g/t Ag reported near a 19th century adit. An eleven hole drill program tested the concept that it may be a northern extension of the Thunder Ridge mineralized trend. No significant values were encountered in this program and the company is returning the property to the optionor.

Massive Sulphide Projects

THOMPSON RIVERS AND SHUSWAP LAKE

Imperial Metals Corporation got a late start this season at its **Ruddock Creek** project, located within the Script Ranges about 100 km north of Revelstoke (Figure 28). 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 cut-off of 4% combined Pb plus Zn.

At the **Harper Creek** copper project, located 10 km southwest of Vavenby, Yellowhead Mining Inc roared back after a relatively quiet year in 2009 (Figure 29). The company completed a public listing and undertook new financings. Prior to listing, the company closed the sale of a 15% interest to Anthill Resources, a private British Columbia company that is building a portfolio of resource-based investments. 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 cut-off. The deposit comprises tabular shaped zones of volcanogenic sulphide



Figure 28. A fall start to operations this year at the Ruddock Creek zinc-lead project north of Revelstoke means working under snowy conditions.



Figure 29. An aerial view of the Harper Creek deposit, east of Clearwater, showing the North Thompson River valley in the background - and proximity to rail, road and power infrastructure (image courtesy of Yellowhead Mining Inc website).

mineralization hosted within highly deformed Late Devonian metavolcanic rocks of the Eagle Bay Assemblage. A preliminary economic assessment is currently underway which will update the resource again and include precious metals for the first time. This may

place this deposit among the larger undeveloped resources within the province. The assessment will model a 70 000 t/d mine producing up to 83 000 t/y of copper over a 20 year mine life. The project is very well located near necessary infrastructure and is currently within the British Columbia Environmental Assessment (EA) process. A feasibility study is proposed to start soon after the completion of the preliminary economic assessment.

A fall program of drilling is currently underway to expand 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.

Several other projects were active in the Adams Plateau with most exploring for volcanogenic massive sulphide mineralization within the highly prospective Eagle Bay Assemblage. Shenul Capital Inc drilled the **Chu Chua** property this year on coincident airborne EM and VLF-EM geophysical targets; however, no significant mineralization was encountered. On the **Moore** property near East Barriere Lake, Almo Capital Corp drilled sixteen holes in search of mineralization within metamorphosed andesite and felsic volcanic rocks of the Eagle Bay Assemblage. Southeast of Barriere, Bitterroot Resources Ltd completed geological mapping and gravity surveys on its **SPN** project this year. Eagle Plains Resources Ltd completed grassroots level work on its **Acacia** property near Adams Lake.

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 (Figure 30).

SIMILKAMEEN RIVER

Supreme Resources Ltd acquired the **Law's Camp** property located around 10 km west-northwest of Tulameen. The property hosts the historical Liverpool, Shelley and Chicago prospects which are described as stratabound massive sulphide occurrences containing copper, lead, zinc, silver and gold. The sulphide horizons are contained within Triassic schist and limestone of the Nicola Group near the contact of the Eagle Plutonic Complex. Subsequently the company also picked up the St Lawrence and St George claims giving it control over a majority of properties in this historical camp. Nearby, prospector Edgar Mosley continues exploring his **Spar** property in a similar setting.

CARIBOO

Southeast of Cariboo Lake and 35 km northeast of Likely, Barker Minerals Ltd trenched the **Cariboo Zinc**

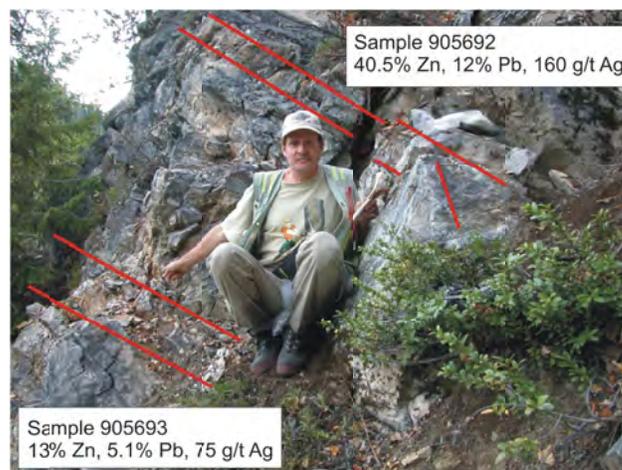


Figure 30. Geologist Leo Lindinger discovered new volcanogenic massive sulphide mineralization on his Argent property located near the Raft River and northeast of Clearwater.

project. The prospect has been previously described as a Kuroko-style polymetallic sulphide (VMS) deposit hosted by felsic volcanic rocks. Most of the work was completed around the Main zone which has been drilled in past programs, yet more remains to be learned about the deposit's geological orientation and extent. The company also trenched the **Blackbear** project which is located approximately 15 km to the south of the Cariboo Zinc property and 5 km northeast of the Spanish Mountain project. The property has historically been explored for high-grade silver and gold veins and in this program the company also tested the hostrocks for their metals contents. Zincore Metals Inc optioned another **Cariboo Zinc** property from Pembroke Mining Corp early in the year. Some permitting delays prevented them from completing a proposed drill program this year. The company reported a chip sample from the Gunn zone graded 7.8% Zn over 17 m including 10.12% Zn over 10 m and 21.8% Zn over 2.8 m.

Magmatic Projects

THOMPSON RIVERS AND SHUSWAP LAKE

At the **Blue River** tantalum and niobium project, 30 km north of Blue River, 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 carbonatite and give an indicated resource of 7.38 Mt at 217 g/t Ta₂O₅ and 1202 g/t Nb₂O₅ and inferred resource of 16.49 Mt of 213 g/t Ta₂O₅ and 1222 g/t Nb₂O₅ at a 175 g/t Ta₂O₅ cut-off. 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 honored during all phases of mineral exploration as well as there will be a focus on training and hiring people from their community.

SIMILKAMEEN RIVER

Near Tulameen, private company Magnetite Ridge Metals and Minerals Ltd of Kamloops, continued to investigate its large magnetite deposit located at its **Magnetite Ridge** project and within the Tulameen Ultramafic Complex, while preparing to advance an application for small scale mining, including on-site pilot scale magnetic separation. The company engaged UBC to perform testing on core samples, and is investigating metallurgical processes that may facilitate the production of by-product ferro-V, ferro-Ti, and PGM's.

OUTLOOK FOR 2011

The Thompson-Okanagan-Cariboo region of British Columbia is set to lead the province in developing new mines over the next two years with scheduled openings at the Copper Mountain and New Afton mines in 2011 and 2012 respectively. These mines have benefitted greatly from existing infrastructure, geography and previous mine operations at the sites. With the Ajax project and Harper Creek being evaluated at an accelerated pace, it should follow suit that they enjoy many of these advantages as they approach mine development. The development of the Prosperity project has significant potential provincial and national benefits alongside the opportunities it could create for local communities and First Nations if a new mine plan could resolve current concerns. Given the company's long term investment in the project and attractive commodity prices, there is reason to be optimistic that the company will consider revising their plans.

Recent capital investments at operating mines seem to be well timed for the recovery of international economies and most of these operations should have very positive times ahead of them. The Highland Valley and Gibraltar operations have mine lives to 2020 and beyond. The Mount Polley mine is aggressively exploring to extend its mine life beyond the middle of this decade and current pit expansion plans suggest this may occur.

The attraction to find gold deposits will likely continue through 2011 as the values of the precious metal are high enough to potentially place a host of deposits into a favorable economic window. Near-surface, bulk-mineable deposits with gold grades in the single gram or less range share some economic parameters at current

metal prices with open pit copper-porphyry deposits. Higher grade veins also remain attractive, but developing tonnages and controlling mining costs will affect these operations more so than the volatility of gold prices.

Expenditures for volcanogenic-hosted zinc, lead and copper should see an increase as demands for zinc, in particular, tracks global recoveries in a fashion more similar to copper. If silver values continue to increase as they have recently, this metal may singularly drive a resurgence in exploration for deposit types rich in the metal. With a lead-zinc smelter in the province, and the overall high value of multi-commodity deposits, these should be attractive targets to the industry.

The high-technology sector will consume increasing amounts of rare metals such as tantalum, niobium, lithium, zirconium, *etc.* Asia's dominance in the production and distribution of rare metals will remain a key to the supply, demand and pricing of this metal group. Meeting global supply shortages from provincial resources is uncharted territory for the industry and represents an exciting opportunity.

EXPLORATION AND MINING IN COAST AREA, BRITISH COLUMBIA

By Bruce Northcote, PGeo
Regional Geologist, Vancouver

SUMMARY AND TRENDS

This report covers the provincial government's new natural resource sector Coast Area, comprising the South Coast and West Coast Regions including Haida Gwaii. The Coast Area corresponds to the former Southwestern Mining Region plus the islands of Haida Gwaii. As the level of exploration activity on Haida Gwaii is low, the addition has had little impact on the statistics collected for this report. Data for the former mining region and the new area are compared without adjustment.

The Coast Area has one major metal mine and one coal mine, both of which report increases in production in 2010 over 2009. Myra Falls Operations produces zinc, copper, gold and silver in concentrates and the Quinsam mine produces thermal coal. Quinsam is now within the Vitol Group of companies and exports account for the majority of its shipments. Myra Falls reports throughput similar to or higher than the previous year, lower costs and recent exploration successes, which, together with stronger zinc prices, places the mine in a vastly better position than two years ago.

The major industrial minerals and aggregate operations also remained in production, although many have found the period of reduced demand since 2008 to be challenging. Construction activity is well off 2005-2008 peaks, and with it demand for construction materials. Several quarries reported increases in volume over 2009, though these were generally on the order of a few percent. One major quarry indicated that they will close indefinitely at the end of the year.

Exploration activity was tracked at over 50 exploration projects in the region in 2010 for a total of approximately \$15 million in exploration expenditures (Figure 1). With two major projects in the evaluation stages, this figure includes significant post-exploration mine evaluation expenditures. Total exploration drilling is estimated at approximately 38 000 m (Figure 2). The majority of projects (Figure 3) were of a preliminary or grass roots nature with relatively modest expenditures (Figure 4). There were however at least four projects with 2010 expenditures in excess of \$1 million.

Orogenic gold veins were attractive targets in 2010 with significant programs at Mineral Creek, Valentine Mountain and Ladner Creek, however more exploration spending focused on porphyry targets (Figure 5). Among these, porphyry mineralization associated with Tertiary intrusions got the most attention. Catface, Okeover and

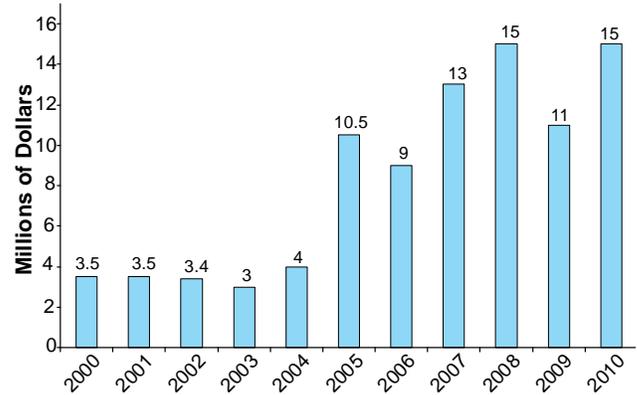


Figure 1. Exploration spending estimates 2000-2010. The addition of Haida Gwaii to the region in 2010 had negligible impact on the statistics.

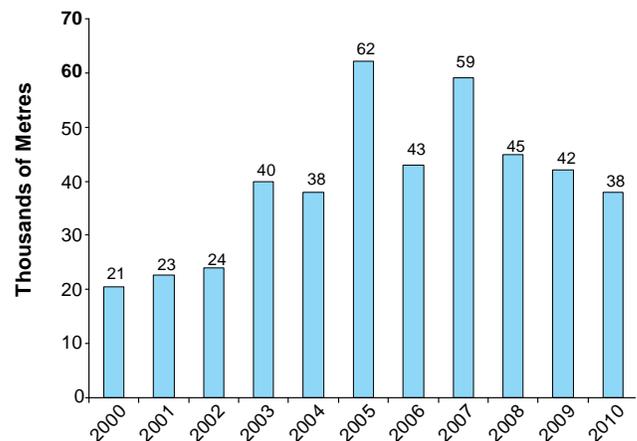


Figure 2. Exploration drilling in the southwestern region (Coast Area) 2000-2010.

Salal Creek are among the better known examples. Also active were some recently discovered or recently reactivated porphyry prospects such as Rogers Creek and NIC.

