

NORTHEAST-CENTRAL REGION

By Bob Lane, PGeo

Regional Geologist, Prince George

SUMMARY

Mineral exploration activity in the Northeast-Central region continued its upward trend in 2003 and reached the highest level since 1996. A much improved investment climate, significantly higher precious metal and base metal commodity prices, and strengthening coal markets all contributed to the recovery. Exploration expenditures jumped to an estimated \$16.2 million, up from \$10.9 million in 2002, and the amount of diamond drilling increased by one-third to about 91 000 metres.

The Wishbone copper-gold zone was the most significant metal discovery made during the year. Wishbone is a well-mineralized hydrothermal breccia that is part of the Mount Polley alkalic porphyry system, near Likely in the Cariboo. Other promising discoveries were the Sickie Creek epithermal vein system on the Pine property and the WG-Gold zone on the Pil property, both in the Toodoggone camp.

The largest exploration drilling program in the region targeted porphyry copper-molybdenum mineralization on the Gibraltar mine property, near McLeese Lake in the Cariboo. Other major metal exploration projects sought gold-enriched porphyry copper deposits, and moderate to high-grade gold vein and replacement systems, including skarns and mantos.

The Kemess North gold-copper deposit was advanced toward a full feasibility assessment, and by the end of the year had entered the province's Environmental Assessment process. A 10 000 tonne underground bulk sample project commenced at the high-grade Bonanza Ledge gold deposit on the Cariboo Gold Quartz property. Several other advanced stage projects in the Peace River Coal Fields are moving toward feasibility, including the Perry Creek (Wolverine) coal project.

Two major open pit mines operated during the year. The Kemess South operation continued to reduce its overall mining costs while increasing throughput and gold and copper production. Higher average gold and copper prices contributed to the success of the operation. Production of gold from the Kemess South mine has now exceeded that of any other British Columbia gold-producing porphyry deposit. Production at the Bullmoose coal mine ended in early April, 2003. During its 20-year operating life, the mine produced and exported approximately 34 million tonnes of high quality metallurgical coal. During its lifetime, the mine played a major role in the economic development of the Tumbler

Ridge area. Several small-scale mines operated intermittently during the year. They included the Shasta silver-gold mine, the Nazko lava rock quarry, the Giscome limestone quarry and the Ahbau railroad ballast quarry.

EXPLORATION TRENDS

An estimated \$16.2 million was spent on exploration in the region (Figure 1) during 2003. This figure is a major increase from last year's total of \$10.9 million, and marks the fourth consecutive increase in annual exploration expenditures for the region. Exploration drilling totaled 90 835 metres in 2003, about 21 000 metres more than last year (Figure 2), again illustrating the four-year positive trend.

In 2003, claim staking in the region was significant. The 6197 mineral claim units staked during the year (Figure 3) were the most since the year 2000, when a staking rush in the Wells-Barkerville area resulted from announcement of the Bonanza Ledge high-grade gold discovery. In 2003, the Toodoggone camp was particularly active with more than 2200 units staked. Only 3189 mineral claim units were forfeited in 2003, the fewest in the last decade. A total of 460 placer claim units were staked while only 222 were forfeited. The 31 coal licenses acquired in the Peace River Coal Fields during the year covered more than 8600 hectares; only 12 were forfeited.

The increase in gold price beyond US\$400 by year's end, and improving silver and base metal prices contributed strongly to rejuvenation of exploration in the region. The search for gold-bearing mineral deposits accounted for about 74% (\$12.4 million) of the exploration dollars spent in the region (Figure 4).

The locations of operating mines, major exploration projects and smaller exploration projects that are believed to have regional significance are shown on Figure 5. There were 19 major exploration projects (those that involved mechanical disturbance and expenditures in excess of \$100 000) carried out in the region in 2003 (Table 1), three fewer than in 2002. Eight of the major programs explored epithermal or mesothermal gold deposits; five evaluated gold-enriched porphyry copper systems; three targeted auriferous skarn mineralization; one targeted copper-molybdenum mineralization; another examined a volcanic redbed copper deposit; and three were major coal projects.

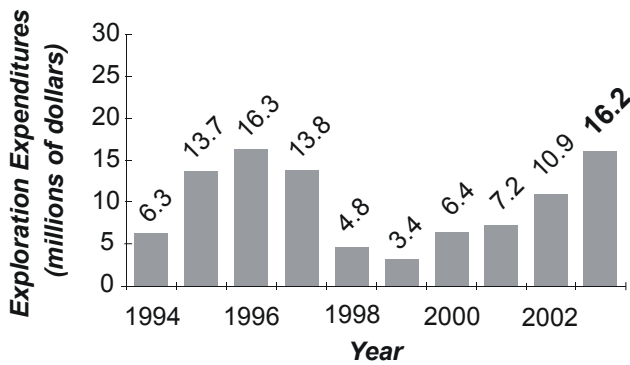


Figure 1. Annual exploration expenditures, Northeast-Central Region.

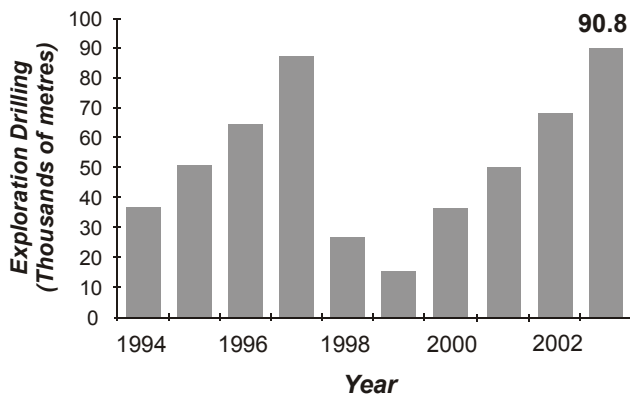


Figure 2. Annual exploration drilling, Northeast-Central Region.

