

# NORTHWEST REGION

By Paul Wojdak, PGeo  
Regional Geologist, Smithers

## SUMMARY AND TRENDS

Mineral exploration activity increased sharply in 2004 and high metal prices were a boon to mines in the region. Exploration spending in the Northwest jumped to \$55 million, more than double the amount in 2003 (see Figure 2-1). Exploration drilling, primarily a measure of work on advanced properties, climbed to about 167 000 meters (see Figure 2-2). Most of the activity was distributed among 41 large projects, 35 of which included drilling. Three major mines operated in the region. All three benefited from high metal prices but the low-cost Endako open pit mine fared particularly well as molybdenum soared to more than \$30 per pound. Buoyed by the strong price, Endako began a large waste rock-stripping program to access more ore and prolong mine life. The rich Eskay Creek underground mine continued to be a major producer of gold and silver but the supply of high-grade ore that is shipped to smelters will be exhausted in early 2005. Eskay Creek will continue to mine and treat lower grade ore for several more years. The open pit Huckleberry mine maintained its output of copper and by-product molybdenum, and carried out a major exploration program in hope of continuing mine life beyond 2007. Mine data, including annual production and reserves, is shown in Table 2-1.

Highlights of exploration and pre-development work include

- At Red Chris near Iskut, completion of a positive feasibility for a 30 000 tonne per day open pit copper-gold mine, and submission of a Project Report to the Environmental Assessment Office. Project economics are based on extension of the British Columbia power grid.
- At Galore Creek, west of Bob Quinn, completion of a major exploration program with results that will significantly enhance near-surface copper-gold resources. Positive results included discovery of a spectacular zone with +10% copper. The Galore Creek project entered the Environmental Assessment process with proposed development of a 30 000 to 60 000 tonne per day open pit mine. Possible access road and mill site locations were investigated for a pre-feasibility analysis.
- At Tulsequah Chief, south of Atlin, a major drilling program to confirm and expand the copper-zinc-

silver-gold resource for an updated feasibility study of a 2500 tonne per day underground mine

- At Copper Creek, near Telegraph Creek, preliminary exploration drilling confirmed surface samples and discovered a substantial zone of copper-gold porphyry mineralization that is open to expansion and includes a supergene enrichment zone
- At GJ near Iskut, step-out drilling significantly extended the known limits of a porphyry copper-gold zone, which remains open to further expansion
- At Kutcho Creek, east of Dease Lake, drilling reappraised the copper-zinc-silver-gold deposit for an optimal grade resource and extracted a sample for metallurgical study
- At Adanac, near Atlin, a large drilling program to validate resources in a porphyry molybdenum deposit, to be followed by a pre-feasibility study
- The Klappan anthracite open pit coal project entered the Environmental Assessment process
- At Morrison, near Granisle, mineable copper-gold resources were estimated and the project continues in the Environmental Assessment process

Table 2-2 lists all exploration projects in the region where expenditures exceeded \$100 000 and their locations are shown in Figure 2-3. The most popular

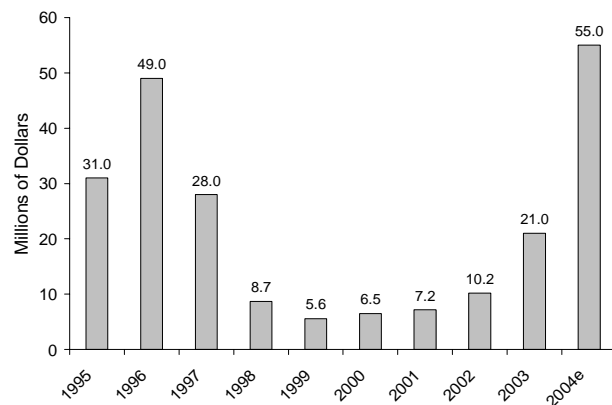


Figure 2-1. Exploration Expenditures in Northwest BC.

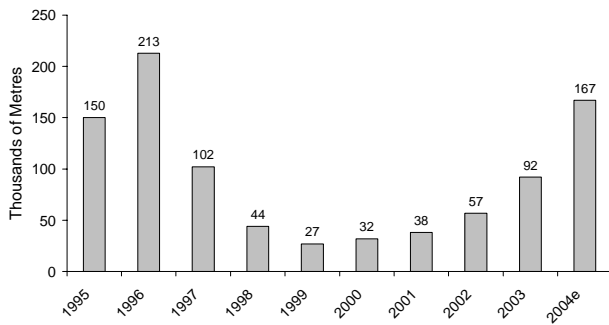


Figure 2-2. Exploration Drilling in Northwest British Columbia.

targets were porphyry copper-gold prospects. Volcanogenic massive sulphide deposits, gold veins and porphyry molybdenum deposits were also sought. An important trend continues to be reactivation of work at past mines and properties with indicated or inferred resources. Successful drilling programs were conducted at three former gold mines, Table Mountain, Summit Lake and New Polaris. Significant mineralization was intersected in drilling on new zones at Foremore, Tide, and Fire Mountain. Bedrock showings that warrant follow up were reported at RDN, Corey and LCR.

Looking ahead to 2005, current levels of activity are expected to continue or increase. Environmental approval of the Red Chris project could occur as early as May 2005 and, if followed by a decision to start mine construction, may spur exploration in the area. At Galore Creek, eight drill rigs are scheduled for an enormous program of definition drilling, engineering and environmental work required for a full feasibility study. Among the many continuing exploration projects listed above, large drilling programs are expected at Copper Creek and GJ to test the extent of porphyry copper-gold mineralization. Work is planned on additional advanced-stage porphyry copper and molybdenum prospects including Schaft Creek and Eaglehead in the Telegraph Creek - Dease Lake area, and Poplar, Lucky Ship and Yorke-Hardy in the Houston-Smithers area.

## MINES AND QUARRIES

### METAL MINES

The **Eskay Creek** underground gold-silver mine, owned by Barrick Gold Corporation, is expected to produce 9300 kg of gold and 450 000 kg of silver in 2004. Eskay Creek comprises a series of volcanogenic massive sulphide deposits with exceptional gold and silver content that occur in mudstone and footwall rhyolite at the top of the early Jurassic Hazelton Group. Scheduled mine production is 670 tonnes per day at an average grade of 46.3 g/t gold and 2225 g/t silver. Gold production cost for 2004, net of silver credits, is estimated at \$US 100 per ounce. Including contractors, the mine employs 320 people. Forecast mine output is 135 000 tonnes of direct shipping ore and 110 000 tonnes of milling ore. Direct shipping ore comes from the stratiform 21B orebody and is richer than average in gold and silver but also contains high levels of mercury, antimony and arsenic that require it to be shipped to smelters for treatment. The 21B zone consists of clastic beds in the Contact Mudstone of sphalerite, tetrahedrite – freibergite, lead-sulphosalts (including boulangerite, bournonite, jamesonite), stibnite, galena, pyrite, electrum and amalgam. The cut-off grade for shipping ore is 30 g/t gold equivalent. Ore that is treated in the on-site mill comes from the NEX zone, the northern extension of 21B, and from Hanging Wall and Footwall zones. Hanging wall ore is stratiform sulphide layers in mudstone intercalated with basalt above the Contact Mudstone. Footwall ore occurs in the underlying rhyolite and consists of gold enrichment along faults and in areas of silica and sericite alteration.

**Endako** is a porphyry molybdenum deposit within the early Cretaceous Francois Lake granite batholith. Thompson Creek Mining Ltd owns 60% of the operation and Sojitz Moly Resources Inc. owns 40%. The Endako open pit mine has operated for 34 years and is a low-cost

TABLE 2-1. MINE PRODUCTION AND RESERVES, NORTHWEST REGION

Mine	Operator	Employment	Production (2004 Estimate)	Reserves
Endako	Thompson Creek Mining Ltd. & Sojitz Moly Resources Inc.	252	5000 t molybdenum	Endako Pit, 32.8 mt at 0.071% Mo; Denak Pit, 22.7 mt at 0.069% Mo; Stockpile, 25.2 mt at 0.047% Mo (Oct. 1, 2004)
Eskay Creek	Barrick Gold Corp.	320	9300 kg gold, 450 000 kg silver	Shipping ore, 248 264 t at 56.40 g/t Au, 3015 g/t Ag; Milling ore, 592 631 t at 25.77 g/t Au, 1013 g/t Ag (Jan 1, 2004)
Huckleberry	Huckleberry Mines Ltd. (50% Imperial Metals Corp.)	230	33 000 t copper 170 t molybdenum	25.0 mt at 0.507% Cu, 0.014% Mo, 0.059 g/t Au, 2.97 g/t Ag (Jan 1, 2004)
Fireside	Fireside Minerals Inc.	20 (seasonal)	9000 t barite	Not available