Renewed interest in iron skarns continued in 2010. These are considered not only as sources of magnetite for coal washing plants, but as potential sources of direct shipping iron ore. The largest of these projects has for several years been the Pearson project near Port Renfrew. Since the 1970s or 80s this deposit type has been considered uneconomic as a source of iron ore, however, recent prices supported by demand from Asia and

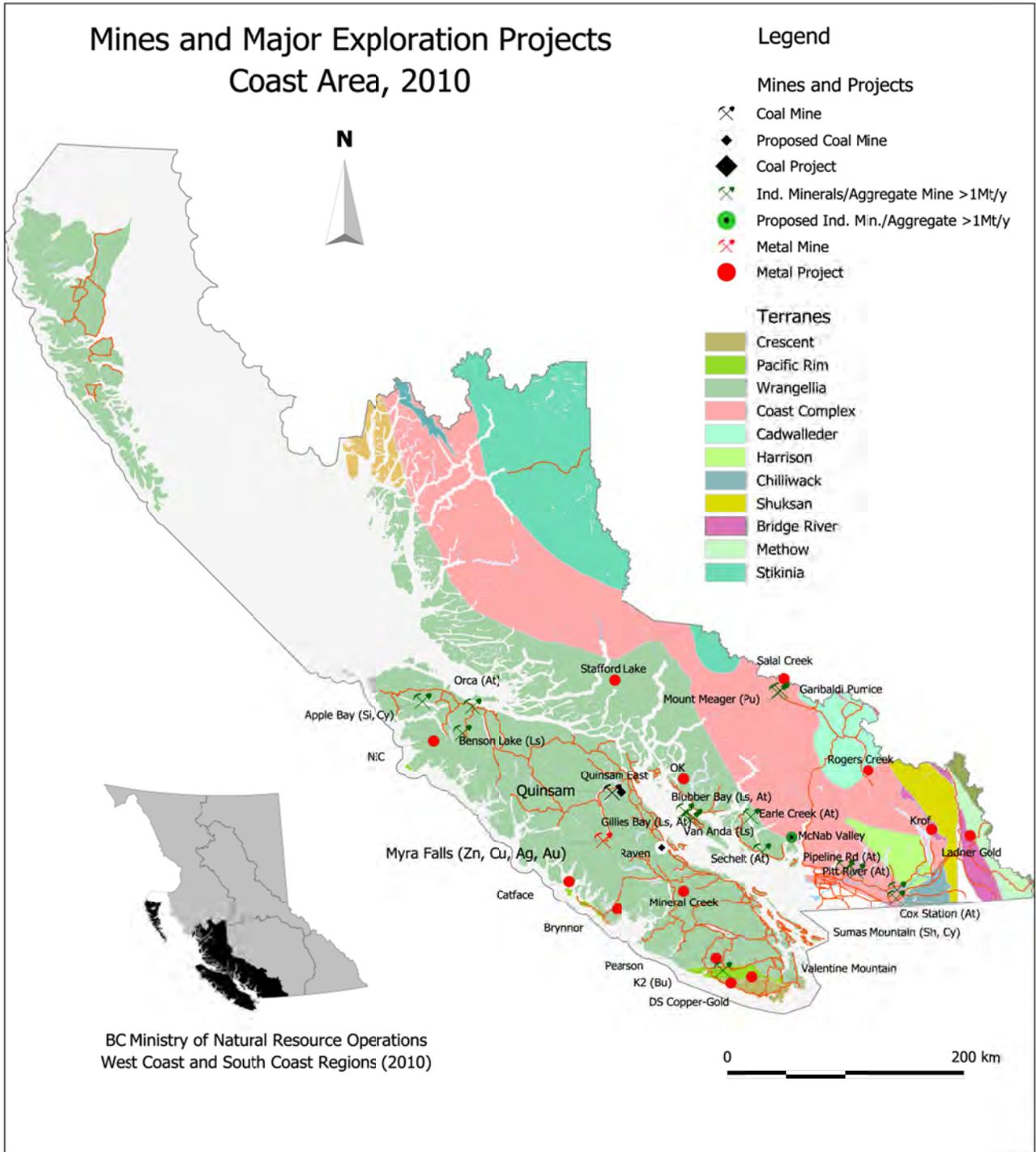


Figure 3. Operating mines and selected major exploration projects in the Coast Area, 2010.

consolidation of iron resources elsewhere in the world are causing some to re-evaluate magnetite skarn deposits on the British Columbia coast.

The Raven coal project continued its progress through federal and provincial environmental assessment

pre-application processes and released a pre-feasibility study, concurrent with work on a full feasibility study. Under consideration is an approximately 2 million tonne-per-year underground metallurgical coal mine.

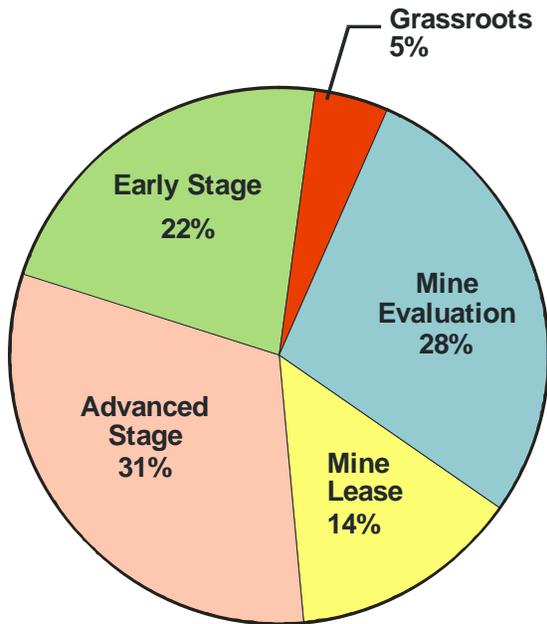


Figure 4. Coast Area exploration spending by exploration stage, 2010. Work at Myra Falls represents most of the on-lease exploration. The Raven coal project represents most of the mine-evaluation stage work.

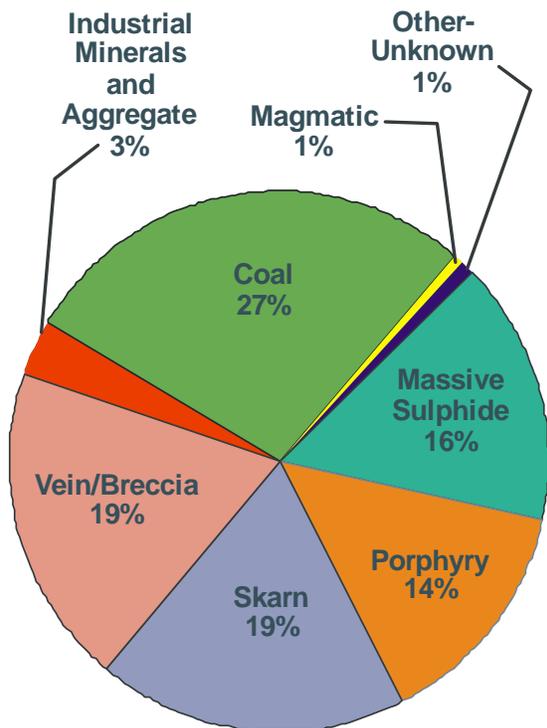


Figure 5. Coast Area exploration spending by primary target type. The Pearson project represents the majority of the skarn exploration spending, the Raven project feasibility, environmental and public consultation work a majority of the coal total.

MINES AND QUARRIES

The location of operating mines and selected exploration projects are shown in Figure 3. Mine production and reserves statistics are given in Table 1.

METAL

Breakwater resources Ltd, through its subsidiary NVI Mining owns and operates an underground polymetallic mine on central Vancouver Island. By the end of the third quarter, **Myra Falls** Operations (MINFILE 092F 330) 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 by product 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, 1.3 g/t Au. As of January 2010 the mine had 254 employees.

The 2010 capital expenditure budget at the mine is \$10.2 million, with major expenditures including work on a tailings disposal area, ramp development and mill improvements (Figure 6). Drifting on 24-level toward the Marshall zone and in the Price mine is to be used initially for exploration purposes.

The Myra Falls camp comprises a number of Kuroko type, or bimodal felsic type VMS deposits, mined since 1966, mostly by underground methods. The Myra Falls camp has a history of replacing reserves through exploration. Although mid-year estimates were not released, the company did indicate that it had “substantially replaced reserves” mined in 2009 through exploration peripheral to existing infrastructure. This would provide for a 13-year mine life.

The deposits are hosted by the Paleozoic Sicker Group, which also hosts among others, past producers in the Mount Sicker area (MINFILE 092B 001-003) and the Lara project (MINFILE 092B 129), a developed prospect a few km northwest of Mount Sicker. Myra Falls is in the Buttle Lake uplift, where Sicker Group basement is exposed along a northwest trending antiform roughly in the centre of Vancouver Island. Ore bodies are found in two horizons in the Myra Formation.

COAL

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

TABLE 1. FORECAST MINE PRODUCTION, COAST AREA, 2010

MINE	OPERATOR	COMMODITY	MINE WORK-FORCE	FORECAST PRODUCTION 2010	PRODUCTION 2009	RESERVES as of Dec 31, 2009
Metals						
Myra Falls Operations	NVI Mining Ltd (Breakwater Resources Ltd)	Zn-Cu-Au-Ag	254	To end of Q3: 25 842 t Zn 3 947 t Cu 486.4 kg Au 17 072 kg Ag metal in concentrate)	30 900 t Zn 3 349 t Cu 482.9 kg Au 17 978 kg Ag (metal in concentrate)	6.2 Mt 5.1% Zn 0.5% Pb 0.9% Cu 1.3 g/t Au 44 g/t Ag (proven+ probable)
Coal						
Quinsam	Quinsam Coal Corp (Hillsborough Resources Ltd)	Thermal coal	Approx 130 (2009)	445 000 t clean coal	390 000 t clean coal	22.073 Mt proven+ probable in situ reserves 2008)
Industrial Minerals						
Apple Bay (PEM 100)	Electra Gold Ltd	Chalky geyserite	8	80-90 000 t	90 000 t	~5 million t
Benson Lake	Imasco Minerals Inc	White marble	4	29 000 t	26 000 t	100+ years
Blubber Bay	Ash Grove Cement Company	Limestone aggregate, dolomitic limestone	19	270 000 t (incl up to 90 000 t dolomite)	221 000 t (incl. 13 000 t dolomite)	100+ years
Garibaldi Pumice	Garibaldi Pumice Ltd	Pumice	4	30 000 m3	20 000 m3	100+ years
Gillies Bay	(Lafarge North America Inc)	Limestone, aggregate	65	3.5 Mt	3.4 Mt	100+ years
K2	K2 Stone Quarries Inc	Building Stone	4	16 000 t	14 000 t	
Monteith Bay	Lehigh Northwest Cement Limited	Geyserite		Care and Maintenance 2008-2010		
Mount Meager	Great Pacific Pumice Ltd	Pumice	2	5 500 m3	3000 m3	100+ years
Sumas Mountain	Sumas Shale Ltd (Clayburn Industrial Group and cement manufacturer partners)	Shale and clay	10	365 000 t	285 000 t	~70 years
Van Anda	Imperial Limestone Company Ltd (JA Jack & Sons Inc)	Limestone	8	230 000 t	209 000 t	~50 years



Figure 6. Mill improvements accounted for part of the capital expenditures at Myra Falls in 2010.

operation, producing thermal coal near Campbell River since 1986. Operator Hillsborough Resources Limited is now a part of the privately-owned Vitol Group, and as such they no longer 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 2/3 of Quinsam's shipments, with approximately 1/3 going to local cement plants.

An application to mine a new area, the 7-South, remains under review (Figure 7). 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.

The coal measures exploited at Quinsam are within the Comox Formation, part of the Upper Cretaceous Nanaimo Group.

INDUSTRIAL MINERALS AND AGGREGATES

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 US market have definitely felt the effects of the decline in the housing market there. Production from government-run gravel pits are thought have 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. Only a



Figure 7. View of the 7-South area at Quinsam. The mine plan is for an underground operation.

selection of the largest is profiled below to establish an overall trend.

INDUSTRIAL MINERALS

Central Coast

Glacial marine clay is found in several locations on the central coast. It has applications in medicine and cosmetics. Ironwood Clay Company Inc has a permitted quarry at **DeCosmos Lagoon** 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 in 2010. The clay is used in the manufacture of cosmetics and skin care products. The company has manufacturing facilities in Richmond.

There are other smaller, intermittent producers of glacial clay, for example King Island clay is sold through Aviva Natural Health Solutions Inc. Precision Labs Ltd also markets glacial clay products.