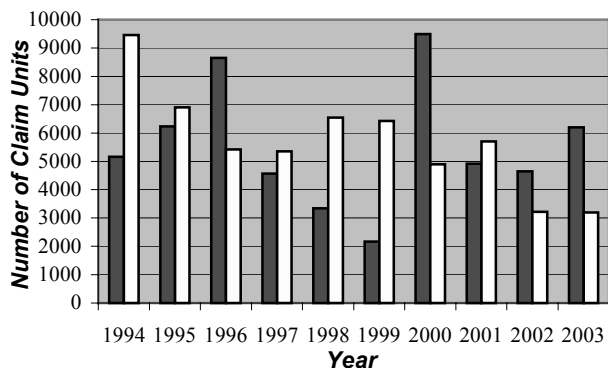


Figure 3. Number of mineral claim units staked (dark bars) versus mineral claim units forfeited (light bars) by year, Northeast-Central Region.

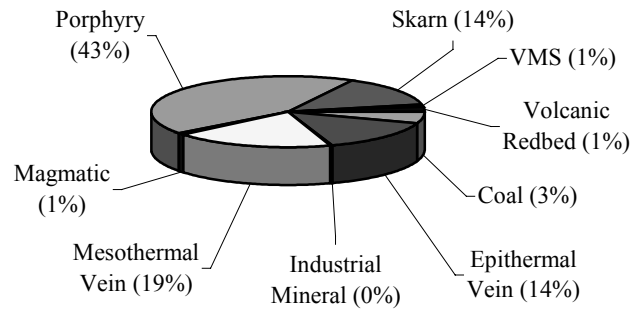


Figure 4. Exploration spending by deposit type (expressed as a percentage of the \$16.2 million total spent in the region).

EXPLORATION PROJECTS

Toodoggone Camp

Exploration activity in the Toodoggone camp continued to increase in 2003—it was the busiest the region has been for many years. Companies targeted both bulk tonnage gold-copper deposits and epithermal gold-silver systems associated with Early Jurassic calc-alkalic intrusions. A major, jointly funded government-industry geophysical survey (gamma ray spectrometer and magnetometer) covered part of the mineral-rich belt in the Toodoggone Camp. Five industry partners contributed funding, and Natural Resources Canada (NRCan) provided staff with geophysical expertise and funding from the Targeted Geoscience Initiative (TGI). At least three companies staked new claim blocks in anticipation of positive survey results. The survey results will be released in April 2004.

Northgate Exploration Ltd. continued its detailed appraisal of the bulk tonnage **Kemess North** (094E 021) porphyry gold-copper deposit (Photo 1) located about 5.5 kilometres north of the Kemess South open pit. Work included oriented core, geotechnical and condemnation drilling, and environmental studies (in support of pre-feasibility and feasibility studies that are required by government as the project enters the Environmental Assessment process). The advanced work identified a ‘mineable resource’ for the Kemess North deposit of 369 million tonnes grading 0.34 g/t Au and 0.18% Cu. The proposed development schedule calls for infrastructure development in 2005, pre-stripping of the deposit in 2006 and mining of ore by the end of 2006. The Kemess North and Kemess South deposits would be mined concurrently until reserves at Kemess South are exhausted in 2009. Mining at Kemess North would continue until 2019. During the final 10 years of operation, annual mill throughput would increase to 34 million tonnes and metal production would average 223 000 ounces of gold and

117 million pounds of copper. The estimated initial capital cost of the project is \$126 million.

Northgate also completed more than 10 000 metres of exploration drilling on Kemess North and several nearby prospects. Twelve holes were drilled at the Nugget porphyry gold-copper prospect, just southwest of the Kemess North deposit. Hole KN-03-12 intersected 419 metres averaging 0.38 g/t Au and 0.13% Cu starting at a depth of just 24 metres. The area of shallow mineralization will be further evaluated for its potential to be a satellite ore body. Two holes were drilled at the Kemess Centre porphyry gold-copper prospect, 3 at the Duncan Ridge silver-copper-zinc skarn and 8 in an area between Duncan Lake and Kemess Lake, referred to as the 'Valley of the Dolls'. Hole DR-03-01 intersected 11.75 metres of garnet-diopside skarn at a down-hole depth of 312 metres that graded 0.8% Cu, 2.24% Zn and 12.7 g/t Ag.



Photo 1. Drill on the Kemess North project.

Northgate also conducted grassroots exploration on its claims. Prospecting late in the field season east-northeast of Kemess North located numerous angular boulders of vein material that are referred to as the Hilda showing. Grab samples from the boulders averaged 5 g/t Au and 44 g/t Ag with anomalous copper, zinc and lead values. The Archie occurrence, located northwest of Duncan Ridge, is a narrow quartz-magnetite vein with visible gold. The company also staked the Bear claim group, which covers a 70 km² area immediately south of and adjoining its existing tenure. Data from an airborne geophysical survey completed over the new claims will assist in guiding future exploration.