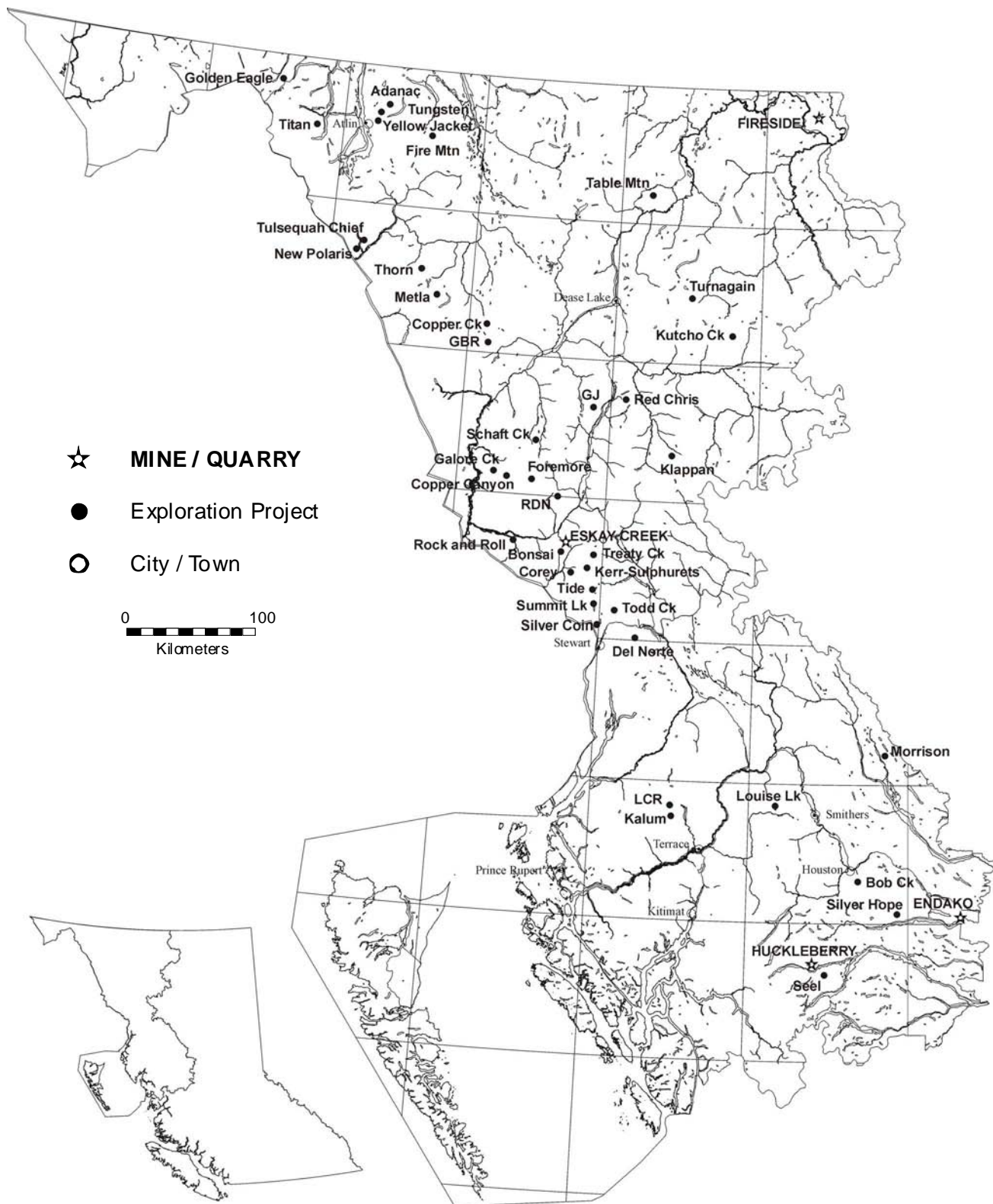


Figure 2-3. Location map, Mines and Exploration Projects in Northwest British Columbia, 2004.

**TABLE 2-2. MAJOR EXPLORATION PROJECTS IN NORTHWEST REGION - 2004**

<b>Property</b>	<b>Operator</b>	<b>Minfile</b>	<b>Commodity</b>	<b>Deposit Type</b>	<b>Work Program</b>
Adanac (Ruby Creek)	Adanac Moly Corp.	104N 052	Mo	Porphyry	IP; A; DD (9022 m); EN
Bob Creek	Canadian Gold Hunter Corp.	93L 009	Au, Ag	Epithermal	DD (1415 m)
Bonsai & Treaty Creek	Heritage Explorations Limited	104B 078, 383	Au, Ag	Epithermal VMS, Porphyry	AB-EM/MG; DD (674 m)
Copper Canyon	NovaGold Resources Inc.	104G 017	Cu, Au	Alkalic Porphyry	AB-MG/RD; DD (3017 m)
Copper Creek	Firesteel Resources Inc.	104J 005	Cu, Au	Porphyry	G; GC; TR; DD (1555 m)
Corey	Kenrich Eskay Mining Corp.	104B 011, 355	Au, Ag	Epithermal VMS	G; GC
Del Norte	Lateegra Resources Corp.	104A 161, 176	Au, Ag	Epithermal Vein	DD (4816 m)
Endako Mine	Thompson Creek Mining Ltd.	93K 006	Mo	Porphyry	DD (1370 m)
Eskay Creek	Barrick Gold Corp.	104B 008	Au, Ag	Epithermal VMS	DD (18 055 m)
Fire Mountain	bcMetals Corp.	104N 067	Mo	Porphyry	DD (3379 m)
Foremore	Roca Mines Inc.	104G 148	Au, Ag, Cu, Zn	VMS	G; P; GC; UT; MG; DD (5900 m)
Galore Creek	NovaGold Resources Inc.	104G 090, 091, 095, 097	Cu, Au	Alkalic Porphyry	G; AB-MG/RD; IP; DD (22 959 m); EN; PF
GBR	Amarc Resources Ltd.	104J 059	Cu, Au	Porphyry	G; GC; IP
GJ	Canadian Gold Hunter Corp.	104G 034, 177	Cu, Au	Porphyry	G; P; TR; DD (4267 m)
Golden Eagle	Marksmen Resources Ltd.	104M 085	Au	Skarn, Vein, VMS	AB-EM/MG/RD
Huckleberry	Imperial Metals Corp.	93E 037	Cu, Mo	Porphyry	G; IP; DD (8000 m)
Kalum	Eagle Plains Resources Ltd.	103I 019, 174, 213	Au	Pluton-related Vein	G; AB-EM/MG, DD (1958 m)
Kerr-Sulphurets	Noranda Inc.	104B 173, 180	Cu, Au	Porphyry	G; R; IP
Kutcho Creek	Western Keltic Mines Inc.	104I 060	Cu, Zn, Ag, Au	VMS	DD (7691 m); MS
LCR	Northern Continental Resources Ltd.	103I 021	Cu, Mo, Au	Porphyry	G; P; GC; AB-EM/MG; DD (484 m)
Louise Lake	Firestone Ventures Inc.	93L 079	Cu, Au	Porphyry	DD (1675 m)
Metla district	Solomon Resources Limited	104K 113	Au	Vein	G; GC
Morrison	Pacific Booker Minerals Inc.	93M 007	Cu, Au	Porphyry	EN; PF
New Polaris	Canarc Resource Corp.	104K 003	Au	Mesothermal Vein	DD (2767 m)
RDN	Northgate Minerals Corp. & Rimfire Minerals Corp.	104G 144	Au, Ag	Epithermal VMS	G; P; DD (2499 m)
Red Chris	bcMetals Corp.	104H 005	Cu, Au	Porphyry	DD (4848 m); GD (1279 m); CD (779 m); EN; FS

**TABLE 2-2. CONTINUED**

<b>Property</b>	<b>Operator</b>	<b>Minfile</b>	<b>Commodity</b>	<b>Deposit Type</b>	<b>Work Program</b>
Rock and Roll & Phiz	Conquest Resources Ltd.	104B 377, 165	Au, Ag, Cu, Zn	VMS, Vein	G; GC
Schaft Creek	Copper Fox Metals Inc.	104G 015	Cu, Mo	Porphyry	MS
Seel	Gold Reach Resources Ltd. & Grayd Resource Corp.	93E 105	Cu, Au	Porphyry	G; R; GC; IP; DD (1500 m)
Silver Coin	Pinnacle Mines Ltd.	104B 095	Au, Ag	Epithermal Vein	DD (3000 m)
Silver Hope	Canadian Empire Exploration Corp.	93L 256	Ag, Cu, Au	Epithermal Vein	DD (1800 m)
Summit Lake	Tenajon Resources Corp.	104B 034	Au	Pluton-related Vein	DD (1280 m)
Table Mountain	Cusac Gold Mines Limited	104P 070	Au	Orogenic Vein	DD (6478 m)
Thorn	Cangold Limited & Rimfire Minerals Corp.	104K 031	Ag, Au, Cu	Epithermal Vein, Breccia	DD (1810 m)
Tide	Serengeti Resources Inc.	104B 129	Au, Ag	Pluton-related Vein	DD (500 m)
Titan	Eagle Plains Resources Ltd.	104M/8W	Mo	Porphyry	DD (314 m)
Todd Creek	Lateegra Resources Corp.	104A 001	Au, Cu	Vein	DD (750 m)
Tulsequah Chief	Redfern Resources Ltd.	104K 002	Cu, Pb, Zn, Ag, Au	VMS	UG (160 m); R; DD (30 444 m); EN
Tungsten	Adanac Gold Corp.	104N 006, 053	Au	Vein	DD (375 m)
Turnagain	Hard Creek Nickel Corp.	104I 119, 120, 051	Ni, Cu, Co	Magmatic	AB-EM/MG; DD (7645 m)
Yellow Jacket	Muskox Minerals Corp.	104N 043	Au	Orogenic Vein	AB-EM/MG; DD (3750 m)

producer. The ore body is a 3.5-kilometer long stockwork zone that is elongated to the west-northwest and dips about 50° south to a depth of 330 meters. In 2004, ore from a low-grade stockpile continued to supplement pit production. The average grade supplied to the mill was about 0.066% Mo. Narrow mining width in the pit coupled with wall instability that interrupted mining led to a 10% reduction in the tonnage milled. The mill normally processes 27 000 tonnes per day and recovers about 78% of the molybdenum sulphide, all of which is converted to molybdc oxide. In June, Endako ceased co-production of Ultrapure, its trademarked molybdenum sulphide product, in favour of producing more oxide because of its greater profitability. Employment increased to 252 persons including 17 temporary personnel who are mainly involved in a pit expansion program.