Northern Vancouver Island

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) on northern Vancouver Island. A typical analysis is 95% CaCO₃, 4.4% MgCO₃, 0.1% Fe₂O₃. Most of the product finds application as high-brightness white filler in paints, coating and PVC among other products. They expect to produce approximately 29 000 tonnes in 2010 and have shipped somewhat more (32 000

tonnes). The quarry has been in operation for over 25 years. It has three employees plus contractors.

Texada Island

The largest quarry in British Columbia is Lafarge North America's limestone operation near **Gillies Bay** (MINFILE 092F 395) on Texada Island. It is operated by subsidiary Texada Quarrying Ltd and is expected to ship approximately 3.5 Mt in 2010, very similar to 2009. The operation recalled some laid-off workers and the number employed now stands at 65. The large majority of its limestone product (approximately 90%) is used in cement manufacture and shipped to area cement plants. Some limestone and dike-rock are sold as aggregate. The out-loading facility can accommodate Panamax freighters in addition to barges, and they continue to make shipments to western North America and Hawaii. This port facility also handles the thermal coal from the Quinsam mine that is loaded onto freighters.

Ash Grove Cement Company's **Blubber Bay** quarry (MINFILE 092F 479) expects to produce and ship approximately 270 000 tonnes in 2010 (Figure 8). The majority of this is limestone aggregate. Up to 90 000 tonnes is dolomite, shipped to Oregon. The quarry is scheduled to suspend production indefinitely at the end of 2010. It employed 17 hourly workers and 2 staff through November 2010. The quarry has a history dating back to 1907, when the Blubber Bay Syndicate constructed a lime kiln.

The **Imperial Limestone** quarry near Van Anda (MINFILE 092F 394) is owned by J.A. Jack & Sons Inc of Seattle. It expects to produce and ship approximately 230 000 tonnes in 2010. At current rates of production, reserves are sufficient for approximately 50 years. Nearly all shipments go to the Seattle parent company, a processor and supplier of industrial and agricultural calcium carbonate products. The majority is used in the construction industry, but a significant amount of the product is also used in the manufacture of glass containers. There are a number of other applications. Their chemical grade products have a CaCO₃ content of 97% or better. Sulphide mineralization has in the past been observed and sampled by quarry staff around the edges of the quarry, returning zinc, silver, lead, copper and gold values. Recently Northstar Mining Ltd has investigated reported gold concentrations in the limestone.

Mainland

Two quarries produce pumice in the **Mount Meager** 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.



Figure 8. The Blubber Bay limestone quarry on Texada Island.

Garibaldi Pumice has entered the lightweight concrete market as well. They also hope to develop a market for the washed out fines, which can be used as filler or as a polishing medium. Transportation costs are significant for both of these operations. These might be mitigated somewhat if they can develop an effective, efficient means of drying the product on site.

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 3-4% of the material mined is used to manufacture brick and refractory products at Clayburn's plant in Abbotsford.

MARBLE, BUILDING AND LANDSCAPING STONE

Adera Natural Stone Supply Ltd supplies **Haddington Island** andesite (MINFILE 092L 146) from a historic quarry that re-opened in 2004. The product is a durable, resistant Miocene volcanic rock (70.5% silica) with a dry crushing strength of 18 428 psi. They shipped approximately 900 tonnes from stockpiles in 2010. The stone can be found on many prominent buildings (notably the British Columbia Legislative Buildings) and is being used for several restoration projects in Vancouver: City Hall, Sinclair Centre, Hotel Vancouver and the Via Rail Building.

Matrix Marble and Stone quarries marble on Vancouver Island to produce value-added products such as countertops, sinks, tiles and slabs at their Duncan shop. They currently have two quarries producing three colours: Black Carmanah (MINFILE 092C 086) from the **Gordon River** quarry, and Tlupana Blue and Island White from the **Hisnet** quarry (MINFILE 092E 020, 070). This year's

total production is approximately 230 tonnes. They mainly serve the local market (Figure 9).

The **K2 Quarry** near Port Renfrew on Vancouver Island is expected to ship over 16 000 tonnes in 2010 (18 000 short tons). The product is a fine metasediment with slaty partings used as building stone and as landscaping stone

There are other smaller producers making use of the Leech River Complex slates. For example, Van Isle Slate has a small quarry approximately 21 km east of Port Renfrew.

Hardy Island Granite, like Haddington, is a historic quarry that was reopened in 1999. It shipped approximately 3800 tonnes in 2010, mainly for residential and commercial construction. The product is a uniform grey Coast Plutonic Complex granodiorite with widely spaced fractures. It 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 in the Squamish-Whistler Corridor. The **Spumoni** quarry operates on a mining lease and has a quarry permit. Other nearby quarry locations are operating on bulk sample permits, although there are plans to upgrade another site to regular production.

There are other small-scale and intermittent producers in the sea-to-sky corridor, including Mountain High Properties Ltd, Corridor Masonry and Alpine Mining Ltd. Bedrock Granite Sales Ltd began test quarrying in the area.

MAJOR AGGREGATE MINES

Polaris Minerals Corporation's large **Orca** sand and gravel quarry (MINFILE 092L 220) is located near Port McNeill. The company's business model targets the California construction market, which has been severely affected by the recent recession. Consequently, the quarry is expected to produce and sell approximately 1.3-1.4 Mt in 2010, below its permitted capacity of 6 Mt. In addition to California, the quarry has also shipped to the Lower Mainland, Hawaii and recently for the first time to Alaska. The company anticipates a modest increase in demand in 2011. Orca has reserves of approximately 125 Mt and port facilities both at the quarry and in northern California capable of accommodating Panamax class ships.

Jack Cewe Ltd does not wish to publish individual production figures here, but its **Jervis Inlet** operation ranks among the larger producers in the region. Sand and gravel and crushed product are shipped by barge to the Lower Mainland market.

The **Earle Creek** operation of Lafarge North America remains among the largest producers in British Columbia, with roughly one million tonnes expected in



Figure 9. Matrix Marble and Stone's Hisnet marble quarry.

2010, similar to last year's 970 000 tonnes. Sand and gravel are shipped by barge from the location near Skookumchuck Narrows on Sechelt Inlet.

The **Sechelt Mine** of Lehigh Materials is the region's largest sand and gravel operation and will produce and ship approximately 3 Mt in 2010. The majority of the product goes to the Lower Mainland and Victoria, roughly 20% was exported to California and less than 5% goes to the local Sunshine Coast market. Employment is approximately 80 including contractors. The operation won the 2010 Jake McDonald Annual Mine Reclamation Award for a 50 hectare project which enhanced biodiversity and lessened the effects of noise, dust and light on the local community. The Sechelt Mine was the first sand and gravel operation to win the award, recipients of which are chosen by provincial government, academic and industry association members representing the British Columbia Technical and Research Committee on Reclamation.

The combined **Pipeline Road** Coquitlam sand and gravel operations of Allard Contractors Ltd, Jack Cewe Ltd and Lafarge North America are expected to have combined production similar to last year, over 1 Mt. They estimate an average volume of 750 000 cubic metres per year over three years.

Lafarge's **Pitt River** Quarry will produce approximately 1 Mt in 2010, up slightly from last year's 930 000 tonnes. This operation produces crushed rock products and ships both by truck and by barge. An expansion project is planned.

Mainland Sand and Gravel Ltd is a family-owned local business and the third largest aggregate producer in the Coast Area. **Cox Station** Quarry, the largest of Mainland's operations, is expected to ship approximately 2.1 Mt in 2010. Located on the north side of Sumas Mountain, it employs 41 people directly and ships the large majority of product by barge on the Fraser River. The product is a crushed quartz diorite. They estimate very roughly 50+ years of reserves within the current land holdings and at current rates of production.

MINE DEVELOPMENT AND MINE EVALUATION PROJECTS

Projects in Environmental Assessment

The **Raven** coal project (MINFILE 092F 333), a proposed underground metallurgical coal mine 20 km south of Courtenay, is in both federal and provincial environmental assessment processes. The BC Environmental Assessment Office issued a section 11 Order under the Environmental Assessment Act in March of this year and the Canadian Environmental Assessment Agency commenced an assessment in May. Majority joint venture partner Compliance Energy Corporation submitted a draft project description. Plans include construction of facilities at Port Alberni to handle loading of freighters up to Panamax class. Application Information Requirements had not been finalized at the time of writing but are anticipated shortly. The first CEAA public comment period concluded in 2010. The Agency determined that the project would continue to be assessed through a comprehensive study, as they identified no significant adverse environmental effects that could not be addressed using standard mitigation measures.

The recent phase of exploration drilling at the Raven coal project ended in 2009. This year the company released coal quality data, an updated resource estimate and results of a pre-feasibility study. The 2010 estimate has measured and indicated resources of 72.0 Mt and a further 59.4 Mt in the inferred category. The proposed mine would produce a semi soft metallurgical coal (High Volatile Bituminous A coking coal) and thermal middlings. The pre-feasibility study considers an underground room and pillar operation with a 16 year life and calculates a pre-tax net present value of \$201.9 million at an 8% discount rate. This assumes a realized price of \$142/tonnes free on board Port Alberni. A full feasibility study is ongoing. 2010 field work consisted of reclamation of the 2009 drill sites, boring and geophysical logging of one new well, installation of a nest of vibrating wire piezometers and ongoing environmental baseline monitoring.

BURNCO Rock Products Ltd's **McNab Valley Aggregate** project on Howe Sound received a section 11 Order from the provincial authorities in June. Fisheries and Oceans Canada is also required to ensure that a comprehensive study is conducted pursuant to section 5 of the Canadian Environmental Assessment Act. There was a 230 m Becker drill program, seismic survey and environmental monitoring at the site in 2010 (Figure 10).

BURNCO's proposal is for initial extraction of approximately 400 000 tonnes of sand and gravel per year from a glacial alluvial fan in the McNab Valley. Production would ramp up to between 1 and 1.6 Mt, with



Figure 10. A Becker hammer drill at McNab Creek. Photo courtesy BURNCO Rock Products Ltd.

possible temporary increases to 4 Mt for special projects. The product would be barged from a marine loading facility on the site to BURNCO's ready mix concrete plants in the Lower Mainland. They currently obtain material from the Orca quarry, among others.

Several other projects remain in the EA process but are currently dormant, or have no progress reported in 2010. One major project, the **Eagle Rock** quarry of Polaris Minerals Corporation, has a BC certificate and is substantially permitted. Completion of a feasibility study is deferred pending improvement in conditions in the target US market.

EXPLORATION HIGHLIGHTS

A common approach to organization of exploration highlights in BCGS publications has been to move through the summaries geographically in north-to-south and west-to-east direction. There was activity on Haida Gwaii in 2010, and exploration coverage begins there. Significant exploration projects are given in Table 2.