In addition, Northgate conducted a five-hole drill program on the **Brenda** (094E 147) porphyry gold-copper property located 25 kilometres northwest of the Kemess South mine. The property, on option from Canasil Resources Inc., is underlain by intermediate volcanics of the Late Triassic Takla Group that are cut by Early Jurassic monzonite dykes. Mineralization, which occurs primarily in propylitically altered andesite, is

associated with quartz-magnetite veinlets and stockwork zones. Drilling was focused near the White Pass zone. Assays from the 2003 drilling included a 161.6 metre intersection in hole BR-03-07 that averaged 0.565 g/t Au and 0.079% Cu. Northgate renewed its option for the 2004 field season.

On the vast **Pine** property, centered about 20 kilometres north of the Kemess South mine, Stealth Minerals Ltd. embarked on an extensive program of prospecting and sampling. Most previous work on the property focused on its porphyry gold-copper potential (094E 016, 045), but the grassroots program discovered a number of very prospective high and low sulphidation epithermal gold prospects (e.g. BeeGee, Sickie Creek and Mess), several polymetallic skarn occurrences, and additional porphyry gold-copper showings (e.g. 10K and Pine North). One of the 2003 discoveries, the Sickie Creek (094E 237) epithermal vein system, produced some spectacular assay results and may have significant regional implications. Mineralization occurs east of the Toodoggone formation within felsic flows and pyroclastics mapped as 'undivided Hazelton Group', although it is suspected that they may be much older, perhaps the Pennsylvanian-Permian Asitka Group. The north-northwesterly trending zone is characterized by several prominent quartz-carbonate-sulphide veins, such as the 570 vein, breccias and stockworks as well as nearby auriferous siliceous sinter and mudstone deposits. The zone is developed within an alteration envelope consisting of quartz, K-feldspar, sericite and carbonate that locally exceeds more than 100 metres in width, has been traced for more five kilometers northward to the Kevin showing, and is part of a 16-kilometre long mineralized corridor. Grab samples assayed up to 100.2 g/t Au and 1185 g/t Ag, and chip samples across several discrete veins (Photo 2) graded as high as 9.5 g/t Au and 407 g/t Ag over 3 metres.

The company also trenched a number of showings and drilled the Wrich Hill (094E 082) and Electrum/Beaver Pond (094E 125) epithermal gold prospects, and the VIP (094E 047, 048) auriferous skarn system. Trenching in 2002 at Wrich Hill and VIP generated encouraging assays, such as 9.4 g/t Au, 22.75 g/t Ag and 0.72% Cu across 6 metres, but drill results from the 2003 program have not been released to date.

Stealth intends to concentrate much of its 2004 exploration program on the Sickie Creek prospect, but will also explore a number of new claim blocks that it staked during the year.

Further north at the **Shasta** (094E 050) epithermal silver-gold deposit, owner Sable Resources Ltd. drilled a number of short holes to further evaluate possible extensions to the JM and Creek zones. Approximately 1400 tonnes of Shasta vein material was mined and processed by Sable at its nearby Baker mill.