Pit expansion comprises a major push back of the south wall and a less extensive set back of the north wall that will enable a return to the scheduled rate of

molybdenum production. The company has embarked on the first two stages of a three-phase program on the south wall to access ore and improve wall stability. Stripping of 10.1 million tonnes of waste rock will open up 9.1 million tonnes of ore for mining. The third phase, not approved yet, comprises removal of 20.3 million tonnes of waste to access 15 million tonnes of ore. On the north wall, a contractor began mining 1.3 million tonnes of waste and 700,000 tonnes of ore thereby alleviating wall instability and protecting access to the in-pit crusher. Ten exploratory holes were drilled southeast of the Endako pit to follow up on a mineralized intercept.

The **Huckleberry** copper mine, operated by Huckleberry Mines Ltd., is owned 50% by Imperial Metals Corp. and 50% by a group of Japanese companies, Mitsubishi Material Corp., Dowa Mining Ltd. Furakawa Company Ltd. and Marubeni Corp. The mine is located at the foot of Huckleberry Mountain, 125 kilometers by road from Houston. Huckleberry is a porphyry copper deposit

related to the late Cretaceous Bulkley intrusions. Copper mineralization, which occurs in two zones one kilometer apart, is developed within a granodiorite stock and related dike, and also in adjacent hornfelsed and fractured volcanic rocks. The East zone dike is controlled by a fault that trends 110°. All the ore mined in 2004 came from the East pit, the Main zone was mined out in 2002. Through the first three quarters the mill processed 20 757 tonnes of ore per operating day grading 0.473% copper and 0.014% Mo. Copper recovery averaged 85.4% but molybdenum recovery was just 18.3%. Copper concentrate is trucked to the port of Stewart for shipment to Japan. Mining of the East zone requires removal of potentially acid generating waste rock that is dumped into the Main pit to be flooded when the mine closes. The high wall of the East pit was stabilized by drilling a series of holes, inclined at +5°, to drain water dammed behind the main, 110° fault. A large exploration program, comprising about 8000 meters of drilling, focused on an area north of the Main zone. An area northeast of the East pit was a secondary target. No results are available.

## **INDUSTRIAL MINERALS**

Fireside Minerals Ltd. produced 9 000 tonnes of barite from the Bear quarry on the **Fireside** property (94M 003), which is 125 km east of Watson Lake. Coarse, white barite occurs as a fault-controlled vein within rocks of the lower Paleozoic Kechika Group. The vein strikes east northeast, dips steeply north and is up to 10 meters wide. To the north, the vein is bounded by buff-brown phyllite and on the south by black siltstone and quartzite that is fractured and in-filled by quartz and calcite. Run-of-mine material was concentrated using jigs at the mine site, then trucked to Watson Lake where the barite was ground, bagged and sold to the western Canadian oil and gas drilling industry. Exploration drilling below the Bear pit and on other targets is planned early in the 2005 season.

## **MINERAL EXPLORATION**

### **ATLIN AREA**

The **Adanac** molybdenum deposit (104N 052) was staked in 2001 by a predecessor company of the current owner, Adanac Moly Corp., to explore the porphyry prospect for gold and tungsten. Instead, results of an economic scoping study prompted a major program in 2004 to bring the molybdenum resource into compliance with NI 43-101. In 1981, Placer Development Limited estimated a mineable reserve of 152 million tonnes grading 0.063% molybdenum based on 32 000 meters of diamond drilling, 1100 meters of underground development and milling of a 9500 tonne bulk sample, but

Adanac Moly was not able to obtain enough of the original data to verify this work. The current 9000-meter program included twinning 5% of the old holes, in-fill holes and exploration holes outside of the previously determined pit limit (Photo 1). The deposit is a quartz-molybdenite stockwork occurring in a multi-phase quartz monzonite stock that is a satellite of the highly evolved Surprise Lake batholith. Molybdenite veins are predominantly gently dipping and are preferentially located in a flat-lying aplite (R. Pinsent, pers. comm.). Drilling enlarged the mineralized zone at depth and laterally, in particular north of the Adera fault, a structure that was previously thought to limit the zone. Prior to drilling, the fault was mapped by a three-dimensional IP survey. The company will commission a new resource calculation and contemplates a feasibility study of the renamed Ruby Creek molybdenum project. Environmental and socio-economic studies were initiated, to update work done by Placer Dome when the project was in the mine development review process. Adanac Moly also drilled 4 holes on the adjacent **Tungsten** property; one hole tested the **Black Diamond** prospect (104N 006) and three targeted gold in quartz veins and a skarn zone along Boulder Creek, near the contact of the quartz monzonite stock with Cache Creek strata.

The **Fire Mountain** molybdenum property (104N 067) was explored by bcMetals Corporation for a porphyry deposit similar to that at Henderson, Colorado. A hornfels zone two kilometers in diameter is developed in chert and siliceous argillite of the Cache Creek Terrane. Pyrite-sericite alteration overprints the hornfels and is cut by quartz-feldspar porphyritic rhyolite dikes, though these are not abundant. Molybdenite occurs on fractures and in locally developed quartz stockwork veining. These features, along with tungsten and fluorine geochemistry, suggest the presence of a molybdenum-bearing stock at depth. Three vertical holes were drilled to depths of more than 1100 meters but did not locate the source intrusion. Dikes with steep and flat contacts are more abundant at



Photo 1. Robert Pinsent, Exploration Manager for Adanac Moly Corp. discusses Adanac core with visitors from Ministry of Energy and Mines.



depth, comprising up to 15% of the core. The dikes contain varying proportions of quartz, K-feldspar and plagioclase, and closely resemble fine and medium grained phases of the Surprise Lake pluton. Quartz veining occurs in dikes and hornfels. The best hole, FM04-01, returned an intercept of 0.058% Mo over 399.3 meters beginning at 716 meters below surface. Wavy banded quartz veinlets, known informally as 'brain rock', are well developed over a few short intervals. Fluorite occurs in quartz veinlets in hornfels up to 300 meters above the mineralized zone.

Kobex Resources Ltd. drilled three short core holes on the **Titan** molybdenum property under an earn-in agreement with Eagle Plains Resources Ltd. At the Titan showing, recently exposed by glacial retreat, molybdenite rosettes occur in Cretaceous granite near the contact with metasedimentary rocks. Two IP anomalies, 300 to 350 meters from the showing were targeted by the drill holes. The holes intersected disseminated pyrite, and a 0.2 meter interval of disseminated molybdenite and chalcopyrite. The Titan showing remains untested.

Muskox Minerals Corporation continued to drill the **Yellow Jacket** (104N 043) gold prospect in the heart of the Atlin placer gold district. Gold at Yellow Jacket occurs in listwanite-altered fault zones near the contact between serpentinitized ultramafic and mafic volcanic rocks of the oceanic Cache Creek terrane. Drill programs in the 1980's by Canova Resources Ltd. and Homestake Mineral Development Corp. yielded intercepts of 10-35 g/t gold over widths up to 4 meters but continuity could not be shown. Drilling by Muskox is focused in the same 250 meter interval along Pine Creek. Two of twelve holes encountered coarse gold that returned assay intercepts similar to those obtained by previous explorers. A structural model was developed to guide further exploration. Results of approximately 20 additional holes have not been released. Muskox contracted an airborne electromagnetic and magnetic survey to identify new targets for drilling.

Marksman Resources Limited carried out a 670 km airborne survey on its **Golden Eagle** property (formerly Pavay) near Bennett Lake, recovering EM, magnetic and gamma ray spectrometry data. Gold is associated with arsenic, antimony and base metal sulphides in a series of vein, disseminated and skarn zones (104M 044, 085) near the faulted contact between Stuhini Group volcanic rocks and Boundary Range metamorphic rocks. Marksman is pursuing an Eskay Creek deposit analogy in its evaluation of drill targets.