Haida Gwaii

There was exploration at the **Sandspit Gold** prospect (MINFILE 103G 005) south of Sandspit on Moresby

TABLE 2. SIGNIFICANT EXPLORATION PROJECTS, COAST AREA, 2010

Property	Operator	MINFILE (NTS ref.)	Commodity	Deposit Type	Work Program	Meters Drilled
Brynnor	Logan Resources Ltd	092F 001	Fe (magnetite)	Fe skarn	G; MG (5.5 km)	n/a
Catface	Imperial Metals Corporation	092F 120, 231, 251	Cu, Mo, Ag	porphyry Cu	DD; A; G	3548 m (13 holes)
DS Copper-Gold	New Shoshoni Ventures Ltd	(092C.050)	Cu, Au	breccia	G; MG; IP, UTEM; DD	~1900 (13 holes)
Krof	Nomad Ventures Inc	092HWN070	Cu, Zn, Ag, Au	VMS	GC (soil); DD	585 m
Ladner Gold	Module Resources Incorporated	092HWN007, 003, 018	Au	veins	A; DD; MS	900 m (5 holes)
McNab Valley	BURNCO Rock Products Ltd	(092G.053)	Aggregate	sand and gravel	PD; EN; FS	230 m
Mineral Creek	Bitterroot Resources Ltd / Mineral Creek Ventures Inc	092F 078, 079, 331	Au, Ag	veins	AB-EM (400 km); GC (soil); UG-BU	n/a
Myra Falls	NVI Mining Ltd (Breakwater Resources Ltd)	092F 330	Zn, Cu, Pb, Au, Ag	VMS	DD; UG (1000+ m)	15 000 m
NIC	Compliance Energy Corporation	092L 266	Cu, Mo	porphyry Cu-Mo	AB; G; GC (silt, soil)	n/a
OK	Eastfield Resources Ltd/Prophecy Resource Corp	092K 008, 057, 155	Cu, Mo	porphyry Cu-Mo	GC (740 soil); IP (linecutting)	n/a
Pearson	Pacific Iron Ore Corporation	092C 022, 023, 025, 027, 091	Fe (magnetite)	Fe skarn	DD; EN	9100 m (32 holes)
Quinsam East	Hillsborough Resources Ltd	(092F.094)	Coal	sedimentary	A; DD; PD;	1400 m (12 holes)
Raven	Comox Joint Venture (Compliance Energy Corporation, Itochu Corporation, LG International Corp)	092F 333	Coal	sedimentary	R; CQ; EN; FS	n/a
Rogers Creek	Miocene Metals Limited	(092J.008, 009)	Cu, Au, Ag, Mo	porphyry Cu	AB; DD	1100 m (2 holes)
Salal Creek	Miocene Metals Limited	092JW 005	Mo	porphyry Mo	AB; GC (rock channel); DD; P	~800 m (2 holes)
Stafford Lake	Dentonia Resources Ltd	(092K.073, 074, 083, 084)	W	W skarn	AB-MG (565 km); GC (rock panel); G	n/a
Valentine Mountain	Mill Bay Ventures Inc	092B 108	Au	veins	DD; TR	1775 m (10 holes)

Work Program Abbreviations:

A = access (trail, road construction on claims); AB-EM = airborne electromagnetics; AB-MG = airborne magnetics; AB-RD = airborne radiometrics; BU (X tonnes) = bulk sample (weight in tonnes if known); CD = condemnation drilling; CQ = coal quality testing; CT = carbonization test (coal); DD (Xm) = diamond drilling 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; PP = Pilot Plant; 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)

Island. Mega Copper Ltd drilled 335 m. The program extended a zone of gold mineralization identified in the 1980's. Also on Haida Gwaii, Tasu Global Resources Inc reported results of a late 2009 trench sampling program in the **Discovery zone** of their property on Tasu Sound. High grade gold assays are reported from epithermal (transitional to mesothermal) quartz veins up to 30 cm wide. Forty channel samples ranged from 0.18 g/t Au over 109 cm to 744.1 g/t Au over 9 cm. The best-known undeveloped epithermal gold deposit on Haida Gwaii is the Specogna deposit (MINFILE 103F 034) part of the **Harmony** project on Graham Island, owned by Taseko Mines Ltd. A 2001 resource estimate has 64 Mt grading 1.35 g/t in measured and indicated categories. Taseko has not reported any recent work.

Central Coast

A small amount of activity was reported on the central coast, including a bulk sample by Ironwood Clay Company at Hvidsten Inlet. Prospector Dave Javorsky has done preliminary work at the **Rose** (MINFILE 092M 015), rhodonite past producer at Rivers Inlet and is considering further work. Pacific Topaz Resources Ltd has recently optioned the **Nugget Queen** (MINFILE 092L 178) with the intention of exploring in 2011.

Northern Vancouver Island

Kobex Minerals Inc terminated its **Island Copper** option with Western Copper Corporation in 2010, following an internal scoping study. There was no 2010 exploration work. Western Copper's large land package covers the Hushamu, Red Dog and NW Expo deposits (MINFILE 092L 240, 092L 200) among a number of other occurrences.

Electra Gold Ltd is upgrading water the water treatment facility at the **Apple Bay**, or **PEM 100** quarry. They also report extending the chalky geysirite deposit by an unspecified amount. In other industrial minerals exploration activity on the North Island, Graymont Western Canada Inc conducted a small prospecting and sampling program on its **MQ**, **Nimpkish** and **Bonanza Lake** Limestone properties. The MQ is located northeast of Rupert Inlet. The other properties are east of Nimpkish Lake.

In the Klaskish Inlet area, Compliance Energy Corporation funded an exploration program at the **NIC** property (MINFILE 092L 266 and others), a copper-molybdenum porphyry prospect associated with the Klaskish granodiorite pluton, recently found to be Late Miocene in age (Figure 11). The 2010 program consisted of mapping, airborne geophysics and geochemistry. A drill program is planned as the next phase, based on results. A few km to the south, on the same land package is a recent discovery, the **Berkshire** showing, with pods



Figure 11. Mineralization exposed in a roadcut at the NIC Cu-Mo porphyry project helped renew interest in the area, explored sporadically from the 1960s to 1990s.

of massive magnetite and chalcopyrite exposed in a roadcut. Initial chip samples reportedly averaged 0.6% Cu.

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. 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 sample.

Homegold Resources Ltd carried out follow-up geochemistry and proposed a bulk sample at its **Bonanza River** Project where a 100 m magnetite exposure is reported at the end of a branch logging road.

On the west coast of the Island, near Harvey Cove, Homegold reports further rock geochemistry at the **Le Mare** property, following a 2009 program of prospecting soil sampling and mapping for New Destiny Mining Corp. The property has porphyry copper, molybdenum and hydrothermal clay-silica (chalky geysirite) targets. Just to the south, they also report a geochemical survey at **Lawn Point** (MINFILE 092L 184), a gold showing.

Homegold also reports work at the **Scrutor Gold** project (MINFILE 092L 100) 20 km northwest of Zeballos, where a program of rock and soil geochemistry identified three previously unreported gold showings.

Near Tahsis, Compliance Energy Corporation funded another program of airborne geophysics, mapping and geochemistry at the **Hisnit** property. Targets are porphyry and skarn deposits. This is the site of a 2004 discovery of massive magnetite and chalcopyrite, not reported until 2010. To the east, Compliance Energy also explored the **Tower** property (MINFILE 092K 124), a copper porphyry prospect near Sayward, with another program of airborne geophysics, geology and geochemistry.

Central Vancouver Island

Compliance Energy Corporation is evaluating massive magnetite at **Camp Lake** (MINFILE 092F 571) near Campbell River for suitability as a coal washing medium (Figure 12). Possible porphyry-style base metal mineralization was also found in outcrop. The 2010 program followed up a previous airborne geophysical survey with mapping and geochemistry, including Davis Tube testing to determine the content of magnetic material. Compliance is considering a drill program as the next phase of exploration.

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

Western Gateway Minerals Inc drilled the **Beavertail** property in 2010, with five short holes in a 500 m program. Two short massive sulphide intersections are reported. Core had not been logged at the time of writing and the nature of mineralization not described. There are several skarns in the area. The nearest recorded is the **Blue Grouse** (MINFILE 092F 358) copper-silver lead prospect 4 km to the west. Also near Campbell River, Western Gateway Minerals Inc conducted an airborne magnetometer survey over the **Bacon Lake** iron skarn (MINFILE 092F 038).

Including drifting which is to be used initially for exploration purposes, Myra Falls had the largest exploration program in the region. A track drift extended toward the Marshall zone, to act as a base for exploration drilling. Depending upon results, the drift would be modified for production. 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. In total, the amount of drilling for exploration purposes will be approximately 15 000 m, representing roughly 90% of 2010 drilling at the mine (Figure 13).

At Mount Washington, there was some further test assaying of a 168-tonne bulk sample taken at the **NinaGayle** last year. The average grade is 51 g/t Au. The property belongs to Cibetre Resources. A larger bulk sample is under consideration, depending on the outcome of metallurgical testing.

Imperial Metals Corporation drilled the **Catface** property (MINFIL E 092F 120, 231, 251) in 2010 (Figure 14). The 3548 m 13-hole program tested north-south continuity of the Cliff zone with a sub-horizontal hole as well as resource expansion the north and south of the zone. The Irishman Creek zone was also drilled to confirm the existence of a high-grade breccia zone. The north-south hole through the Cliff zone returned 755 m grading 0.46% Cu and 0.006% Mo. This included



Figure 12. Ron Johnston and Dan Berkshire at the Camp Lake property. Magnetite outcrop and subcrop have been mapped and sampled over a significant area and drilling is proposed in the next exploration phase.



Figure 13. Part of a copper-rich intersection at Myra Falls, evidence of the success of near-infrastructure exploration.



Figure 14. Geologists Jaime Pascoe and Jason Corlazzoli at work in the core shack at Catface Copper.

275.5 m of 0.60% Cu, 0.014% Mo and 3.52 g/t Ag. Some of the other holes in the 2010 program did not reach target depths due to ground conditions. 2009-2010 work also included re-activation of 8.4 km of road access, construction of core facilities and a program of geological mapping. Equipment is barged from Tofino to Hecate Bay, where it proceeds by road.

Catface is a copper-molybdenum porphyry deposit located approximately 15 km north of Tofino. Mineralization is associated with Eocene felsic intrusions (quartz diorite to granodiorite) intruding quartz diorite and Triassic Karmutsen volcanic rocks, both of which are mineralized. Mineralized zones include the Cliff, Irishman Creek and Hecate Bay prospects. 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% inferred resources. Oxide copper over 66% CuO/Cu is not included in the estimate.

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 ground-truthed in 2010, in addition to stream sediment and moss-mat sampling. Late in the season, an airborne VTEM survey (400 km, 100 m line spacing) was conducted over the northern part of the property. This work has identified targets for future exploration. A 2008 airborne survey to the southeast covered the area of known, drill-tested gold in quartz vein mineralization. Mineral Creek Ventures Inc continued bulk sampling of the Linda vein at Mineral Creek in 2010. The amount of gold and silver produced in 2010 are unreported at the time of writing. Monetary proceeds are shared with Bitterroot. To date the Mineral Creek property has at least 6 known high-grade gold bearing structures (en-echelon veins and shear-hosted veins) hosted in Sicker Group volcanic and sediments (Figure 15). There are also VMS targets on the property, including zinc and copper soil anomalies within the area of the 2010 VTEM survey.

G4G Resources Ltd announced plans for geophysics and mapping at the Port Alberni properties **Macktush** (MINFILE 092F 012, 221) and **Dauntless** (MINFILE 092F 168) in December. Gonzaga Resources Ltd reported 2010 work at its Kennedy River gold property (MINFILE 092F 032, 392, 448) in 2010, consisting of soil and rock geochemistry and a 3D IP survey.

Logan Resources Ltd returned to the **Brynnor** Iron Deposit on its Redford property in 2010 with a 5.5 km ground-based magnetic survey, augmenting a 2009 survey. Logan subsequently signed an option agreement with Ridgemont Capital Corp regarding the **Redford** property, intended as Ridgemont's Qualifying Transaction. The optionee Ridgemont does not report a



Figure 15. The portal of Westmin's 1989 exploration adit at Mineral Creek. It now houses a gravity mill used to process a bulk sample.

magnetite resource in their filing statement.

Southern Vancouver Island

Nitinat Minerals Corporation explored the **Jasper** property (MINFILE 092C 037, 080, 081, 088) northeast of Nitinat Lake in 2010. In 2008, Inspiration Mining Corporation commissioned an airborne geophysical survey. The 2010 program consisted of prospecting and rock and soil sampling, in part following-up 2004 and 2008 work. A number of targets for further exploration have been generated. Drilling was permitted, but not begun in 2010. Despite a history dating back to the 1950's, it appears most of the work in the area has been of a preliminary nature, although some drilling was reported in the 1980's. Historically identified showings on various parts of the property have characteristics consistent with VMS, skarn and porphyry styles of mineralization (Figure 16). The property is underlain mainly by Jurassic Bonanza Group volcanics and sedimentary rocks. Strata of the Vancouver Group underlie the northeastern portion where skarn showings are documented.

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 (Figure 17).

There are several occurrences of iron skarn on the Pearson property, some outside the Bugaboo Creek area, notably at points several km to the southeast (e.g. MINFILE 092C 030) and approximately 15 km east (MINFILE 092C 090, 091, 146).



Figure 16. Geologist Jacques Houle examining a massive sphalerite occurrence at the Jasper project.



Figure 17. Geologists Alexis Eapen and Tim Norris at Pacific Iron Ore's Pearson project core storage area at Port Renfrew.

The majority of British Columbia's iron skarns occur in the Wrangellia terrane, associated with Triassic Vancouver Group or Kunga Group limestones and with dioritic to gabbroic intrusive rocks, typically Early to mid Jurassic in age. Generally deposits are not much larger than 20 Mt magnetite ore. Some of the past-producing examples include **Tasu** (MINFILE 103C 003), **Jessie** (MINFILE 103B 026, 027, 029), **Merry Widow** (MINFILE 092L 044-050), **Ford** (MINFILE 092L 028), **Yellow Kid** (MINFILE 092F 258) and **Brynnor** (MINFILE 092F 001) among hundreds of occurrences recorded in MINFILE. Since the 1970s the world's iron production has been dominated by large Precambrian iron formations, however, there is a market in the steel industry for high grade magnetite concentrate, and some industry players expect that smaller deposits near tidewater could again become economic. Magnetite is also used as a heavy medium in coal washing plants.