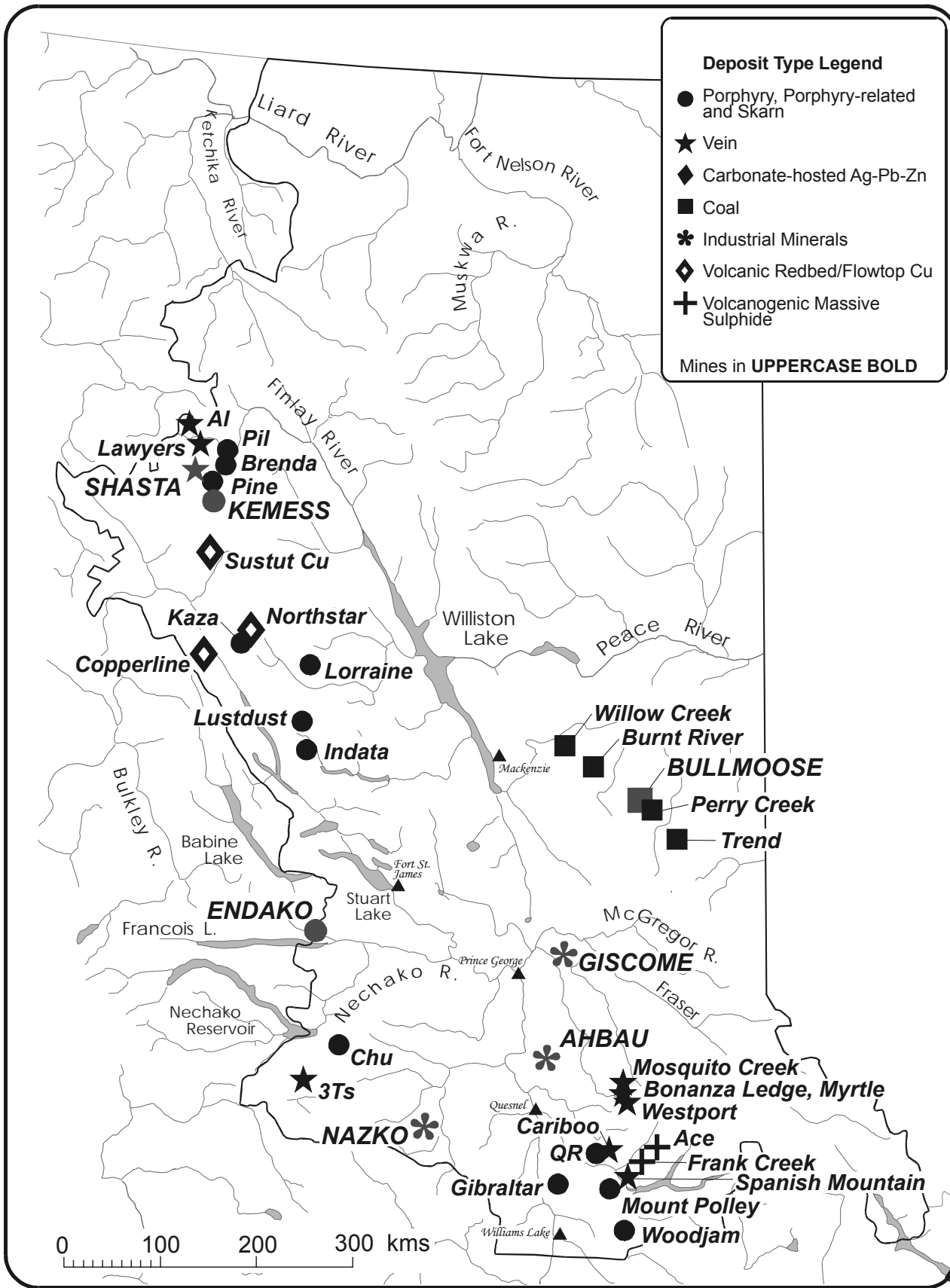


Figure 4. Operating mines, major exploration programs and selected smaller exploration projects carried out in 2003 in the Northeast-Central Region.

TABLE 1. MAJOR EXPLORATION PROJECTS, NORTHEAST–CENTRAL REGION, 2003

Property	Operator	MINFILE	NTS	Commodity	Deposit Type	Work Done
Al	Bishop Resources Ltd	094E 079	94E/06	Au, Ag	High-sulphidation epithermal	10 ddh, 712 m; compilation; deposit modeling
Brenda	Northgate Exploration Ltd	094E 147	94E/07E	Au, Cu	Calcalkalic porphyry	5 ddh, 1485 m
Burnt River	Western Coal Corp	093P 007-008	93P/05W	Coal	Sedimentary	est 11-12 pdh, 1500-2000 m
Cariboo (Most Likely)	Cross Lake Minerals Ltd / Gold Giant Ventures Inc	093A 201	93A/12E	Au, Ag	Epithermal vein	access; grid; geol; geochem; 3D IP; 7 ddh, 1421 m
Cariboo Gold Quartz (Bonanza Ledge)	International Wayside Gold Mines Ltd	093H 019	93H/04E	Au	Replacement	26 ddh, 3037 m; u/g development in support of 10,000 tonne bulk sample
Copperline (Skutsil Knob)	Kit Resources Ltd / Hathor Exploration Ltd	093M 117	93M/15E	Cu	Volcanic redbed	geol; 5 ddh, 444 m
Gibraltar	Taseko Mines Ltd	093B 005-008, 011-013, 051, 061-063	93B/09W	Cu, Mo	Calcalkalic porphyry	194 ddh, 33 746 m
Kemess North	Northgate Exploration Ltd	094E 021	94E/02	Au, Cu	Calcalkalic porphyry	27 ddh, 10 003 m exploration drilling; airborne geophys; infill, geotech & oriented core drilling; pre-feasibility & feasibility studies
Lustdust	Alpha Gold Corp	093N 008, 009	93N/11W	Au, Ag, Zn, Cu, Pb	Skarn, manto, vein	geol; soil geochem; trenching; 42 ddh, 7209 m;
Mosquito Creek Gold	Island Mountain Gold Mines Ltd	093H 010	93H/04E	Au	Replacement, mesothermal vein	geochem; trenching; drill access; 13 ddh, 1397 m
Mount Polley (Northeast, Springer & Bell zones)	Imperial Metals Corp	093A 008	93A/12E	Cu, Au	Alkalic porphyry	trenching & 21 ddh, 4324 m on Northeast zone; 4 ddh, 2601 m on Springer; airborne geophys
Myrtle	International Wayside Gold Mines Ltd	093H 025	93H/04E	Au	Mesothermal vein	planned 15 ddh, 3000 m
Perry Creek (Wolverine)	Western Canadian Coal Corp	093P 015 & 025	93P/03W	Coal	Sedimentary	est 10 rdh, 1000 m; spot coring; pre-feasibility studies
Pil North & Pil South	Finlay Minerals Ltd	094E 029, 083, 213 & 216	94E/07	Cu, Au	Calcalkalic porphyry	grid; prosp; geol; geochem; IP; mag; 3 ddh, 675 m; airborne geophys
Pine (VIP, Wrich Hill, Electrum/ Beaver Pond)	Stealth Minerals Ltd	094E 016, 045, 047-048, 082, 237	94E/02E	Au, Ag, Cu	Porphyry, skarn, high & low-sulphidation epithermal vein	prosp; geol; grid; geochem; IP; mag; airborne geophys; trench; 20 ddh, 2931 m;
QR	Cross Lake Minerals Ltd / Gold Giant Ventures Inc	093A 121	93A/12W	Au	Skarn (propylite)	grid; 3D IP; mag; geochem; drill access; 18 ddh, 2893 m; scoping study
3Ts (Tsacha, Tam & Taken)	Southern Rio Resources Ltd	093F 055, 068	93F/02W, 03E	Au, Ag	Epithermal vein	prosp; geochem; seismic; radar; excavator trenching; drill access; 22 ddh, 3272 m
Trend (Roman Mtn.)	NEMI Northern Energy & Mining Inc	093I 030	93I/15W	Coal	Sedimentary	37 rdh, 3500 m; spot coring; trenching; pre-feasibility studies
Westport	Williams Creek Explorations Ltd	093H 027, 034	93H/04E	Au	Mesothermal vein, replacement	drill access; 5 ddh, 1007 m; IP