## **TULSEQUAH-TAKU AREA**

Redfern Resources Ltd., a wholly owned subsidiary of Redcorp Ventures Ltd., conducted a major program of in-fill and step-out drilling to confirm and expand resources at the **Tulsequah Chief** deposit (104K 002). Three drills recovered over 30 000 meters of core in 54

holes and include some of the highest grades obtained over the life of the project. In the 1950's Cominco Ltd. mined 575 000 tonnes from Tulsequah Chief. Exploration up to 1994 by Cominco and Redfern determined a measured and indicated resource of 5 940 000 tonnes grading 1.42% copper, 1.26% lead, 6.72% zinc, 107 g/t silver, 2.59 g/t gold and an additional 3 million tonnes of inferred resources at similar grade. In 2004, the 5400 level drift was extended 160 meters and all drilling was conducted from three underground stations (Photo 2). Tulsequah Chief is a volcanogenic massive sulphide deposit found in the hinge zone and limbs of a steeply plunging syncline within Mississippian strata. Sulphide lenses are stacked near the base of a rhyolite-dominated sequence overlying a quartz-pyrite-sericite-cordierite alteration zone in a thick accumulation of mafic volcanic rocks. The most important part of the deposit, the H lens, forms a steep pipe, or lens, that is about 100 meters long, up to 31 meters in true thickness and was delineated by the current program to 800 meters below previous mining. At that level, a fault zone was encountered that caused several drill holes to be lost. Holes that were completed through the fault penetrated intense alteration and the company suggests that the H lens bends to the east toward the 5300E fault. Drilling also targeted the G zone, which is a faulted offset of the H deposit on the east side of the 5300E fault. Geologic modeling and calculation of a new resource estimate are in progress. Equipment and construction cost estimates were obtained for an updated feasibility study. Redfern installed a pilot plant to treat acidic water draining from old mine workings. The company also completed a geotechnical study of a fan at the mouth of Shazah Creek that concluded the fan is not subject to debris flows and is therefore a safe site to dispose of mine tailings. The Tulsequah Chief project has a Project Approval Certificate from the B.C. government and is being reviewed by the federal government under the Canadian Environmental Assessment Act (CEAA).

At the **New Polaris** gold property, across the Tulsequah River from the Tulsequah Chief project, Canarc Resource Corp. began an in-fill drilling program



Photo 2. Underground drilling at Tulsequah Chief

near the end of the year. Gold is associated with disseminated arsenopyrite in conjugate, shear-controlled quartz-ankerite vein stockworks and listwanite alteration developed within Devonian mafic volcanic rocks. The shear zone is a splay of the 220 kilometer-long Llewellyn fault. A previous resource estimate of 3.26 million tonnes grading 12.3 g/t gold is not compliant with Canadian policy NI 43-101. The objective of the current program is to block out proven and probable resources in the C vein by reducing the spacing between drill intercepts from 60 to 30 meters, beginning down dip of two old stopes in the former Polaris-Taku mine. The first four holes returned a weighted average of 25.6 g/t gold over a 5.3-meter core length. True width is estimated to be 85 to 90% of the core length.

Cangold Limited performed geophysics and core drilling on the **Thorn** gold-silver prospect (104K 031) under an earn-in agreement with Rimfire Minerals Corporation. Intensely altered Upper Cretaceous volcanic rocks and a related biotite-quartz-feldspar porphyry stock underlie the property. The primary targets are pyrite-tetrahedrite-enargite quartz veins up to 5 meters wide that containing significant to bonanza grades of silver, copper and gold. The Oban breccia zone, discovered by drilling in 2003, contains about 1 g/t gold and 100 to 200 g/t silver across widths of a few tens of meters. Float samples suggest it may contain silver and gold locally of much higher grade. An IP survey over the Oban breccia detected a pronounced anomaly over known mineralization. The response is interpreted to show a 300-meter continuation of the zone and a similar target one kilometer to the south. A forest fire interrupted geophysical work and delayed drilling. Drilling comprised 12 holes and totaled 1810 meters. Four holes tested the Oban zone along strike and at depth and five holes tested the IP anomalies. Three holes explored the continuity of high-grade gold-silver-copper mineralization in massive sulphide veins along the 1.5 kilometer-long Camp Creek structural zone. Results were not available.

Solomon Resources optioned the **Metla** (104K 113) property from Clive Aspinall and James Dawson to explore for the source of gold-rich boulders exposed by recent glacier retreat. Solomon also acquired the In-Law (104K 078), La Veta (104K 075) and Tatsa (104K 037) showings located nearby. Geological work and sampling did not locate new targets and the company concluded that previous operators adequately tested known showings and anomalies.

Copper Ridge Explorations Inc. reacquired claims on the **Joss'alun** copper prospect (104N 136) from Imperial Metals Corporation. An agreement was made with Consolidated Norsemont Ventures Ltd., which performed an 8-kilometer IP survey.

## **CASSIAR AREA**

Exploration drilling at the shutdown **Table Mountain** gold mine (104P 070) resulted in discovery of a new vein by Cusac Gold Mines Ltd. Gold at Table Mountain occurs in steeply dipping quartz-sulphide veins over a wide area but with limited vertical extent, within listwanite-altered ultramafic rocks and underlying mafic volcanic rocks. The veins terminate against overlying argillaceous sedimentary rocks emplaced by a thrust fault in an imbricated, gently dipping succession known as the Sylvester allocthon. All past-productive veins strike at 070° but the Rory vein trends 020° and dips steep to the west. It was found north of the Jennie and Bear veins in a prospective but relatively unexplored portion of the property. The Rory vein averages 3 meters in true width over a length of 130 meters and dip extent of 45 meters, and is 25 meters above a main haulage drift. Indicated resources were calculated to be 19 958 tonnes at 12.17 g/t gold. The Rory and East Bain veins contain a combined total Indicated resource of 40 059 tonnes at 16.9 g/t gold. Five kilometers south of the Rory discovery, four holes were drilled to test for an eastern extension of the Hot vein. More drilling is planned in this area in 2005.

## **TURNAGAIN-UPPER STIKINE AREA**

Western Keltic Mines Inc. acquired the dormant **Kutcho Creek** property (104I 060) and revived exploration and evaluation of the volcanogenic massive sulphide deposit. The host rocks are dacite to rhyolite pyroclastic rocks of Permo-Triassic age. Previous operators discovered a series of three deposits over a strike length of 3.5 kilometers; Kutcho, which contains an indicated resource of 14.9 million tonnes grading 1.85% copper, 2.62% zinc, 31.6 g/t silver, 0.37 g/t gold, Sumac West, which contains 10 million tonnes at sub-economic grade and Esso West, which contains 1.5 million tonnes grading 3.37% copper, 5.71% zinc, 63.4 g/t silver, 0.54 g/t gold. Work in 2004 on the Kutcho lens comprised 21 drill holes that improved definition of higher-grade areas, slightly extended limits of the deposit and extracted a sample for metallurgical study (Photo 3). The best intercept was near the margin of the Kutcho lens, 8.3 meters grading 5.34% copper, 5.94% zinc, 138 g/t silver, 2.28 g/t gold. Work in the Esso West lens comprised 9 drill holes that expanded the deposit. Hole 04-27b1, 50 meters beyond the previous western limit of the lens, intersected 5.2 meters grading 3.03% copper, 18.6% zinc, 65.4 g/t silver, 0.93 g/t gold. New resource estimates will be calculated and a prefeasibility study is anticipated in 2005.

Hard Creek Nickel Corporation (formerly Canadian Metals Exploration Ltd.) continued exploration for a bulk-tonnage nickel deposit on the **Turnagain** property, 110 kilometers east of Dease Lake. The program included a 1600-line kilometer airborne EM and magnetic survey, a





Photo 3. Transporting drill core by helicopter at Kutcho Creek.

soil geochemical survey over a 115-kilometer grid and 49 diamond drill holes totaling 7645 meters. The 3 by 8 kilometer Turnagain serpentinized ultramafic body contains variably disseminated pyrrhotite and, locally, minor pentlandite and chalcopyrite. Based on work prior to 2004, the company announced an Inferred resource of 48.3 million tonnes averaging 0.34% nickel in the Horsetrail zone (104I 119) and 5.0 million tonnes averaging 0.55% nickel in the Cub zone (104I 120). Much of the 2004 drilling comprised in-fill holes in the Horsetrail zone and a new resource estimate is anticipated in early 2005. Nickel is contained in sulphide and silicate minerals and on-going metallurgical study is investigating recoverable nickel, copper, cobalt and platinum group elements. The soil survey covered the ultramafic body northwest of the Horsetrail zone up to tree line and found elevated levels of copper, nickel, cobalt, platinum and palladium. Some twenty drill holes, located to test the soil response, intersected hornblendite and magnetite-bearing clinopyroxenite locally containing 100 to 500 parts per billion platinum and palladium.

At the **Eaglehead** porphyry copper prospect (104I 008), John Poloni completed a soil survey and struck an agreement with Carmax Explorations Ltd. to carry out further exploration in 2005. Previous exploration includes 59 core holes that intersected six mineralized areas along a 10 km trend. One of the last holes drilled in the East zone cut 0.94% copper over 63 meters.