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 (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 (Figure 18). The project is in the Paleocene-Eocene Crescent terrane. Country rocks are basaltic volcanic and intrusive rocks of the Metchosin Complex, which hosts the past producing **Sunro Mine** (MINFILE 092C 073) 5 km to the east. The mine produced copper, silver and gold between 1962 and 1978. New Shoshoni plans further exploration at the DS.

A drilling and trenching program occurred late in the year at the **Valentine Mountain** (MINFILE 092B 108) gold project northwest of Sooke on southern Vancouver Island. Mill Bay Ventures drilled 10 holes totalling 1775 m in the Discovery zone (Figure 19). Visible gold is reported in one of the holes, although analytical results are not yet available. Existing trenches were partially re-opened for sampling and mapping (Figure 20). 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 comprehensive GIS compilation and a remote sensing project were recently completed. A 1990 (historical) resource estimate for the "C" structure in the Discovery zone has 30 660 tonnes averaging 14.7 g/t Au. Current work in combination with geo-referenced historical data is intended to assist estimation of a resource according to modern best practices. The Valentine Mountain property is underlain by metasediments and amphibolites of the Leech River Complex. Cretaceous and Eocene intrusive rocks are also mapped in the area. Two phases of deformation and amphibolite metamorphism have been attributed to Eocene events. Gold bearing quartz veins in the metamorphic rocks are the targets of current exploration.

Inside Coast

Dentonia Resources Ltd continued early-stage exploration at its **Stafford Tungsten** (no MINFILE) project, a 2009 discovery of tungsten-rich skarn along a logging road 11 km from Fraser Bay in Loughborough Inlet. The 2010 program included panel sampling and an airborne magnetometer survey covering 11 000 ha of the property. A drill program at the main showing is proposed.

AZ Copper returned to its grass roots stage **Mount Hayes** property (no MINFILE) briefly in 2010 following 2007 and 2008 programs of mapping prospecting and geochemistry. The chalcopyrite and molybdenite showing is interpreted as porphyry-related.

Prophecy Resource Corp and Eastfield Resources Ltd resumed activity at the **Okeover** or **OK** project



Figure 18. Copper mineralization in siliceous breccia at the DS project on southern Vancouver Island.



Figure 19. Sampling drill core from the Valentine Mountain project.



Figure 20. A trench to be re-opened for mapping and sampling at the Valentine Mountain Gold project.

(MINFILE 092K 008, 057, 155) 20 km north of Powell River. The 2010 program included 20 km of cut line and soil geochemistry. An IP survey is planned and permitted on the same grid. 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% MoS₂. The work identified three strong new soil anomalies. A drill program is also permitted.

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. Mineralization at Okeover is associated with multiphase Tertiary granodiorite or quartz diorite and quartz feldspar porphyry intrusions in Coast Plutonic Complex granodiorites and quartz diorites.

Sea-to-Sky

Exploration activity between Squamish and Whistler was mainly bulk sampling of natural stone for landscaping and building purposes. A bulk sample permit may allow collection and test marketing of up to 10 000 tonnes of material on a smaller scale than fully permitted quarrying, which requires a mining lease and mine plan in order to receive a quarry permit.

There was a drill program consisting of three HQ holes totalling 175.5 m at the **Brandywine** (MINFILE 092JW 001) property of Auramex Resource Corp, designed to verify historical gold results in the Dave's Pond area. The property is a past producer of silver, gold, lead, zinc and copper in the 1970s (Figure 21).

Northern Cascades

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. The company has seven projects: the **MacKenzie** and **Shulaps** are located in the Thompson-Okanagan Region, 30 km west and east of Gold Bridge, respectively. The **Salal Creek** property (MINFILE 092JW 005), northwest of Pemberton, and **Rogers Creek** northwest of Harrison Lake are located on Figure 3. **Mount Barr**, **Sunshine** and **Custer Ridge** are East and south of Chilliwack.

Preliminary prospecting and sampling were done on the MacKenzie and Shulaps properties. At Salal Creek molybdenum porphyry prospect, there was a program of airborne geophysics, prospecting, channel sampling and a 2-hole late season drill program. The first hole reached a target depth of 450 m in the Float Creek area, whereas the second hole was terminated early in the Plug Creek area



Figure 21. The Tedi Pit and Silver Tunnel at the Brandywine property were mined for silver, gold, lead, zinc and copper in the 1970s.

due to technical difficulty. There was also a two-hole 1100 m program in addition to silt and soil geochemistry at Rogers Creek, a copper-molybdenum porphyry prospect. In the southwestern portion of that property, near Fire Mountain, there was an airborne geophysical survey (magnetic, electromagnetic, radiometric). Stream sediment surveys were conducted at the grass roots southern properties Mount Barr, Sunshine and Custer Ridge. Encouraging gold results are reported at Mount Barr where anomalous results are focused along a north-south trend apparently coincident with the Hope fault.

Salal Creek has a history of intermittent exploration that dates back to 1958. Topography has presented challenges to drill programs in the Float Creek area, the most-developed prospect on the property (Figure 22). There are a number of other molybdenum occurrences associated with a quartz-monzonitic pluton (Salal Creek stock) roughly 8-10 km in diameter (Figure 23).

The Rogers Creek prospect is a more recent discovery, reported in late 2007 and explored 2008-2010. This is also spatially associated with an intrusive body believed to be Miocene in age.

At the **Sylvan** gold prospect (MINFILE 092JSE020, 029) 18 km north-northeast of Pemberton, Sean Morriss obtained a bulk sample permit (10 000 tonnes) and began work in the fall. The plan is to drift from an existing



Figure 22. A helicopter slings a rig in for a setup on Float Creek at the Salal Creek project. Photo courtesy Miocene Metals Limited.



Figure 23. Previously unreported molybdenum mineralization was noted near the foot of a retreating glacier at the Salal Creek project.

portal. Historically, samples of massive pyrrhotite and pyrite have yielded significant gold values, up to 46.6 g/t. In the area there are several vein and skarn showings in a pendant of Upper Triassic Cadwallader Group rocks in Coast Plutonic Complex intrusives.

International Millennium Mining Corp conducted a two-hole drill program at the **Jason** Ni-Cu-PGE prospect (MINFILE 092HNW076, 040) east of Harrison Lake. The target was a self potential anomaly under deep overburden in the Hut Creek area. No mineralization was reported in drill core. Access issues appear to have discouraged testing of other targets, including a Cu-Ni-PGE-Au geochemical anomaly and another area of pyrrhotite-chalcopyrite-pentlandite mineralization in pyroxenite.

There was also a two-hole drill program by Nomad Ventures at the **Krof** property (MINFILE 092HNW070) a few km to the west (Figure 24). They drilled electromagnetic anomalies identified in an airborne survey, targeting blind massive sulphides bodies south of



Figure 24. A low-impact drill program at the Krof project east of Harrison Lake.

the Krof occurrence. That showing, discovered by prospectors in 1981, consists of stratabound sulphide lenses of massive or banded sulphides interpreted as Besshi type VMS mineralization. Wallrocks are Cogburn Schist, consisting of chlorite-actinolite schist, biotite-quartz schist, graphitic phyllites and meta-chert.

Module Resources Incorporated had an exploration program at the **Ladner Gold** project (MINFILE 092HNW003, 007, 018) consisting of an approximately 900 m 5-hole surface drill program at the McMaster zone, stepping out to the north of late 2009 drilling, 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 potentially open-pit gold resource. An airborne geophysical survey is planned but not flown at the time of writing. Also planned is underground exploration from re-habilitated **Carolyn Mine** workings, though not by year end. A third aspect of the Ladner project is the potential gold resource in tailings of the former Carolyn Mine. Gold recovery during the 1982-1984 operating period was roughly 50%, leaving an average 1.68 g/t Au in tailings, according to recent sampling (consistent with historical results). 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 (Figure 25).

There are a number of gold showings and past producers in the Coquihalla Gold Belt, all situated close to and to the east of a zone of serpentinite and gabbro following the Hozameen fault. Significant gold mineralization is found not in the fault or the serpentinite, but in lesser structures within mixed lithologies to the east of the major fault. The common characteristic of the hostrocks appears to be the ability to support open fractures which can host mineralization. This setting has led to comparisons with the Mother Lode district of California.

Roughly 70 km to the northwest, Electra Gold Ltd



Figure 25. The Carolyn mine mill site at the Ladner gold project. The conveyor brought ore from an underground crusher.

optioned the **Dot-Apex** property, also called **Nahatlatch Gold** (MINFILE 092ISW055, 065, 090). Preliminary geochemical soil and rock sampling was encouraging (4.33 g/t in a grab sample), and the company re-habilitated access and began a follow-up program in November. There are two previously-reported gold occurrences on the property, roughly 8 km apart along the northwest trending Kwoiek Creek fault system, spatially associated with a discontinuous belt of serpentinized Bridge River ultramafic rocks. Exploration trenching and drilling are permitted. The property straddles the boundary with the Thompson-Okanagan region.

Homegold Resources Ltd restored road access and secured underground workings at the **Silver Peak** (MINFILE 092HSW011) project beginning in 2009 (Figure 26). Proposed bulk sampling had not begun at the time of writing. Main orebodies are the Eureka, Victoria and Victoria West zones, among other smaller bodies. High grade silver veins were first discovered in 1869 and mined until 1874. Veins are characterized by siderite, quartz and silver-lead rich tetrahedrite. The conglomerate host has been assigned an Eocene age.

OUTLOOK FOR 2011

The region's metal mine, Myra Falls, overcame a period of poor profitability that threatened mine closure and is now reporting positive revenue. Consequently, increasingly ambitious exploration efforts have followed. Quarter-to-quarter profitability depends on zinc prices, but with lower costs the operations is somewhat less sensitive. The camp has good exploration potential and the mine has been able to replace reserves historically and in the current year through near-infrastructure drilling. Exploration may accelerate in 2011 as, for example, drilling of the Marshall zone proceeds from underground stations.

Quinsam coal mine now releases less information as a privately owned operation, but higher production and



Figure 26. Abe Reimer stands (hangs) by the Eureka vein and old workings. The Eureka-Victoria mine was the first Crown-granted mineral property in British Columbia.

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sales and greater access to the international market are positives. The near term plan depends on success of the application to mine the 7-South area, and the ability to market a higher sulphur product expected there. Exploration is in progress several km to the east of the mine site, whereas past exploration was much closer.

The industrial minerals and aggregates producers informally surveyed for this report do not expect drastic changes in demand in 2011, but rather are looking for gradual improvement.

The local exploration community feel that the Raven coal project is a bellwether for the industry in the region. To date the project has achieved exploration success, attracted financial partners and produced a positive pre-feasibility study. Federal and provincial environmental reviews are in progress. Located in the relatively populous Comox Valley, there is support from those looking forward to the possibility of new employment and a boost to the local economy, but also concern for potential or perceived negative impacts on the environment, the community or other industries such as tourism. The location of the proposed mine is an area open to mining activity under the province's two-zone system, subject to applicable legislation, such as that concerning permitting and environmental certification. Quinsam coal, which began operations in 1986 was the last major mine to open in the region.

EXPLORATION AND MINING IN KOOTENAY-BOUNDARY REGION, BRITISH COLUMBIA

By David Grieve, PGeo
Regional Geologist, Cranbrook

SUMMARY AND TRENDS

Activity and output levels for exploration and mining in the Kootenay-Boundary Region of British Columbia began to rebound in late 2009 from the global economic recession. This general positive trend continued through 2010, although raising funds for exploration continued to be a challenge.

Significant industry events in 2010 included:

- approval of the expansion at the MAX molybdenum mine (Roca Mines Inc) to a production rate of 1000 tonnes per day (Phase 2 Expansion);
- strong gold drill intersections on properties near Nelson, including the Kena (Sultan Minerals Inc), Star (Valterra Resource Corporation) and Kenville (Anglo Swiss Resources Inc);
- underground exploration drilling programs at the Silvana mine (Slocan Silver project, Klondike Silver Corp), the J&L (Merit Mining Corp) and the MAX mine (Roca Mines Inc);
- drilling for Sullivan-style lead-zinc mineralization in the East Kootenays at the Iron Range property (Eagle Plains Resources Ltd and Providence Capital Corp) and at Hawkins Creek (Klondike Gold Corp);
- new discoveries of mineralized showings on the Silver Fox property (Kootenay Gold Inc) that have affinities to known economic copper-silver mineralization in Proterozoic rocks in western Montana;
- improved prices for metallurgical coal;
- increased production at four of the five metallurgical coal mines in the Elk Valley (Teck Coal Limited);
- a large advanced exploration drilling program at the Bingay Creek coal property, representing the largest Chinese investment to date in a southeast British Columbia coal exploration project (Centremount Coal Ltd);
- the largest ever exploration rotary drilling program at Fording River Operations (Teck Coal Limited);
- a large rotary drill program on the Burnt Ridge North coal property in the Elk valley (Line Creek

Phase 2 Expansion Project, Teck Coal Limited); and,

- increased production at the Elkhorn gypsum mine (CertainTeed Gypsum Canada) and the Mount Brussilof magnesite mine (Baymag Inc).