Finlay Minerals Ltd. explored its **Pil North** (094E 029, 083, 213 & 216) property, centered approximately 35 kilometres north of the Kemess South mine, for bulk tonnage porphyry copper-gold mineralization. The company carried out a surface exploration program consisting of prospecting, mapping, and geochemical sampling, and 18 line-kilometres of Induced Polarization and magnetometer surveys. The property is underlain primarily by phases of the Early Jurassic Black Lake intrusive suite. The work expanded the NW zone. It is characterized by a 200 x 600 metre Induced Polarization chargeability anomaly that is coincident with a strong copper-gold soil geochemical anomaly and pronounced leaching and alteration of the underlying monzonite (Photo 3). The surface program also led to discovery of

the NW Extension, a quartz-barite stockwork anomalous in copper and lead, and the WG-Gold zone, a well-developed northwest-trending quartz±barite breccia and stockwork zone within phyllic-altered quartz diorite. The latter is estimated to be more than 100 metres wide and has been traced for more than one kilometre; quartz float assayed up to 16.8 g/t Au. Finlay Minerals also drilled four holes to test a coincident magnetic high, Induced Polarization chargeability and copper-gold geochemical anomaly on its adjoining **Pil South** property. The bore holes encountered badly broken to shattered rock and only one reached its target depth. That one intersected weakly propylitized andesitic flows and tuffs of the Triassic Takla Group that are cut by widely-spaced quartz-magnetite-pyrite±chalcopyrite±sphalerite veins.



Photo 2. Dave Kuran surveys the 570 quartz-carbonate-sulphide vein, part of the Sickie Creek epithermal gold-silver prospect, Pine property. Photo courtesy of David Blann, Stealth Minerals Ltd.



Photo 3. Larry Diakow, project geologist with BC Ministry of Energy and Mines, discusses the regional geology of the Pil property with Robert Brown, geologist for Finlay Minerals Ltd.

Bishop Resources Ltd. completed a tightly spaced 10-hole diamond drill program on the **Al** (094E 079) property, optioned from Guardsmen Resources Ltd. Drilling took place on the Bonanza zone near the Ghost pit that was excavated by Cheni Resources Ltd. in 1991. This small, high-sulphidation epithermal deposit has yielded some striking native gold specimens in the past,

and visible gold was observed in core from three of the ten holes. Gold is associated with base metal sulphides. High-grade intersections from the program included 5.8 m grading 27.85 g/t Au in hole A03-07, and 13.7 m grading 17.45 g/t Au in hole A03-09. The company has raised funds to support future exploration on the property.

Guardsmen also vended the former **Lawyers** (094E 066) epithermal gold-silver mine to Bishop Resources Ltd. This reclaimed underground mine was operated by Cheni Resources Ltd. from 1989 until 1992 and produced more than 171 000 ounces of gold and 3.55 million ounces of silver. In 2003, Guardsmen completed a month-long program of prospecting, geochemical sampling and minor trenching. The program generated encouraging assay results, particularly in an area that may represent a southern extension to the mined AGB zone. A channel sample across the zone averaged 5.13 g/t Au and 20.8 g/t Ag over 27 metres.

Omineca Mountains

Doublestar Resources Ltd. decided to reassess elements of a \$20 million production scenario outlined in a 2003 feasibility study on its **Sustut** (094D 063) volcanic redbed copper project located 40 kilometres south of the Kemess South mine. The Southeast zone comprises a diluted mineable resource of 6.3 million tonnes grading 1.64% Cu and 5.42 g/t Ag. Doublestar's formal partnership arrangement with Procon Mining and Tunneling Ltd. and Northgate Exploration Ltd. has been dissolved.

The **Copperline** (Skutsil Knob, 093M 117) volcanic redbed copper prospect, located in the Driftwood Range 120 km northeast of Smithers, was re-evaluated by Kit Resources Ltd. and joint venture partner Hathor Exploration Ltd. The companies drilled three holes to confirm and expand the previously identified Main zone, and two holes to test the West zone, which is 1.2 km to the southwest. Mineralization consists of 5 to 10% fine-grained disseminated and stringer bornite, tetrahedrite, chalcopyrite, chalcocite and rare native copper within subaerial, calc-alkalic volcanics of the Lower Jurassic Telkwa Formation. Drill hole CL-16 intersected two well mineralized zones on the Main zone that are 13 metres apart. The upper interval averaged 0.812% Cu and 25.8 g/t Ag over 14.3 metres and the lower interval averaged 0.385% Cu and 13.3 g/t Ag over 21.0 metres.