### **TELEGRAPH CREEK AREA**

Firesteel Resources carried out a program of geological mapping, backhoe trenching, soil geochemistry and drilling on the **Copper Creek** property 50 km northwest of Telegraph Creek and 8 km from the Golden Bear mine road. Work focused on the DK zone (104J 035), one of three zones of porphyry copper and skarn mineralization. Monzonite, probably an apophysis of the Kaketsa pluton, intrudes mafic volcanic rocks and bedded tuffs of the Stuhini Group. Trenches were dug along old

dozer trails by a portable machine that was transported to the property by helicopter. A trench cut obliquely across the intrusive contact returned 0.38% copper and 0.23 g/t gold over 270 meters, the entire length of the trench (Photo 4). The rock is strongly fractured and cut by quartz veinlets. Malachite is present locally but along most of the trench copper minerals are difficult to recognize. Drilling determined that chalcopyrite is the principal copper mineral at depth but is essentially absent near surface where copper oxides and/or chalcocite comprise a zone of supergene enrichment. Drill holes collared along the trench began and ended in copper mineralization. The best hole of the program, CUCR 04-05 was angled to the north and cut 0.44% copper and 0.32 g/t gold averaged over its full length of 242 meters, the top 52.3 meters of the hole averaged 0.80% copper and 0.73 g/t gold. Hole CUCR 04-02, fifty meters away and angled south, averaged 0.42% copper and 0.21 g/t gold over its length of 173 meters. The tenor of the hypogene zone is about 0.2 to 0.3% copper and 0.06 to 0.2 g/t gold. The extent of copper mineralization remains to be determined but may extend 300 meters south where a trench returned 0.51% copper and 0.41 g/t gold over its full length of 20 meters.

Amarc Resources acquired the **GBR** property, 40 kilometers northwest of Telegraph Creek, to explore for a porphyry copper deposit. The claims straddle the Golden Bear mine road. Previous exploration, to evaluate a gold vein (104J 059), also identified a 1.0 by 1.5 kilometer copper and gold soil anomaly that was not explored. Amarc conducted geological mapping and 51 kilometers of induced polarization surveying that determined Triassic to Jurassic intrusive rocks on the property are unlikely to contain significant porphyry mineralization.

Copper Fox Metals Inc. agreed to acquire the **Schaft Creek** porphyry copper deposit (104G 015) from 955528 Alberta Ltd. Old core, stored on the property in a weatherproof building, was sampled to conduct metallurgical test work.



Photo 4. Copper Creek channel sample graded 0.38% copper and 0.23 g/t gold over 270 meters.

## KINASKAN AREA

At the **Red Chris** copper-gold porphyry deposit (104H 005), bcMetals Corporation concluded definition drilling and most other field studies, and prepared a feasibility analysis. The BC Environmental Assessment Office accepted the Red Chris Project Report for review by Provincial and Federal agencies, with a decision expected in May 2005. bcMetals completed the purchase of minority interests in the property held by Teck Cominco Limited, thereby consolidating title after more than 30 years of fractured ownership. The copper-gold deposit is in the Red stock, a body of monzonitic composition that is 4.5 kilometers long and up to 1.2 kilometers wide, elongated along an east-northeast structure named the East Zone fault. The stock consists of two compositionally similar phases; the 'Main Phase' is a medium-grained, weakly to intensely altered plagioclase-hornblende porphyritic monzonite that hosts most of the copper-gold mineralization and comprises about three quarters of the stock. The 'Late Phase' is thought by the company to include both unaltered and barren Main Phase and post-mineral dikes with indistinct contacts, which are remarkably similar in composition and texture to very weakly altered Main Phase rocks. The deposit, 1.7 kilometers long, occurs along the central axis of the stock and comprises two distinct zones. The East zone is 60 to 200 meters wide, sharply defined and dips steeply southeast. Copper-gold grade correlates closely with the intensity of quartz-sulphide stockwork veining, which is controlled by the East Zone fault. The Main zone is 150 to 650 meters wide with irregular areas of internal waste. In the Main zone, the continuation of the East Zone fault curves and branches into several sub-vertical splays and the quartz-sulphide stockwork is disrupted by younger faults and reactivated structures. Mineable reserves at Red Chris, excluding low-grade stockpile material, are estimated at 185.4 million tonnes at 0.414% copper and 0.325 g/t gold and, if mine development proceeds, would supply a 30 000 tonne per day mill for a period of 17 years. The East and Main zone pits would merge as mining progresses. Stockpile material is estimated to be 92.4 million tonnes grading 0.216% copper and 0.145 g/t gold and could extend milling an additional 8 years. The initial waste to ore ratio is 2.3, declining to 1.1 after processing the stockpile material. Mill recoveries are expected to average 87.2% for copper and 50.3% for gold. Capital costs are estimated to be \$228.5 million. The feasibility study assumes that a 230-kilometer extension of the Provincial power grid will be built by BC Hydro along Highway 37. A new 22-kilometer road would connect the mine to Highway 37. bcMetals Corporation, in conjunction with Outokumpu Technology, is considering the production of metallic copper and gold on-site at Red Chris by a new hydrometallurgical process of chloride leaching of copper sulphide concentrate. Testwork is being conducted on a 24 tonne sample of drill core material.

Canadian Gold Hunter Corp. conducted a 20-hole drilling program on the **GJ** (Kinaskan) property to explore the poorly exposed Groat monzonite stock for a porphyry copper-gold deposit. A series of 200-meter step out holes in the Donnelly zone (104G 086) significantly enlarged the known extent of mineralization to an area 1100 meters long by 100 to 300 meters wide (Photo 5). The zone remains open along trend to the east and in width to the north. Drill hole 04-02, angled across the zone, is representative of the results; it intersected 0.34% copper and 0.35 g/t gold over 252 meters with a higher grade central interval of 168 meters that graded 0.41% copper and 0.44 g/t gold. Chalcopyrite is disseminated in medium-grained monzonite and in a weakly developed quartz vein stockwork. K-feldspar occurs in the groundmass and as vein envelopes. The Donnelly zone contains little pyrite and does not produce a strong IP response. A broad IP chargeability high adjacent to the Donnelly zone may be due to pyrite in volcanic country rocks. In a separate zone, ten drill holes tested the north contact of the Groat stock near an area that was hand-trenched in 2003 (see *Exploration and Mining in BC – 2003*). Most holes encountered Stuhini Group volcanic rocks. Here too, drilling was guided by a broad IP chargeability high and copper mineralization was intersected mainly in holes along the south flank of the anomaly, closer to the pluton. The best intercept was 81.6 meters in hole 04-07 that averaged 0.29% copper and 0.22 g/t gold in a zone of quartz veins enveloped by K-feldspar and epidote. Elsewhere on the property, trenching of a gold-bearing quartz vein on Trevor Peak did not yield significant assays but prospecting 2.5 km north of the Donnelly zone resulted in discovery of a new copper showing called the YT zone.

Freegold Ventures Limited staked the **Compass** and **Ram** properties in the Kinaskan area to cover areas with geology correlative to Eskay Creek and new mineral occurrences found by the B.C. Geological Survey Branch



Photo 5. Project Geologist David Mehner at the only outcrop of the Donnelly zone on the GJ property. Copper-gold mineralization continues at least 1100 meters on the plateau in the background.



(see *Geological Fieldwork 2003*). Prospecting, silt and rock geochemistry were carried out, focusing on mineral occurrences on the claims.

## **ISKUT DISTRICT**

At **Galore Creek**, NovaGold Inc. conducted a major exploration drilling program to augment copper-gold reserves and performed engineering and baseline environmental studies to consider development of a large open-pit mine (Photo 6). Drilling totaled nearly 26 000 meters in 69 holes. A key strategy of the exploration program is to delineate 100 million tonnes of material grading 1% copper and 1 g/t gold that can be mined during the initial years of production to offset high development cost of the proposed mine. A preliminary economic assessment of the project, based on historic data and drilling in 2003, estimated the Main and Southwest deposits (104G 090, 095) contain an ‘indicated resource’ of 70.0 million tonnes grading 1.15% copper and 0.99 g/t gold, plus 10.4 million tonnes of ‘inferred resource’ at slightly lower grade. This represents most of the high-grade development objective and is contained within a lower grade ‘indicated resource’ of 285.9 million tonnes grading 0.73% copper and 0.44 g/t gold together with an ‘inferred resource’ of 98.8 million tonnes grading 0.54% copper and 0.37 g/t gold. No resources were assigned to other mineralized areas. Drilling in 2004 tested the southeast margin of the 2 kilometer-long Main deposit and the 0.5 kilometer ‘Gap zone’ between the Main and Southwest deposits. Other targets include the Junction (104G 091), West Fork (104G 097), Grace and Copper Canyon zones (104G 017) and geophysical targets. Results were not available for about one-third of the holes at the time of writing. Bornite and chalcopyrite in the Main deposit is disseminated in volcanic breccias that are cut by sub-horizontal alkaline intrusions, so that the deposit consists of a series of stacked tabular zones. Drilling in 2003 through a barren sill discovered



Photo 6. Logging core at Galore Creek. Rugged mountains and glaciers that challenge ground access to the property are displayed in the background.

disseminated chalcopyrite and pyrite, the Bountiful zone, below and to the east of the Main deposit. Step-out holes in 2004 extended the zone but did not find its limits, either to depth or to the east. A deep sensing IP geophysical survey was performed over the Main deposit and surrounding area. Parallel chargeability anomalies were found east and west of the Main deposit. A deep response that corresponds with the Bountiful zone is interpreted to link the east anomaly with the Main deposit.