As in previous years, past producing, historic metal mines and camps were the sites of significant exploration programs, spurred mainly by high gold and silver prices. These included projects in the Slocan, Greenwood, Nelson, Salmo and Rosslund areas. The Nelson area in particular witnessed resurgence in exploration activity in 2010.

Exploration expenditures in 2010 are projected to total about \$28.0 million, nearly double the 2009 level (Figure 1). This total was divided between metals (about 52%) and coal (about 48%). This increase was in part due to the expansion of the region's area, through the addition of the Revelstoke district (west half of the former Columbia Forest District), in 2010.

Exploration expenditures in 2010 can be broken down into stages as shown in Figure 2. The commodities with the highest exploration expenditures were coal and gold.

An estimated 114 000 m of exploration drilling was carried out in the Kootenay-Boundary Region in 2010 (Figure 3). Of this total, approximately 35% represented drilling for metals, compared with about 65% for coal (not including drilling in active pits).

In addition to the exploration expenditures,

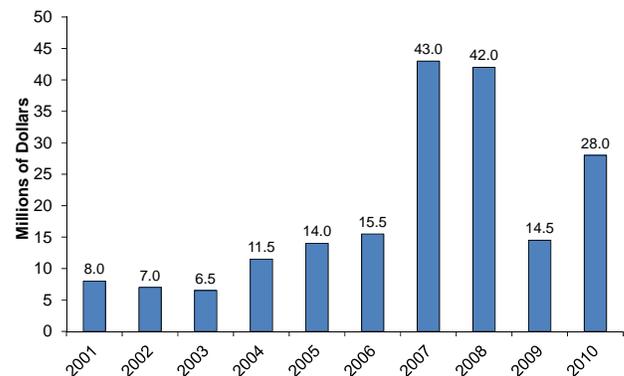


Figure 1. Annual exploration spending in millions of dollars, 2001 to 2010, Kootenay-Boundary Region. The Revelstoke area was added to the region in 2010, which accounts for part of the increase in 2010 over the previous year.

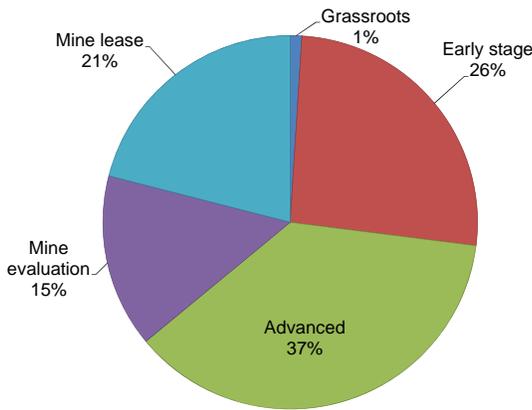


Figure 2. 2010 expenditures by exploration category, Kootenay-Boundary Region.

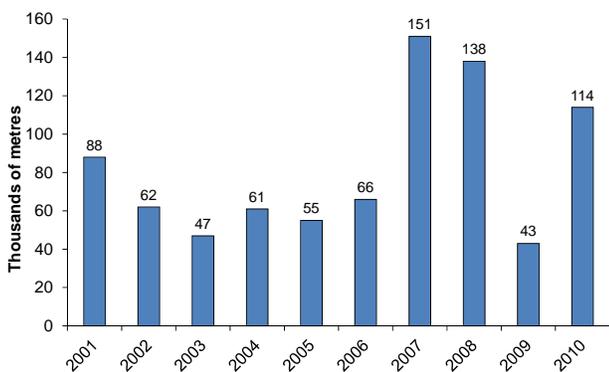


Figure 3. Annual exploration drilling in thousands of metres, 2001 to 2010, Kootenay-Boundary Region. Note that prior to 2004 production (in-pit) drilling at operating coal mines was included in the total.

approximately \$6 million was spent on mine development in the Kootenay-Boundary Region in 2010. All of this was at Roca Mines Inc's MAX underground molybdenum mine.

MINES

The Kootenay-Boundary Region hosts five large coal mines, and smaller operations for molybdenum and various industrial minerals including gypsum, magnesite, silica and dolomite. Selected current producing mine locations in the Kootenay-Boundary Region are shown on Figure 4 and basic information concerning these operations is listed in Table 1 and outlined below.

METALS

Roca Mines Inc's MAX underground molybdenum mine at Trout Lake is the only metal mine in the region. The MAX mine (Figure 5) began shipping concentrate in November 2007 and achieved full commercial production in April 2008 at a rate of 72 000 tonnes per year. In April

2010, Roca received approval to expand its production rate to 1000 tonnes per day (Phase 2 Expansion). At the time of writing, the MAX operation was temporarily shut down due to underground sill pillar stability problems.

The MAX deposit (MINFILE 082KNW087) contains measured plus indicated resources of 42.9 Mt grading 0.20% MoS₂ using a 0.10% MoS₂ cut-off. The Phase 1 mine has been producing from the HG zone, with an initial resource of 280 000 tonnes (measured and indicated) grading 1.95% MoS₂ at a 1.00% cut-off. The Phase 2 expansion is based on a measured plus indicated resource of 1.7 Mt at 0.73% Mo.

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

Potential exists for additional high-grade zones, as well as a deeper large porphyry system. 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 (Figure 6). 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

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, Elkview, Line Creek** (Figure 7), **Greenhills** and **Fording River** operations is approximately 22.4 Mt of clean coal (predominantly metallurgical). This compares with an actual production total of 18.0 Mt in 2009. The mines directly employ 3160 people and make a major contribution to the East Kootenay and provincial economies.

Proven and probable raw coal reserves at the five mines are listed in Table 1; in addition there is a very large resource base in the southeast British Columbia coalfields. With the exception of Coal Mountain Operations, all of the mines produce from multiple seams. Currently productive coal seams are typically medium-volatile bituminous in rank, and are low in sulphur. Clean metallurgical product coal ash contents are typically in the 8.6 to 9.5% range. Other attractive quality parameters include favourable ash chemistry, which contributes to a high Coke Strength after Reaction (CSR).

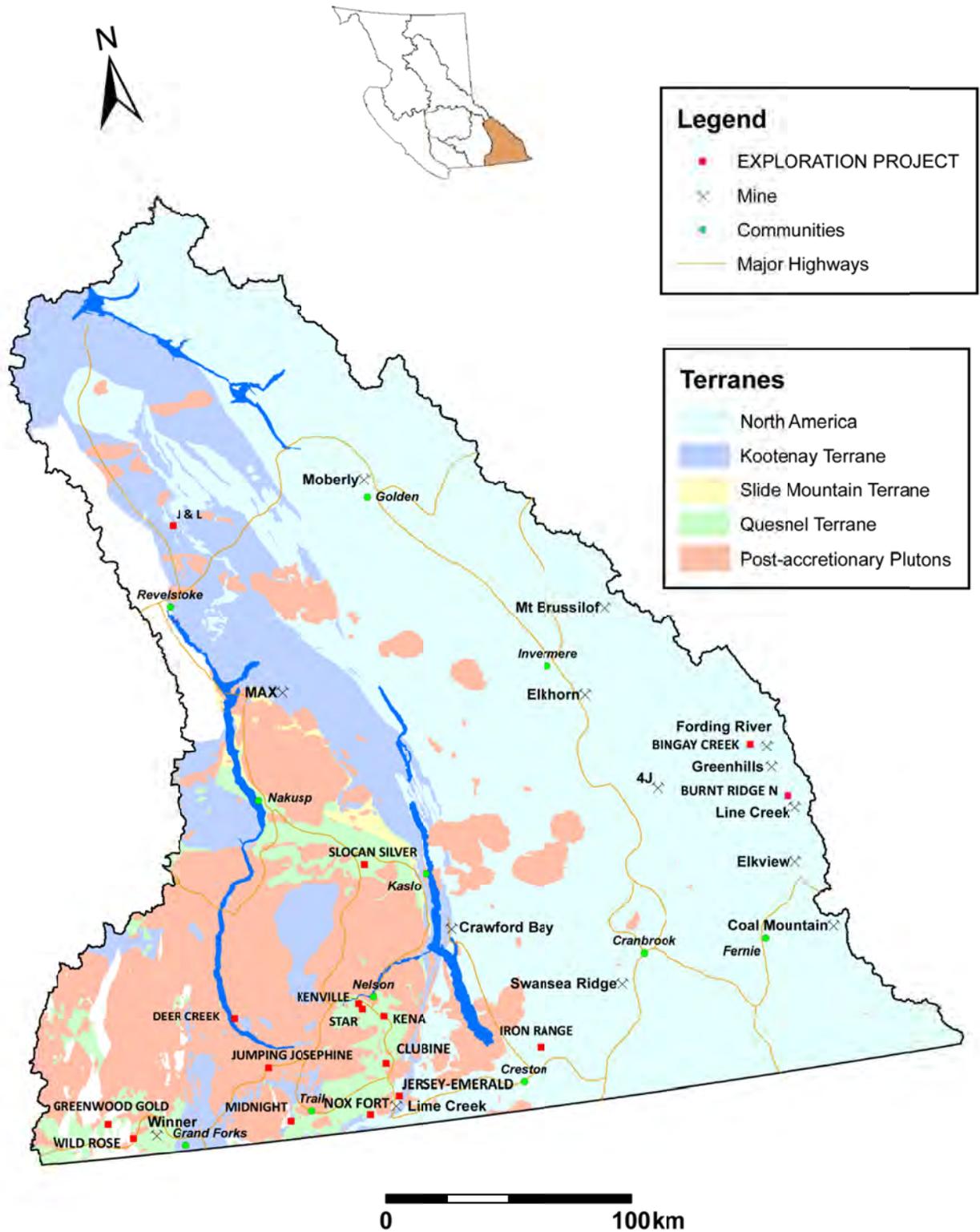


Figure 4. Locations of selected operating mines and exploration projects, Kootenay-Boundary Region, 2010. On-lease exploration drilling programs at three operating mines (MAX, Elkview and Fording River) are not indicated separately.

TABLE 1. SELECTED PRODUCING MINES, KOOTENAY-BOUNDARY REGION, 2010

Mine	Operator	Commodity	Employment	Actual 2009 Production	Projected 2010 Production	Proven and Probable Reserves as of December 31, 2009 or as indicated	Reference for Reserves
Coal							
Coal Mountain	Teck Coal Limited	Metallurgical coal	242	2.36 Mt clean coal	2.21 Mt clean coal	22.0 Mt	Annual Information Form
Elkview	Teck Coal Limited	Metallurgical coal	877	4.18 Mt	5.42 Mt	231.7 Mt	Annual Information Form
Fording River	Teck Coal Limited	Metallurgical coal	1050	6.04 Mt	8.0 Mt	249.9 Mt	Annual Information Form
Greenhills	Teck Coal Limited	Metallurgical coal	564	3.4 Mt	4.2 Mt	84.9 Mt	Annual Information Form
Line Creek	Teck Coal Limited	Metallurgical and thermal coal	431	2.02 Mt	2.6 Mt	20.2 Mt	Annual Information Form
Metals							
MAX	Roca Mines Inc	Mo	80		456 t Mo	Measured and indicated resource of 1.7 Mt at 0.73% Mo (December 2009)	Application to amend permit (Phase 2 Expansion)
Industrial Minerals (selected)							
4J	Georgia-Pacific Canada Inc	Gypsum					
Crawford Bay	Imasco Minerals Inc	Dolomite					
Elkhorn	CertainTeed Gypsum Canada	Gypsum	17	389 000 t	450 000 t		
Lime Creek	Imasco Minerals Inc	Limestone					
Moberly	HCA Mountain Minerals (Moberly) Ltd	Silica sand					
Mount Brussilof	Baymag Inc	Magnesite	32	135 000 t	155 000 t		
Winner	Roxul (West) Inc	Gabbro (mineral wool)	3		80 000 t		



Figure 5. Adit #2 at Roca Mines Inc's MAX molybdenum mine near Trout Lake.



Figure 7. Burnt Ridge South pit at Teck Coal Limited's Line Creek mine.