Northern Hemisphere Development Corp. conducted an Induced Polarization survey, bedrock mapping and geochemical sampling on its **Kaza** (093M 111) copper-gold-silver skarn property, 30 kilometres due north of Takla Lake. Felsic dykes intrude andesites of the Lower Jurassic Telkwa Formation on the property. The work extended the central mineralized zone along trend to the north-northwest and south-southeast, and identified several sub-parallel magnetite-rich zones that produced encouraging grab sample assays. One sample assayed

2.30% Cu, 5.81 g/t Au and 26.6 g/t Ag. The company also explored the adjoining **Northstar** (Fred, 094D 032) property, where north-trending chalcocite-bornite veins and stockwork zones occur within bladed feldspar porphyry flows, tuffs, and related sediments of the Triassic Takla Group. Chip sampling across these structures produced assays up to 4.69% Cu and 33.2 g/t Ag over 2.3 metres. Drilling is planned for both properties in 2004.

Wildrose Resources Ltd. conducted a bedrock mapping, prospecting and geochemical sampling program on the **Carruthers Pass** (094D 172) volcanogenic massive sulphide property. The property, which is located about 70 km south of the Kemess South mine, is an option from Phelps Dodge of Canada Limited. The program followed up encouraging contour soil geochemical results that Phelps Dodge obtained during earlier exploration efforts. Late in the year Wildrose optioned the claims to MaxTech Ventures Ltd. who plan to carry out a multiparameter airborne geophysical survey in 2004.

Eastfield Resources Ltd. did not explore its **Lorraine** (093N 002, 066, 224) alkalic porphyry copper-gold property in 2003. However, the property, which is located in the Omineca Mountains northwest of Germansen Landing, caught the attention of several mining companies, each of whom toured the property and examined its database. A 2004 drill program is anticipated.

Eastfield Resources vended its **Indata** (093N 092) property, located 40 kilometres southeast of Takla Landing, to Castillian Resources Inc. In the ensuing exploration program two grids were extended and soil sampling and Induced Polarization surveys were completed over the Albert Lake porphyry copper-gold prospect. The geochemical data expanded the copper anomaly, and spot arsenic and antimony highs suggest the presence of precious metal veins similar to those identified on the eastern part of the property.

Minterra Resource Corp. optioned the **Star** magmatic platinum group element property, located 13 km from Aiken Lake in the Lay Range, from Ursala Mowat. The company proceeded with an eight line-km Induced Polarization survey that identified a number of drill targets. Platinum and palladium-bearing disseminated magmatic sulphide mineralization, mainly chalcopyrite and pyrrhotite, occurs within shallow dipping sheets of olivine clinopyroxenite and pyroxenite of the Polaris Ultramafic Complex.

Prospectors Dave Hayward and Gary Lee returned to their **Nina** (093N 011) volcanogenic massive sulphide prospect, north of Germansen Landing. They blasted several trenches in the hope of exposing new showings. No results have been released to date.

Alpha Gold Corp. drilled three styles of mineralization on its **Lustdust** (093N 009) polymetallic prospect, located 210 kilometres north-northwest of Prince George and immediately west of the Pinchi fault. The property is underlain by deformed oceanic rocks of the Cache Creek Terrane that have been intruded and altered by the Eocene Glover monzonite stock and a series of related feldspar megacrystic dikes and sills. Drilling intersected the north-trending No. 1 zone over a strike length of 750 metres. It is a structurally controlled vein and replacement body that includes the former Takla Silver mine. Encouraging gold, silver and base metal mineralization was intersected over widths of 0.5 to 7.4 metres within a 450 metre long section. For example, hole LD03-09 intersected 5.0 metres averaging 13.3 g/t Au, 899 g/t Ag, 1.1% Pb and 5.7% Zn. The No. 3 zone is an intensely oxidized gold-bearing manto deposit (Photo 4). It too has a northerly trend and occurs within grey dolomitized limestone. Wall rock is typically discoloured to a pale brown tones and has been decalcified. Surprisingly, the manto is oxidized to depths of more than 100 metres. The richest gold grades from this zone occurred in hole LD03-30 that averaged 20.5 g/t Au and 194 g/t Ag over 5.2 metres. The Canyon zone, a well-developed proximal skarn prospect, was the focus of recent drilling by Alpha. Work in 2003 confirmed the deeper, high-grade potential of this promising auriferous copper skarn body. Hole LD03-35 intersected 3.7 metres averaging 3.6 g/t Au, 64 g/t Ag and 5.2% Cu. The company also conducted a broad, grid-based soil sampling and bedrock mapping program that covered not only the Dream Creek area north of the Canyon skarn zone but also part of the Pinchi fault system at the former Bralorne Takla mercury mine.



Photo 4. Consulting geologist Jim Oliver examining oxidized manto mineralization at the No. 3 zone, Lustdust property.

Peace River Coal Fields

In 2003, exploration and deposit appraisal continued at the Burnt River, Perry Creek and Trend properties in the Peace River Coal Fields. Each property has near-term

development potential. The more advanced Willow Creek project was inactive, but a number of recent corporate changes may enable the company to reach a production decision. Strengthening coal markets, driven in part by China becoming a net importer of coking coal, coupled with the purchase of BC Rail by CN Rail, may have a positive impact on the economic viability of these deposits.