Work in the West Fork zone at Galore Creek, 1 kilometer south of the Main deposit, provided impressive results. Semi-massive to massive bornite, chalcopyrite and magnetite was intersected near surface in at least three drill holes and returned exceptionally high assays, e.g. 14.8% copper, 88.6 g/t silver and 2.05 g/t gold over a 33.6 meter core length. The results of additional holes to investigate the geometry and extent of this zone are pending. A flat-lying zone of more typical disseminated mineralization averaging 50 meters thick was intersected about 100 meters below the high-grade zone. It has been defined over an area of 500 by 400 meters and is open toward the Southwest deposit. Initial results from the Gap zone include a newly recognized style of mineralization close to surface. Hole GC04-462 intersected 38.4 meters grading 3.20 g/t gold with only trace copper values in a late-stage silicified fault zone. Drilling in the Junction zone also returned favourable results. The Junction zone, 1.2 kilometers west of the Main deposit, is an area 500 meters by 1 kilometer long delineated by 35 previous drill holes. The first hole drilled by NovaGold intersected 2.20% copper, 20.0 g/t silver and 1.66 g/t gold over 56.4 meters. At Copper Canyon, located 8 km further west of the Main deposit, mineralization begins at surface and occurs as a relatively flat-lying, roughly 50 to 270 meter thick tabular zone. Malachite and azurite are prominent in a cliff near the base of the valley wall above the toe of Copper Canyon glacier (Photo 7). Eight holes were completed to augment data from 21 prior holes. Mineralization is related to syenite and monzonite that intrudes alkalic volcanic rocks. Disseminated chalcopyrite



Photo 7. Geologist Bruce Otto studies the malachite and azurite-stained cliffs at Copper Canyon, part of the Galore Creek project.

and pyrite occur with biotite, garnet and K-feldspar in the matrix of what is interpreted to be an orthomagmatic breccia. Assay intercepts range up to 0.88% copper, 0.77 g/t gold over 172.4 meters.

NovaGold submitted a pre-application report to the Environmental Assessment office, to begin the mine development approval process. Engineering work at Galore Creek focused on consideration of mill and tailings sites and two possible road routes to Highway 37. Difficult access has been the critical impediment for decades to development of Galore Creek. A direct route, 81 kilometers long, follows More Creek, West More and Sphaler creeks and requires three tunnels, with lengths of 3.3, 1.0 and 14 kilometers. An alternative route that is 150 kilometers long follows the Iskut valley (using the existing Eskay Creek mine road) and the Stikine valley. It requires a single tunnel, 3 kilometers long. The Tahltan Nation Development Corporation and Rescan Environmental Services formed a new joint company to carry out environmental and access studies.

Barrick Gold Corporation completed 18 055 meters of drilling in 54 holes in exploration around the **Eskay Creek** mine. The 22 zone, two kilometers south of the mine, was a focus of work in 2003 and was the first area to be investigated in 2004. Gold occurs with arsenopyrite along a northwest structure in the Eskay footwall rhyolite and base metal sulphides were intersected where the structure intersects a permeable amygdaloidal dacite deeper in the footwall succession. Significant gold values were found to be limited to a small area near surface and no further work is anticipated (D. Gale, pers. comm., 2004). Additional holes evaluated the footwall rhyolite on the western limb of the Eskay Creek anticline for structurally controlled gold and base metal veins like the 22 zone. North of the Eskay Creek deposit, in the Deep Adrian area, long holes were drilled in search of a mudstone and clastic sulphide-filled basin analogous to the Contact mudstone that contains the 21B and NEX gold-silver ore zones. In the mine area, long drill holes tested stratigraphically lower mudstone horizons in proximity to the Pumphouse fault, which channeled hydrothermal fluids on the margin of the Eskay graben. Massive, polymetallic sulphide with modest gold enrichment was intersected in the Betty Creek mudstone. Geological mapping, focusing on a rhyolite facies analysis, was combined with silt, soil and rock geochemical sampling throughout the Eskay Creek area.

Northgate Minerals Corporation acquired the **RDN** property (104G 144), 40 km north of the Eskay Creek mine, and completed 2499 meters of drilling in nine holes. Rocks underlying the RDN property are similar to those that host the Eskay Creek deposit and exhibit a comparable geochemical signature (see *EMBC-2001*, page 65-71). Drilling in the Wedge zone followed up on anomalous gold that was found by a previous operator at the contact between felsic volcanic and sedimentary rocks. Significant intersections in the 2004 holes were restricted to altered dacite volcanic rocks, occurring in

quartz-carbonate veins and a brecciated sulphide shear zone. The values ranged from 1.43 g/t gold over 5 meters to 9.18 g/t gold over 2 meters with anomalous silver, copper, lead and zinc. A single hole in the Jungle gold-arsenic soil anomaly reached a depth of 336 meters entirely within argillite, siltstone and minor mafic volcanic rocks thought to be correlative with the hanging wall sequence at the Eskay Creek deposit. Anomalous values of gold (58 to 649 parts per billion) and arsenic (102 to 664 parts per billion) near the top of the hole are considered the likely source of the anomalous soil geochemistry. Two holes at the Marcasite Gossan zone targeted two stacked dacite flow-domes, which are cut by stockwork alteration and veining and overlain by shallow marine sedimentary rocks and pillow basalt. Both holes encountered elevated antimony and mercury values in the dacite, without significant gold values. Prospecting resulted in two new areas of interest that will be investigated in 2005. The Blind fault area is highest priority. Grab samples over a 200-meter interval along the contact between chlorite-altered rhyolite and sedimentary rocks returned values from 140 g/t to 363 g/t silver. The silver-enriched horizon is associated with disseminations and veinlets of base metals. At Eskay Creek, chlorite alteration in rhyolite is proximal to stratiform ore.

Roca Mines Inc. continued to explore for the source of volcanogenic massive sulphide boulders on the **Foremore** property (104G 148). Prospecting, geophysics and a 37-hole drill program focused along a 3.5 km length of folded Devonian-Mississippian volcanic and sedimentary rocks in the North zone that contains the BRT showing, discovered in 2003. Semi-massive to massive base metal sulphides were intersected in six holes collared close to the BRT outcrop but additional holes drilled in 2003 and 2004 indicate BRT mineralization is restricted in extent. The thickest intercept was in drill hole FM04-04, 3.1 meters that averaged 14.6 g/t gold, 1114 g/t silver, 0.2% copper, 1.2% lead and 6.6% zinc. The mineral horizon, represented by pyritic phyllite near the contact between felsic and overlying mafic volcanic rocks, was traced 1.6 km north and tested with holes spaced 200 to 400 meters apart (Photo 8). Several holes encountered multiple layers of massive sulphide, each 0.3 to 1.2 meters thick, over a 300-meter interval within the felsic sequence. Visible gold was noted in FM04-32 in a 0.8 meter-wide sulphide band and assayed 26.5 g/t gold, 85 g/t silver, 2.2% copper, 1.3% lead, 8.6% zinc. Other sulphide bands contain generally lower metal grades. A 20-kilometer UTEM survey was completed over the projected extent of the mineralized sequence in More Creek valley. Roca also explored areas outside the North zone. Two drill holes on strike of the SG lead-zinc-silver-gold showing determined graphite to be the cause of an EM conductor surveyed in 2003. A single drill hole at the Sunday zone did not intersect significant gold in an area of fracture veins filled by arsenopyrite, spalerite and galena. Roca also delineated ground magnetic and gold-in-soil anomalies over an area of skarn developed near the contact between limestone, volcanic and intrusive rocks. Sampling of a



Photo 8. Helicopter-supported drilling at Foremore, in the North zone.

hand-dug trench returned an average assay of 18.7 g/t gold, 15.3 g/t silver and 0.52% copper.

Heritage Explorations Ltd. continued exploration of its extensive mineral claim holdings surrounding the Eskay Creek mine with a large geophysical survey and two drill holes. A 2600 line-kilometer airborne survey was carried out late in the field season, recovering time-domain electromagnetic and magnetic data. Target follow up will occur in 2005. One hole was drilled at **Bonsai** (104B 383) to test the strike extension of a pyrite zone in rhyolite for Eskay Creek type mineralization but returned low gold and silver values. A drill hole at **Treaty Creek** (104B 078) explored a porphyry system and did not encounter significant mineralization.

On the **Corey** property, 10 km south of Eskay Creek, Kenrich-Eskay Mining Corporation conducted a program of geological mapping, rock and silt geochemistry in search of new targets for a precious metal-enriched massive sulphide deposit. The claims cover the southern portion of the Eskay bimodal volcanic rift sequence. Smitty is a new mudstone-hosted bedded sulphide showing that was discovered in a five kilometer-long area of multi-element geochemical anomalies that extends south of the VMS-style Cumberland showing (104B 011). Four chip samples on the Smitty showing spaced one metre apart average 0.75% copper, 0.18% lead, 7.98% zinc and 204 g/t silver across 0.65 meters. Gold was not reported. Drilling is anticipated in 2005.