Figure 6. Molybdenite-bearing quartz veining from the Ethyl zone at the MAX molybdenum mine.

Commercially mineable coals in southeast British Columbia belong to the Jurassic-Cretaceous Mist Mountain Formation (Kootenay Group), and are contained in three structurally distinct coalfields, known collectively as the East Kootenay coalfields, in the Front Ranges of the Rocky Mountains. The more northerly Fording River, Greenhills and Line Creek operations are in the Elk Valley coalfield, which is formed by the Alexander Creek and Greenhills synclines. The Elkview and Coal Mountain operations are in the Crowsnest coalfield, which occupies the Fernie Basin, a broad synclinorium that has hosted coal mining since before the turn of the twentieth century. The third coalfield, known as the Flathead coalfield, consists of four relatively small, structurally isolated erosional remnants of Kootenay Group exposures. A portion of the Crowsnest coalfield and the entire Flathead coalfield are now off limits to development based on a 2010 government decision to prohibit mining and oil and gas-related activities in the

Flathead River drainage.

INDUSTRIAL MINERALS

The Kootenay-Boundary Region continues to be an important source of industrial minerals and related products, including gypsum, magnesite, silica sand, mineral wool, dolomite, limestone, tufa, flagstone, rip rap, aggregate and smelter slag. Selected larger operations are described below, listed in Table 1 and shown on Figure 4.

Baymag Inc produces high-quality magnesite from its open-pit mine near **Mount Brussilof** (MINFILE 082JNW001), in the Rocky Mountains northeast of Radium (Figure 8). The operation has been in production since 1982. The deposit represents a large magnesium alteration zone in Cambrian carbonates. 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. Magnesite has a variety of environmental, industrial and agricultural uses. A recent and growing market for a water treatment (environmental) application has been the Alberta oil sands mining operations, where magnesia in suspension is used to promote precipitation of silica from waste waters.

There are two gypsum mines in the Kootenay-Boundary region, both producing from a Devonian evaporate unit in the Rocky Mountains. CertainTeed



Figure 8. The Mount Brussilof magnesite mine, Baymag Inc.

Gypsum Canada operates the **Elkhorn** mine (MINFILE 082JSW021) east of Windermere, 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) southeast of Canal Flats.

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** 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) southeast of Salmo, and a granite quarry at **Sirdar** (MINFILE 082FSE072).

The **Winner** gabbro quarry (MINFILE 082ESE265) west of Grand Forks supplies feed for the Roxul (West) Inc mineral wool insulation manufacturing plant in Grand Forks. Production at the Winner quarry in 2010 totalled 80 000 tonnes.

MINE EVALUATION PROJECTS

Teck Coal Limited continued baseline environmental and other studies at **Line Creek Operations' Phase 2 Expansion Project**. The expansion, which encompasses Mount Michael (MINFILE 082GNE022) and Burnt Ridge North (MINFILE 082JSE001), will 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 2011. Burnt Ridge North was the site of a large fill-in rotary exploration drilling program in 2010 (see below).

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.

EXPLORATION HIGHLIGHTS

Selected 2010 mineral and coal exploration projects in the Kootenay-Boundary Region are listed in Table 2, and their locations are shown on Figure 4. Generally the selected exploration programs involved expenditures in excess of \$250,000 in 2010 on work that included mechanized ground disturbance. The information in this section was derived mainly from discussions with

TABLE 2. SELECTED EXPLORATION PROJECTS, KOOTENAY-BOUNDARY REGION, 2010

Property	Operator	MINFILE	NTS	Commodities	Target Type	Work program	Metres of drilling (approximate in some cases)
Bingay Creek	Centremount Coal Ltd	082JSE011	82J/2W	coal	sedimentary	G, RC, DD, TR	18809
Burnt Ridge North	Teck Coal Limited (Line Creek Operations)	082JSE001	82G/15W, 82J/2W	coal	sedimentary	A, G, RC, EN	8148
Clubine	Klondike Gold Corp	082FSW200	82F/3W	Au, Ag, Cu	vein	DD	600
Deer Creek	Kootenay Gold Inc and Northern Vertex Capital Inc		82E/8E	Au	vein	DD	500
Elkview	Teck Coal Limited	082GNE017	82G/15W	coal	sedimentary	RC, EN	10793
Fording River	Teck Coal Limited	082JSE010	82J/2W	coal	sedimentary	RC, RC-BU	36000
Greenwood Gold	Grizzly Discoveries Inc	082ESE/034, 147, 174, 082ESW231	82E/2E, 2W, 3E	Au, Ag, Cu, Mo, Zn, Pt	vein, skarn, intrusion-related	P, G, GC, MG, EM, AB-EM	4000
Iron Range	Eagle Plains Resources Ltd and Providence Capital Corp	082FSE014 to 028	82F/1W	Au, Zn, Pb, Fe, Cu	IOCG, SEDEX	DD	3337
J & L	Merit Mining Corp	082M 003	82M/8E	Au, Ag, Pb, Zn	sedimentary replacement	UG-DD	3500
Jersey-Emerald	Sultan Minerals Inc	082FSW009, 010, 011, 059, 218	82F/3E	W, Zn, Pb, Mo, Au	skarn (W, Au), sedimentary replacement (Pb, Zn), porphyry (Mo)	GC, TR, DD	555
Jumping Josephine (JJ)	Astral Mining Corp and Kootenay Gold Inc	082ESE275	82E/8E, 82F/5W	Au	vein	DD, TR	5500
Kena	Sultan Minerals Inc	082FSW237, 332, 379	82F/6W	Au, Cu	porphyry	IP, DD	1400
Kenville Gold Mine (Nelson Mining Camp project)	Anglo Swiss Resources Inc	082FSW086	82F/6W	Au, Cu	vein, porphyry	AB-EM, DD, UG-DD	5850
MAX	Roca Mines Inc	082KNW087	82K/12E	Mo	porphyry	UG-DD	1500
Midnight (Rossland project)	West High Yield (W.H.Y.) Resources Ltd	082FSW119, 116, 117	82F/4W	Au, Mg, Ni	vein, ultramafic	DD	1698
Nox Fort	Jaxon Minerals Inc	082FSW002	82F/3W	Au, Bi, Te, Pb, Zn, W, Mo	intrusion-related	DD	1581
Slocan Silver	Klondike Silver Corp	082FNM013, 043, 050	82F/14W	Ag, Pb, Zn	vein	G, P, GC, TR, DD, UG (100m)	1750
Star	Valterra Resource Corporation	082FSW083, 084, 294	82F/6W	Au, Ag, Cu	vein, porphyry	P, DD	3000
Wild Rose	Golden Dawn Minerals Inc	082ESE116	82E2E	Au, Cu, Ag	vein, porphyry	DD	2000

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)

exploration project staff during site visits, as well as company reports, presentations, press releases and websites.

Gold Projects

BOUNDARY DISTRICT

Grizzly Discoveries Ltd's extensive **Greenwood Gold** Project was active for the third consecutive year. Grizzly Discoveries has assembled what it claims is the largest ever land position in the Boundary District. The company's holdings extend from east of Greenwood to west of Anarchist Summit, and cover an area roughly 70 km by 25 to 30 km.

The project area is underlain by a range of rock units, including the Paleozoic Knob Hill and Anarchist groups, Triassic Brooklyn Formation, and Eocene Penticon

Group. Intrusions of Jurassic, Cretaceous and Eocene rocks are widespread.

There are many known mineral occurrences encompassing varying types of mineralization within the overall project area, including gold-quartz veins, polymetallic veins, skarns and intrusion-related precious metals. The common themes for Grizzly Discoveries' targets are the proximity of intrusive rocks, notably Eocene syenites, and the presence of gold. High gold prices and the proximity to Kinross' Buckhorn mine and concentrator in northern Washington are stimulating exploration interest north of the border.

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 (Figure 9); the Sappho past producer; the Ket 28 prospect; and, the Dayton past producer.



Figure 9. The Motherlode open-pit mine (past producer) near Greenwood, part of Grizzly Discoveries Ltd's Greenwood Gold Project holdings.

The Copper Mountain area is 13 km west of Greenwood. It is a gold-silver vein-related target (with or without copper and zinc) in hornfelsed rocks in proximity to intrusive contacts. A strong gold intersection at the Prince of Wales target (MINFILE 082ESE255) was reported as a new discovery. The Motherlode (MINFILE 082ESE034) is a copper-gold skarn past producer 3 km west of Greenwood. Production occurred at various time intervals up until 1962. Mineralization at the Sappho (MINFILE 082ESE147), 10 km south of Greenwood, includes copper, silver, platinum and gold in massive to semimassive sulphide veins, and is related to alkalic and ultramafic intrusions. Ket 28 (MINFILE 082ESW210) is a gold prospect 8 km west of Rock Creek. Mineralization is associated with quartz veins and pyrite-bearing silicified breccia zones adjacent to a southeast-northwest trending shear zone. Drilling at the Dayton (MINFILE 082ESW022), 6 km north of Bridesville, was designed to follow up a significant gold soil-geochemical anomaly. Gold mineralization at the Dayton occurs in quartz veins, and is also associated with copper-gold skarns; all mineralization is spatially related to alkalic intrusions.

Golden Dawn Minerals Inc undertook a late season diamond drilling program on the **Wild Rose** property, 3.5 km south of Greenwood. 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 (Figures 10 and 11), 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. The JJ Main zone (MINFILE 082ESE275) is 22 km west of Castlegar and just north of Highway 3. Mineralization in this zone is hosted by monzonitic rocks of the Jurassic Nelson plutonic suite, and may be related to a later phase Jurassic intrusion that does not reach surface. Occurrences of Eocene Coryell syenite are also widespread. Mineralization (chiefly pyrite and arsenopyrite) occurs with quartz in stockworks, vein breccias, ladder veins and sheeted veins, and is associated with a prominent northeast trending shear zone.



Figure 10. Diamond drilling on Astral Mining Corporation and Kootenay Gold Inc's Jumping Josephine property.



Figure 11. Pyrite, arsenopyrite and gold (inside red circles) in quartz vein material, Jumping Josephine property drill core.

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, and drilling in 2010, including work at the Highway zone, confirmed that the structure is continuous over a strike length of greater than 2 km.

Drilling in 2010 also targeted suspected parallel zones to the JJ Main, based on aeromagnetic and soil geochemical anomalies. Drilling of the Cedar zone, to the northwest, confirmed the presence of quartz stockwork and vein breccias with pyrite and arsenopyrite. Similarly, drilling has provided further evidence for a parallel zone to the southeast of the JJ Main (Ford zone).

The potential for deep seated, lower grade mineralization is also being considered.

West High Yield (W.H.Y.) Resources Ltd carried out diamond drilling on the **Midnight** property, part of its Rossland project on the western outskirts of the town of Rossland. Past gold producers on the company's property include the Midnight, OK and IXL (MINFILE 082FSW119, 116 and 117). Gold mineralization is associated with ultramafic contacts and a regional tectonic boundary, and consists of gold-bearing quartz-carbonate veins, in contrast to the more typical Rossland-style sulphide-rich veins.

The 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.

The property is also being evaluated for its potential for magnesium and nickel associated with ultramafic rocks. Further work on the magnesium potential of Record Ridge, for which a resource calculation and metallurgical studies were recently completed, is being planned for 2011.

WEST KOOTENAYS

Sultan Minerals Inc's **Kena** property (Figures 12 and 13) is 8 km south of Nelson and includes the Gold Mountain, Kena Gold, Copper King and South Gold zones. Porphyry-style gold and gold-copper mineralization is associated with both the Jurassic Elise Formation volcanic rocks (Rossland Group) and the comagmatic Jurassic Silver King porphyry intrusions. The belt comprising these zones trends northwest-southeast and is subparallel to and east of the Silver King shear zone.

Gold-copper mineralization in the belt referred to above occurs in bulk tonnage (low grade) settings, particularly in the Copper King zone, while gold mineralization occurs in both bulk tonnage and bonanza



Figure 12. Diamond drilling on Sultan Minerals Inc's Kena property near Nelson. Consulting geologist Linda Dandy is in the foreground.



Figure 13. The Copper King zone at Sultan Minerals Inc's Kena property.

(high grade) settings. All these styles of mineralization have been a target of recent exploration efforts.

Gold mineralization tends to occur in four settings: a high-grade corridor, associated with volcanics and intrusives; volcanic-intrusive contact areas; bonanza shoots; and, bulk tonnage haloes around shoots.