Pine Valley Mining Corporation (formerly Globaltex Industries Inc.) will purchase Mitsui Matsushima Canada Ltd.'s 1/3 interest in the project to gain 100% ownership of the Willow Creek (093O 008) coal project. The purchase price must be made in a series of scheduled payments that total Cdn\$6 million by June, 2005. Completing the deal will enable Pine Valley to regain the exclusive right to market the Pulverized Coal Injection (or PCI) product. Test mining in 2001 and 2002 produced 84 400 tonnes of coal that was shipped to Japan. Tests have shown that the Willow Creek medium volatile bituminous coal can produce a PCI product with qualities that are as good as, or better than, the current benchmark. The Willow Creek coal measures occur within the Cretaceous Gething Formation on the east limb of the Peace River anticline. Current mineable reserves for the property total 12.3 million tonnes. A review of the final feasibility study, completed in September 2002, identified a total capital requirement of approximately Cdn\$18 million. Subject to financing, the company plans to initiate production in the first half of 2004 at a rate of 500 000 tonnes per year then ramp up to the permitted level of 900 000 tonnes per year. Estimated mine life of the project is 14 years.

In 2003, Pine Valley hired Norwest Corporation to evaluate the coal reserve potential of its adjacent **Pine Pass** (093O 007) property. Norwest's report indicated that 9.5 million tonnes of coal could be recovered from two pits using low-cost surface mining methods. The coal seams correlate with those at Willow Creek, but more coal quality testing is required to accurately characterize the Pine Pass material. Production at Pine Pass could supplement that of Willow Creek.

Late in 2003, Western Canadian Coal Corp. initiated a 10 to 12-hole rotary and core drilling program on its **Burnt River** (093P 007 & 008) coal property, located 50 kilometres southwest of Chetwynd. In 1981, Teck Corporation identified a resource of 23 million tonnes of low-strip ratio Gething Formation coal on the property. Geological bedrock mapping and exploration drilling completed in 2001 and 2002 by Western confirmed that the coal measures continue along the northwest trend of the Dillon Anticline thereby increasing the potential for additional low strip ratio coal. Western believes that the high carbon and high energy content coals of the main deposit at Burnt River are well-suited to the expanding low-volatile, pulverized coal injection (PCI) market. Western has advanced planning for its Burnt River project

based on annual production of 750 000 tonnes over a 10 year mine life.

Western Canadian Coal Corp. filed a revised project description report with the province's Environmental Assessment Office for its Wolverine metallurgical coal project. The cornerstone of the plan is development of the **Perry Creek** (093P 025) deposit that is located between the former Quintette and Bullmoose mines near Tumbler Ridge. The coal measures, which occur within the Lower Cretaceous Gates Formation in a gently southeast plunging open syncline, have a medium-volatile bituminous rank. The new plan, based on a resource of 17.4 million run-of-mine tonnes, features open pit mining for the first 8 years of operation at a rate of 1.6 million tonnes per annum. According to the proposal, open pit development of the nearby **EB** (093P 015) deposit, with a resource of 8.21 million run-of-mine tonnes, would proceed concurrently. Underground development of the remaining resource at Perry Creek would be considered following completion of open pit mining. In 2003, Western continued with its rotary and core drilling program. Coring of the seams produced enough coal to facilitate one coke test. The company plans to return to the property early in 2004 for an expanded coring program to recover enough coal to satisfy a number of requests from potential customers, and to run a pilot scale wash plant test.

NEMI Northern Energy & Mining Inc. (formerly Consolidated Goldbank Ventures Ltd.) completed a major trenching, rotary drilling and coring exploration program, on its **Trend** (093I 030) metallurgical coal property (Photo 5) 25 km southeast of the inactive Quintette mine. The property is divided geographically into the South, Roman, Extension and Hambler areas or blocks. Past exploration outlined an inferred resource of 30 million tonnes on the South block and 27 million tonnes on the Roman block. The southerly continuation of coal seams identified on the South block occur in the Extension and Hambler blocks, and may greatly expand the overall resource of the property. The coal measures are within the Middle Gates Member. Five seams (D, E, F, G/I and J), all greater than one metre thick, occur in a steeply northeast-dipping homocline. These five seams have a cumulative thickness of more than 15 metres on the South block. Drilling on the Extension block in 2003 showed that the cumulative thickness of the five seams reaches 18 metres there, and that seams D and F merge to form a single 12-metre thick seam. Coring of each of the five coal seams produced approximately 150 kg of material that will be evaluated for a range of characteristics, including ash chemistry which has a significant impact on the CSR (Coal Strength after Reaction) value. Analysis of cuttings from rotary drilling will provide data for acid-base accounting and potential acid rock drainage characteristics of the host rock. The company plans to complete a preliminary feasibility study that will update the property's coal resource and form the basis for further work.

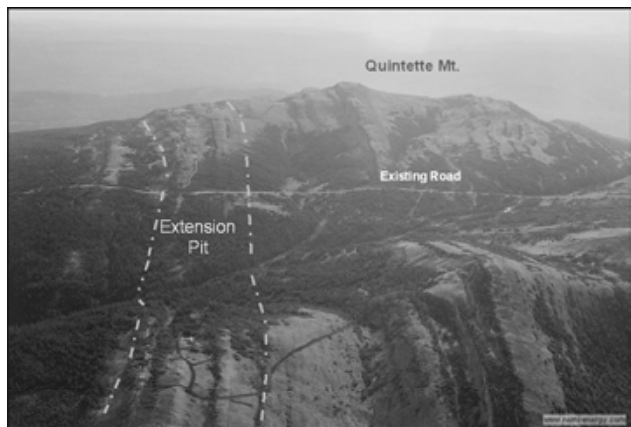


Photo 5. View of the Extension block, Trend property. Photo courtesy of NEMI Northern Energy & Mining Inc.