Conquest Resources Limited and Newcastle Minerals Ltd. formed a joint venture to acquire and explore the **Rock and Roll** property (104B 377) near the former Snip gold mine. Newcastle already held claims on the adjoining Phiz gold vein showing (104B 165). Previous work at Rock and Roll by Prime Resources outlined an inferred mineral resource of volcanogenic massive sulphide mineralization, the Black Dog zone, of 675 000 tonnes at an average grade of 1.75 g/t gold, 234 g/t silver, 0.4% copper, 0.5% lead, 2.2% zinc. Geological mapping and a soil geochemical survey were carried out primarily in the area between the two prospects. Some 1400 soil

samples were analyzed for mobile metal ions (MMI) in the hope of detecting a 'blind' southeast extension of the Black Dog zone and/or extensions of the Phiz zone. Weak anomalies in zinc and gold were found, not much different than were identified by an earlier conventional B-horizon soil survey. No follow up work was done to determine their significance.

At the **Kerr-Sulphurets** property Noranda Exploration Inc. carried out geological mapping and an IP survey focused on the North Mitchell (104B 180) and Iron Cap (104B 173) areas, and reclaimed roads and trenches at the Kerr deposit. At Iron Cap and North Mitchell, felsic intrusions are associated with quartz veining and sericite-pyrite alteration from which previous operators have obtained drill intercepts of about 0.3% copper and 0.3 g/t gold over 100 meters (Photo 9).

## STEWART DISTRICT

Tenajon Resources Corporation reactivated exploration at its **Summit Lake** (Scottie) underground gold mine (104B 034), which operated from 1981 to 1984 producing 160 000 tonnes of ore at an average grade of 16.2 g/t gold. The mine closed due to high operating cost following closure of the Granduc copper mine. At shutdown, prior to NI 43-101, geological resources were estimated at 120 000 tonnes at an average grade of 19.2 g/t gold. Gold occurs in a series of en echelon quartz-pyrrhotite-pyrite-calcite veins near the margin of the Summit Lake granodiorite stock. Fourteen holes were drilled from the mine workings to confirm historic drill intersections and to extend the L, M and N zones. Intercepts range from 2 to 40 g/t gold over apparent widths of 0.3 to 4 meters, sufficiently encouraging for drilling to continue in 2005.

Serengeti Resources drilled four holes on the **Tide** property (104B 129), 36 km north of Stewart, to test two surface showings and two soil anomalies for gold mineralization. The targets derive from work by Rimfire



Photo 9. Geologist Mike Saville examines the North Mitchell zone on the Kerr-Sulphurets property.



Minerals Corporation and previous explorers. A 200 to 1000 meter wide hornblende-feldspar porphyry sill complex, an offshoot of the lower Jurassic Summit Lake stock, intrudes Hazelton Group volcanic rocks. The most encouraging results came from one of two holes that tested porphyry-style mineralization. The 36 zone comprises an east-west fracture zone in volcanic rocks that is mineralized with pyrite, arsenopyrite and lesser pyrrhotite, and a corresponding gold in soil anomaly. Closely fractured and veined rocks were encountered over the full length of a 168-meter hole, the top 129.4 meters averaged 1.0 g/t gold. Gold distribution is fairly uniform, only one sample interval contained over 5 g/t gold. Holes in the Arrow and South Pit zones, where moderate to high-grade gold was recorded in veins on surface, returned lower grade intercepts of 1 to 2 g/t gold over widths of 1 to 3 meters. Prospecting two kilometers northeast of the 36 zone drill hole discovered a quartz-pyrite-arsenopyrite vein with high-grade gold. Named the 52 zone, the average of two closely-spaced samples across a width of 0.5 meters is 476 g/t gold and 11 314 g/t silver. Nine grab samples of other veins along the 400 meter length of the host structure returned values ranging from 0.85 g/t to 4.59 g/t gold and 4.4 to 95 g/t silver. The 52 zone is within a gold soil anomaly that measures 600 by 450 meters.

On the **Del Norte** property 34 km east of Stewart, Lateegra Resources Corporation continued to drill the LG gold-silver vein (104A 161). Thirty-six holes were completed in a series of two to four-hole fans targeting a one-meter thick quartz-calcite breccia vein. Sulphosalt minerals occur in the vein with pyrite, sphalerite and galena. The intersection in hole 2004-01 is representative of the tenor, 9.25 g/t gold and 958 g/t silver over 0.7 meters. Lateegra has not estimated the true thickness of intercepts but wider assay intervals may be due to oblique intersection of the vein. Drilling in 2004 in-filled the area tested in 2003, delineating the LG vein over a horizontal distance of 750 meters, but a series of step-out holes along strike to the north did not locate the structure. Lateegra believes the vein may be faulted and plans to continue a search for the offset. Exploration is also planned to the south across an icefield where the LG vein likely correlates with the wider Kosciuszko vein (see *Exploration and Mining in BC – 2002, 2003*).

Lateegra Resources Corporation tested a gold-bearing quartz breccia vein, the South zone, with five drill holes on the **Todd Creek** property (104A 001). The late-stage, north-striking vein is up to 3 meters wide and contains coarse chalcopyrite and hematite. Hemlo Gold Mines Inc. explored the property by drilling 57 holes in 1988 and 1989 and estimated an inferred resource in the South zone of 207 000 tonnes grading 5.48 g/t gold. Drill hole SZ04-04 of the current program obtained the deepest intersection drilled in the South zone, 8.55 g/t gold and 0.67% copper over a true width of 1.25 meters. Step-out drilling intersected the gold-bearing vein 500 meters north of previous drilling.

Lateegra Resources Corporation completed a 6-kilometer IP and magnetic survey on the **Poly** claims in the Bear Pass, 42 kilometers northeast of Stewart. The claims are underlain by pyrite and pyrrhotite-bearing hornfels adjacent to a Tertiary pluton. Talus samples of polymetallic vein material contain appreciable precious metals. IP anomalies will be tested by drilling for the source of the mineralized talus.

Pinnacle Mines Ltd. conducted a drilling program on the **Silver Coin** property, 24 km northwest of Stewart, under an agreement with Mountain Boy Minerals Ltd. Silver Coin adjoins the Silver Butte property (104B 150) where previous operators identified five irregular vein stockwork and breccia zones containing gold, silver and base metals. The zones are disrupted by cross-faults and current drilling by Pinnacle in the 'Perseverance zone' may be an extension of one of these zones. Mining in the 35 zone by Westmin Resources Ltd. in 1991 produced 105 000 tonnes of ore grading 7.86 g/t gold and 23.4 g/t silver. In 1995 (prior to NI 43-101) Westmin calculated resources in the Kansas/West Kansas (KWK) zone to be 1 774 000 tonnes grading 2.20 g/t gold based on drilling, underground development and three bulk samples. Pinnacle acquired the Kansas crown grant claim, internal to the Silver Coin property, and subsequently reported a series of drilling results, for example, drill hole #32 intersected 11.8 g/t gold, 32.9 g/t silver, 1.13% zinc over 3.05 meters. No information is available on hole locations, orientation or true thickness of the mineralized zone.

Clarence Brent mined 600 tonnes from a gold-bearing quartz vein on the **Lloyd** property (also known as Mobile, 103P 069) and proposes to process the material in a pilot mill.

## **TERRACE-KITIMAT AREA**

Eagle Plains Resources Ltd. continued exploration for an intrusive-related gold deposit on the 540-unit **Kalum** property 35 km northwest of Terrace. A series of gold-silver vein showings and soil anomalies are related to the contact of Cretaceous plutonic rocks with sedimentary rocks of the Bowser Lake Group. The program comprised a 1500-line kilometer airborne geophysical survey, on-the-ground evaluation of targets and the drilling of 19 holes, totaling 1958 meters. The geophysical survey recovered magnetic and time-domain electromagnetic data. The Rico vein, discovered by Eagle Plains in 2003, is in a contact-parallel fault zone that trends NNW up the steep valley wall north of Mayo Creek (Photo 10). Five holes targeted the vein, hole KRC04005 intersected 11.6 g/t gold over a length of 0.9 meters, beginning at 0.9 meters from surface. At the Misty showing (103I 213), three holes were drilled to test quartz veins in a zone of strongly fractured and sheared granodiorite. Broken rock resulted in difficulty completing the holes and there was one significant



Photo 10. Drill platform under construction at the Rico gold vein showing on the Kalum property.

intersection, 29.7 g/t gold across 0.6 meters. Six holes tested the Chris gold-bearing quartz-arsenopyrite vein (103I 174) over a strike length of about 150 meters, east of previous drilling. One significant intersection was obtained, 16.3 g/t gold over 0.3 meters. Five holes at the Kalum prospect (103I 019) returned a best intercept of 16.6 g/t gold in a 1.1 meter-wide vein.