The main objective of the 2010 drilling program was to demonstrate the continuity of the high grade gold corridor. The corridor is believed to be associated with a

deep seated shear structure to the west of the Gold Mountain (MINFILE 082FSW379) and Kena Gold (MINFILE 082FSW237) zones. The structure is characterized by silicification and sericite alteration, as well as mafic dikes, and has been traced with a magnetometer survey over a 7 km strike length. 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.

Valterra Resource Corporation's gold-silver-copper **Star** project is 7 km southwest of Nelson, and 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.

Production from the Eureka mine (MINFILE 082FSW084) between 1905 and 1954 totalled about 9000 tonnes of ore averaging over 2 g/t Au, 125 g/t Ag and 1.77% Cu. Gold-silver-copper mineralization at the Star project is hosted by both the Jurassic Elise Formation volcanic rocks (Rosslund Group) and Jurassic Eagle Creek pluton, and has both alkali porphyry (disseminated) and shear-hosted (higher grade) affinities. Mineralization consists mainly of pyrite, with or without chalcopyrite, within sericite and K-feldspar alteration zones.

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.

New geological and geophysical compilations have also identified a number of potential target areas, some of which are apparently related to intersections of north-south and east-west structures. These target areas will be evaluated through drilling.

Anglo Swiss Resources Inc was active again on its **Kenville Gold Mine** property, roughly 6 km west of Nelson. 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. More than 180 000 tonnes of ore was mined, yielding over 2 tonnes Au and 861 kg Ag, along with significant amounts of copper, lead and zinc. Production averaged

more than 17 g/t Au, from a series of northeast dipping quartz veins.

Hostrocks at the Kenville (MINFILE 082FSW086) are within the Jurassic Eagle Creek plutonic complex which is intruded into, and may be the intrusive equivalent of, basalts of the Jurassic Elise Formation of the Rosslund Group. Jurassic (Nelson suite) and Tertiary intrusive rocks are also common in the immediate area. The property lies on the Silver King shear zone.

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.

The Kenville Gold mine property is part of a larger Anglo Swiss claim area, referred to as the Nelson Mining Camp. This area contains numerous examples of gold, silver and base metal mineralization, including other past producers. One of the objectives of the overall Nelson Mining Camp program has been to identify potential deep source areas for known vein-style mineralization, as well as to assess potential for deep, disseminated mineralization. Work in 2010 on the larger claim area included an airborne EM-MAG survey, intended in part to assist in identifying targets of potential deeper mineralization.

Recent acquisitions contiguous with the Kenville Gold Mine property itself include the Silver Lynx zinc-lead-copper-silver property (MINFILE 082FSW378) and the Gold Hill silver-gold-copper property (082FSW092). Diamond drilling programs were carried out on both properties in 2010.

Jaxon Minerals Inc's **Nox Fort** property is an intrusion-related gold prospect with bismuth and tellurium located about 15 km southwest of Salmo. 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.

Mineralization on the Nox Fort property is hosted by quartz veins and skarn-altered rocks and is closely associated with the Bunker Hill intrusion, a possible sill related to the Cretaceous Wallack Creek stock. Pyrrhotite is the most common sulphide mineral, with lesser pyrite, galena and chalcopyrite. A significant portion of the known mineralization is associated with the north trending western contact of the Bunker Hill intrusion, which intrudes metasedimentary rocks of the Cambrian Laib Formation at the south end of the Kootenay Arc. Jurassic Rosslund Group volcanic and sedimentary rocks on the hangingwall of the Waneta thrust fault occupy the northwest portion of the property. Two bodies of

ultramafic rock of unknown affinity also occur on the property.

The company believes that mineralization on the property, particularly in the vicinity of the Bunker Hill mine, represents a reduced, intrusion-related gold (RIRGD) system, perhaps analogous to deposits in the Tintina gold belt including the Fort Knox mine in Alaska. Thin, low-sulphide veins with a gold-bismuth-tellurium geochemical signature are characteristic of this type of system.

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.

Klondike Gold Corp followed up a successful 2009 drilling program on the past producing **Clubine** gold-silver-copper property near Salmo with another round of diamond drilling in 2010. Mineralization at the Clubine (MINFILE 082FSW200) is associated with a shear zone containing lenses of quartz and quartz-carbonate, as well as distinct veins. Hostrocks are part of the Jurassic Rossland Group. Drilling was intended to test along strike and downdip continuity of the shear zone and veins, including high-grade material, intersected the previous year.

At the **Deer Creek** property, 30 km northwest of Castlegar, Kootenay Gold Inc and Northern Vertex Capital Inc carried out a diamond drilling program to test gold-bearing zones discovered through airborne geophysics and trenching in 2009. Gold, along with minor copper, occurs in quartz veins, veinlets and fractures within north trending shear zones. Hostrocks are clastic and carbonate sedimentary rocks of the Paleozoic Mount Roberts Formation, which are intruded by Jurassic granitic rocks and Eocene syenites.

Base Metals Projects

WEST KOOTENAYS

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 tonnes per day concentrator, is operational and the company has an arrangement for a smelter to accept concentrates from the mill.

Mineral occurrences in the Slocan are hosted by sheared and brecciated argillite and slate of the Triassic Slocan Group, which are intruded by granodiorite and quartz monzonite dikes.

Exploration activities on the Slocan Silver project in 2010 were carried out both underground and on the surface.

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 main lode structure, a major source of ore in the Slocan. The projected extension of the main lode into a gap of approximately 1.5 km between the Silvana mine and Silverton has not been tested up until now, but is presumed to have significant potential for mineralization. Drilling from a recently established underground drill station intersected a structure assumed to be the main lode in four holes. Quartz-carbonate veining is prevalent, with minor galena and sphalerite. Locating more strongly mineralized shoots is a high priority as the project moves forward.

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. The company's overall objective is to discover new lodes or extensions of known occurrences at various locations. IP geophysical surveys are proving to be very effective in seeing through unconsolidated cover. Diamond drilling to test two IP anomalies in the western part of the Hewitt camp was carried out late in the year. The objective was to see if these anomalies represented western extensions of the past producing Hewitt mine (MINFILE 082FNW065) lode structure. Another focus was the rich McLanders vein at the past producing Wonderful mine in the Sandon camp (MINFILE 082FNW043).

The **Jersey-Emerald** property, 10 km south of Salmo, was the site of significant work by Sultan Minerals Inc again in 2010. The property, which is situated near the south end of the Kootenay Arc, is host to a variety of different types and styles of mineralization. Replacement-style, stratabound lead-zinc mineralization is associated with Paleozoic carbonates. Tungsten is associated with the contact between Paleozoic sedimentary rocks and Cretaceous intrusions. It is hosted by both skarn and massive pyrrhotite bodies. Gold is also associated with skarn. Molybdenum-bearing, granitic intrusion-hosted quartz stockworks lie beneath some of the old tungsten mine workings and in some cases molybdenum is also associated with tungsten.

The underground Jersey lead-zinc and Emerald tungsten mines (MINFILE 082FSW009, 010, 011 and 218) closed in 1973. The Jersey mine was historically British Columbia's second largest lead-zinc producer, and the Emerald was Canada's second largest tungsten producer (Figure 14).



Figure 14. The Emerald open-pit mine (tungsten past producer) near Salmo on Sultan Minerals Inc's Jersey-Emerald property.

In 2009 Sultan Minerals acquired the rights to the past producing HB underground and Garnet open pit lead-zinc mines. The HB and Garnet adjoin the Jersey-Emerald property on the north side of Sheep Creek. The HB-Garnet mine (MINFILE 082FSW004 and 082FSW249), which closed in 1978, was the province's third largest lead-zinc producer.

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 cut-off grade of 3.5% combined Pb-Zn. This resource is located solely in the area of the old Jersey mine workings.

Exploration work in 2010 involved diamond drilling and trenching to test magnetic geophysical anomalies in the vicinity of the Garnet mine. Exploration was successful in extending mineralization, consisting of pyrrhotite associated with sphalerite, to the north of the Garnet open pit.

EAST KOOTENAYS

Eagle Plains Resources Ltd and Providence Capital Corp carried out a diamond drilling program on the **Iron Range** property, roughly 15 km northeast of Creston (Figures 15 and 16). Providence Capital holds the option to earn a 60% interest in the property. There are two settings for mineralization at the Iron Range. One is gold



Figure 15. Diamond drilling on the Iron Range property (Eagle Plains Resources Ltd and Providence Capital Corp).



Figure 16. View to the southwest from the Iron Range property. The Creston valley is in the far distance.

mineralization associated with iron oxide and copper along the Iron Mountain structure (also known as the Iron Range fault). These known occurrences (MINFILE 082FSE014 to 028) have possible affinities with iron oxide-copper-gold (IOCG) mineralization. The second style is sedimentary exhalative (SEDEX) mineralization associated with the contact between the lower and middle members of the Aldridge Formation (so-called Sullivan horizon) in the Proterozoic Purcell Supergroup. This latter style is analogous to the Sullivan mine orebody.

Diamond drilling in 2010 was generally focused on the potential SEDEX target near the south end of the Iron Range in an area of pervasive albite alteration. Encouraging results were obtained in terms of sulphide mineralogy, alteration, lithologies and textures that suggest proximity to a possible hydrothermal vent system at Sullivan time. The presence of gold and silver associated with sulphide mineralization has also been demonstrated in two drillholes, based on early analytical results.

Polymetallic Projects

WEST KOOTENAYS

Merit Mining Corp carried out underground drilling at the **J&L** gold-silver-zinc-lead property, 35 km north of Revelstoke. The polymetallic mineral zones at the J&L (MINFILE 082M 003) are stratabound, massive sulphide-bearing units. There is uncertainty as to the origins of the J&L, but mineralization has been compared to structurally controlled, carbonate replacement-type deposits.

The property lies near the north end of the Kootenay Arc. Mineralization is hosted by the late Proterozoic to early Cambrian Hamill Group metasedimentary rocks. 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 hangingwall 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.

East Kootenay Coalfields Projects

Centremount Coal Ltd carried out a large diamond and rotary drilling program on the **Bingay Creek** property, 20 km north of Elkford on the floor of the Elk Valley, and within the Elk Valley coalfield (Figures 17 and 18). 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. At Bingay Creek (MINFILE 082JSE011) the coal-bearing Mist Mountain Formation of the Jurassic-Cretaceous Kootenay Group is preserved in a tight, asymmetric syncline in the immediate footwall of the west dipping Bourgeau thrust fault. The west limb of the Bingay Creek syncline is steeply east-dipping to overturned. Strata at Bingay Creek are contiguous with those on the west side of the Greenhills Range, and are separated from the Greenhills syncline by the Fording Mountain anticline.

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.



Figure 17. Rotary drilling at the side of the Elk Valley Forest Service Road north of Elkford on Centremount Coal Ltd's Bingay Creek coal property.



Figure 18. Diamond drilling on the Bingay Creek coal property

In comparison to coal-bearing sections in other parts of the Elk Valley coalfield, the section at 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 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 and roughly 8 km southeast of Elkford in the Elk Valley coalfield (Figure 19). On Burnt Ridge North (MINFILE 082JSE001) the Mist Mountain Formation occurs on the west limb of the Alexander Creek Syncline. Coal-bearing strata dip moderately to steeply eastward and are predominantly in a dip-slope situation.

Together with Mount Michael (MINFILE 082GNE022), which is immediately to the east of Burnt Ridge and on the east limb of the Alexander Creek syncline (Figure 20), Burnt Ridge North 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 to replace those in Line Creek Operations' current pits. Exploration rotary drilling in 2010 was mainly of a fill-in nature and was targeted at delineating mineable reserves.

The Mist Mountain Formation averages about 550 m in thickness on the property, and includes several potentially mineable coal seams. Coals are predominantly



Figure 19. Rotary drilling on Teck Coal Limited's Burnt Ridge North property.



Figure 20. View looking east to Mount Michael (right, middle distance) from Burnt Ridge North.

medium-volatile bituminous in rank, with some high volatile-A bituminous coals near the top of the section. Coal seams on Burnt Ridge North are potentially similar to seams currently being extracted at Line Creek Operations in terms of their quality characteristics, and can be expected to yield good metallurgical coal products.

Teck Coal Limited carried out large mine-site exploration rotary drilling programs at Elkview Operations and Fording River Operations. At Elkview the work was carried out on **Adit Ridge**, site of a potential new pit less than 1 km east of the Harmer shop. At Fording River the drilling occurred in the **North Greenhills** area (MINFILE 082JSE010), representing previously mined and unmined zones in the Greenhills Range portion of the property, and along strike from Greenhills Operations. In both cases, the potential for new open pit mining opportunities is being evaluated. Also at Fording River, the Henretta Pit was the site of engineering studies and drilling related to the proposed pushback of a pit highwall.

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