Northern Continental Resources Inc. acquired the **LCR** claims, located immediately north of the Kalum property, from Eagle Plains Resources to explore for gold in an area previously explored by Amax of Canada Limited for porphyry-type mineralization (103I 021). Northern Continental extended the Kalum geophysical survey by 500 line-kilometers and followed up the results with ground surveys and drilling. A strong copper-molybdenum soil anomaly occurs over an area measuring 1 kilometer long by 400 meters wide and overlies a partly unroofed body of quartz monzonite. A quartz vein stockwork, sparsely mineralized with chalcopyrite and molybdenite, is developed in the intrusion and in adjacent siltstone and greywacke. Three drill holes collared from one site penetrated the quartz-veined sedimentary rocks but did not intersect the intrusion. Previous work and the magnetic data show the stock is located further east. Chalcopyrite is present throughout the holes but overall copper content is low, few samples exceed 1000 parts per million copper, and no gold values were reported. The Shea copper showing was discovered 1.5 km east of the current target area and, based on the magnetic survey, is related to a separate intrusion. Northern Continental plans further drilling of the soil anomaly.

Trade Wind Ventures Inc. conducted soil geochemical and magnetic surveys over the Dardanelle prospect (103I 107), a small past producer of gold ore located on the north side of the Copper River. Quartz veins are developed along both contacts of an aplite dike, the offshoot of a granodiorite pluton. Results of the work are unknown.

## **SMITHERS-HAZELTON AREA**

Firestone Ventures Inc. optioned the **Louise Lake** copper-gold porphyry prospect (93L 079) from Bernard Kreft and drilled six core holes. Previous drilling by Canadian Superior Exploration and New Canamin Resources identified a tabular mineralized zone estimated to contain 50 million tonnes grading 0.3% copper and 0.3 g/t gold. Host rocks are altered felsic volcanic rocks and interbedded conglomerate belonging to the Cretaceous Skeena Group. Firestone intersected copper-gold mineralization in all six holes. Two holes indicate a modest increase in strike extent of the zone and two holes extend the zone below previous drilling. A confirmation hole within the previously known resource returned the best intersection of the program, 0.408% copper, 0.014% molybdenum and 0.401 g/t gold over 158 meters. Firestone plans to complete a new inferred resource calculation and to continue exploration drilling.

Amarc Resources optioned the **Natlan** claims from Lyle West, and staked additional claims, to explore for a porphyry copper deposit. A recently built logging road uncovered an altered and veined Bulkley granodiorite stock.

NDT Ventures Ltd. acquired the **Zymo** porphyry copper prospect (93L 324) 50 km west of Smithers and performed an airborne electromagnetic and magnetic survey late in the year.

## **BABINE AREA**

Pacific Booker Minerals Inc. continued to collect environmental baseline data and contracted a preliminary economic study related to potential development of the **Morrison** porphyry copper deposit (93M 007). The Morrison-Hearne Hill project is in the Environmental Assessment Process. Optimized open pit resources were estimated at 86,892,000 tonnes grading 0.45% copper and 0.257 g/t gold. Waste rock is estimated at 125 million tonnes giving a waste to ore ratio of 1.44. Approximately 97% of the mineral resources are classified as measured and indicated, and the remainder is inferred. Included in the waste is 28,152,000 tonnes grading 0.278% copper and 0.123 g/t gold that would be placed on a low-grade stockpile and processed subject to prevailing metal prices. The optimal milling rate was determined to be 25,000 tonnes per day. A preliminary assessment estimated capital costs at \$175.2 million and the project would generate an after tax rate of return of 14.7% based on an operating (mining and milling) cost of \$6.07 per tonne, copper price of US\$1.10 per pound and gold price of US\$385 per ounce. Geotechnical drill holes and test pit excavations will begin early in 2005 in the proposed tailings storage site, waste rock dumps and open pit. Pacific Booker signed an agreement with Noranda Inc. to buy out all Noranda's interest in the property by making staged payments that total \$3.5 million.

## **HOUSTON-TAHTSA AREA**

Canadian Gold Hunter Corp. drilled five holes at the **Bob Creek** epithermal gold-silver prospect (93L 009) aimed at confirming gold assays from prior drilling. Core could not be located from two holes drilled by Royalstar Resources Ltd. that intersected 0.79 g/t gold over 156.1 meters in one hole and 23.7 g/t gold over 3.0 meters in another. Current drilling intersected felsic tuff and feldspar-quartz porphyry dikes; both lithologies are altered to clay sericite and pyrite, and are cut locally by vuggy quartz-base metal sulphide veins. Assay results were not available.

Canadian Empire Exploration Corp. acquired the **Silver Hope** (93L 256) property immediately south of the past-producing Equity copper-silver-gold mine. Previous exploration traced an extension of the Equity Southern Tail zone over a 2-kilometer strike length in the Hope, Superstition and Gaul zones. An estimated 1800-meter drilling program began in November to test below previous shallow drill holes, in particular a hole that graded 7.88% copper and 105 g/t silver over 3.8 meters, and to test a 400 meter-long copper-silver-mercury geochemical anomaly.

Gold Reach Resources Ltd. explored the **Seel** property (93E 105), 110 km south of Houston, under an earn-in agreement with Grayd Resource Corporation. An IP survey delineated an anomaly that is 1 km wide and at least 1.2 km long. In the northeast part of the anomaly, a previous operator drilled shallow holes, typically 20 to 30 meters deep, into a quartz porphyry stock and breccia zone intersecting up to 1.59% copper and 0.64 g/t gold over 18 meters. A 10-hole, 1500-meter drilling program began in December.

Amarc Resources Ltd. purchased the **Buck** claims 20 km south of Houston. A reconnaissance IP survey in 2003 identified two high contrast anomalies near a RGS gold anomaly. Bedrock is poorly exposed but comprises Tertiary intrusions and volcanic rocks.

Manson Creek Resources Ltd. optioned the **CR** porphyry copper-gold prospect (93L 268, 269) on the west slope of Morice Mountain from Wesley Moll. Backhoe trenching in the South zone exposed mineralized granodiorite that graded 0.25% copper and 0.031% molybdenum over 18 meters. Immediately west, and on strike, a coincident magnetic and copper in soil anomaly may indicate a continuation of the mineralized zone. Work in the North zone also outlined soil and magnetic anomalies centred over outcrops of a copper-bearing intrusion.

Lorne Spence and Ed Westgarde explored the area between two related, porphyry-style occurrences (93L 010 and 93L 011) near Dungate Creek. Previous explorers found chalcopyrite and molybdenite in a Tertiary quartz-feldspar porphyry intrusion and chalcopyrite, sphalerite and galena in a weak but extensive quartz stockwork in pyroclastic rhyolite. Using the same percussion drill,

Spence completed three holes on the LS claims and Westgarde completed two holes on the adjoining Lake claims.

Steve Bell drilled a 72-meter hole on the Palomino property (93L 019) to test a geophysical anomaly. Copper mineralization occurs nearby, as porphyry and vein occurrences. The top of the hole intersected silicified Hazelton volcanic rocks with sparse chalcopyrite.

Barry Hofsink drilled two holes south of the Carrier Road (Silver Streak) silver-copper showing but failed to extend the zone. Gary Thompson completed an IP survey on the Rox claim, under an option agreement with a private company.

Huckleberry Mines Ltd. carried out an 8-kilometer IP and soil geochemical survey on its **Whiting Creek** porphyry molybdenum prospect (93E 112).

## **INDUSTRIAL MINERALS AND GEMSTONES**

Nephrite jade was recovered from waste rock at the former **Cassiar** chrysotile asbestos mine (104P 005) by Cassiar Jade Contracting Ltd. Polar Gemstones Ltd. mined nephrite jade on the **Polar Jade** property (104I 083) near Serpentine Lake. The Jade West Group markets all the jade, mainly to Chinese and Korean buyers.

Hyder Gold Inc. conducted prospecting and sampling on the **Hid** property, 130 kilometers northeast of Dease Lake. The Hid claims were acquired to cover ultramafic diatremes to evaluate their potential to contain diamonds. Four diatremes were located, from 30 to 80 meters in width. Petrographic work concluded these are ultramafic lamprophyres. Probe analysis of 150 chromite grains determined they are unlikely to be associated with diamonds. Chrome diopside, a diamond indicator mineral, is present but scarce. Examination of stream sediment samples indicate that chromites and chrome diopside found in the stream sediment samples are likely derived from the known diatreme exposures and similar occurrences, so that the potential for diamonds is considered low.

## **COAL PROJECTS**

Fortune Minerals Limited submitted a Project Description report to the British Columbia Environmental Assessment office describing plans to mine coal from the **Mount Klappan** property. The proposed surface mining operation is planned for 1.75 million tonnes per year of product for 20 years, which will require mining of 2.6 million tonnes of run-of-mine coal annually. Measured plus indicated resources in the Lost Fox deposit total 217.4 million tonnes of coal. Anthracite coal is a high-value specialty product used for water purification, cooking and heating briquettes and as a reductant in metallurgical processing. Transportation options include

the BC Rail line, which requires 70 kilometers of construction and upgrading of existing track, or a 90 kilometer road to link with Highway 37 at the Bell-Irving River. Shell Canada holds coal-bed methane rights at Klappan and drilled three wells to begin evaluation of the gas resource.

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