NEMI acquired a total of 16 coal licenses that cover the **Saxon East** (093I 016), **Saxon South** and **Omega** properties and expand the Trend property. Considerable exploration has been conducted in the past on Saxon East and Omega, and resources have been outlined on both properties.

Nechako Plateau

One major drill program and several smaller projects targeted epithermal gold-silver deposits in the Nechako Plateau area. Prospecting and re-evaluation for several other deposit types also took place.

The **3Ts** property of Southern Rio Resources Ltd. hosts a northerly-trending, low-sulphidation epithermal gold-silver quartz vein system. It is on the Nechako Plateau approximately 120 kilometres south of Vanderhoof and includes the Tsacha (093F 055), Tam (093F 068) and Taken claim groups. Exploration identified nine discrete mineralized veins. The veins cut variably welded rhyolite of the Jurassic Naglico formation and are themselves intruded by a Late Cretaceous microdiorite sill. In November 2002, the company released a revised (43-101 compliant) 'inferred resource' estimate for the main Tommy vein of 470 000 tonnes averaging 7.4 g/t Au and 65.22 g/t Ag (using a cut-off grade of 4.0 g/t Au). In 2003, the company conducted two phases of drilling primarily targeting the Ted and Mint veins on the Tam claims. Drilling on approximate 25-metre centers intersected the Ted vein (Photo 6) along a strike length of 350 metres. Mineralized intersections include 10 metres grading 4.65 g/t Au and 552.7 g/t Ag within a 17.05 metre interval that averaged 3.84 g/t Au and 364.6 g/t Ag. The true width of the zone, locally including marginal stockworks and silicified wallrock, reaches 14 metres. The data will be used to establish a resource figure for a portion of the vein.

Prospecting of the Taken claims resulted in discovery of a cluster of large, sub-angular quartz vein boulders that comprise the Ringer zone. Sampling of the float yielded a



Photo 6. Banded quartz-sulphide mineralization, Ted vein, 3Ts property.

number of impressive assays with values ranging up to 53.7 g/t Au and 332 g/t Ag. Follow-up trenching was unable to reach bedrock, so seismic and ground penetrating radar (GPR) surveys were employed to determine overburden depth. Future work will include trenching and drilling up-ice from the Ringer zone in an attempt to locate the source of the high-grade boulders.

Nustar Resources Inc. evaluated the **Chu** (093F 001) porphyry molybdenum prospect, located about 90 kilometres south-southwest of Vanderhoof. The Chu property covers the contact zone between an Eocene granitic to granodioritic pluton and hornfelsed sedimentary and volcanic rocks of the Jurassic Hazelton Group. Mineralization consists of molybdenite with minor pyrite, pyrrhotite and chalcopyrite as disseminations and coatings along fractures, mainly in biotite-altered argillite. The company sampled and re-assayed core from a 1970 Rio Tinto drilling campaign, and also conducted geological mapping, geochemical sampling and geophysical surveys.

Bard Ventures Ltd. completed modest Induced Polarization survey programs on the **Laidman** (093F 067) and **Clisbako** (093C 016) epithermal gold prospects. At Laidman, where stockworks of quartz-pyrite occur in a quartz monzonite of the Cretaceous Capoose Batholith, the survey outlined several high-level geophysical anomalies over the Discovery, 110, and West Trench zones. These merit further exploration. At Clisbako, felsic volcanics of the Eocene Ootsa Lake Group host a well-developed epithermal system. Surveys took place over the Discovery and Brooks grids, where past prospecting located anomalous gold values from both float and bedrock mineralization.

Cariboo

Exploration activity in the Cariboo increased dramatically in 2003. Major projects were conducted at

the region's three dormant metal mines, and each produced exciting results that generated renewed optimism for the future of bulk tonnage deposits in the area.

Two helicopter-borne multiparameter (gamma ray spectrometer and magnetometer) geophysical surveys were flown over parts of the central Quesnel Trough in September. The Horsefly survey covered more than 800 square kilometres of ground highly prospective for alkalic porphyry copper-gold mineralization. The adjoining Mount Polley survey covered almost 70 square kilometres of tenure owned by Imperial Metals Corporation. Results from the survey will be released in March 2004. An underground bulk sampling program on the Cariboo Gold Quartz property in the Wells-Barkerville gold belt, stimulated exploration for bonanza-grade gold mineralization, primarily within metasedimentary rocks of the Paleozoic Snowshoe Group.

The **Wishbone** or Northeast (093A 164) zone, discovered by Imperial Metals Corporation is likely British Columbia's most significant mineral discovery in 2003. The zone (Photo 7) occurs on the company's mineral claims that are contiguous with its **Mount Polley** (093A 008) mine lease. It is about 1.5 km from the partly mined Bell pit, and less than three km from the 20 000 tonne per day mill at Imperial's dormant Mount Polley open pit alkalic porphyry copper-gold mine. Trenching and tightly spaced diamond drilling outlined a northwest striking zone with a minimum length of 325 metres, an apparent width of 100 metres, and a down dip extension of more than 200 metres. All but three of the twenty-one holes drilled intersected impressive intervals of well-mineralized hydrothermal breccia.

Hole WB03-01 cut 57 metres with grades of 2.54 % Cu, 1.15 g/t Au and 17.4 g/t Ag, and hole WB03-19, the furthest along trend to the southeast, intersected 119.7 metres grading 1.02% Cu, 0.20 g/t Au and 9.61 g/t Ag. Intensely potassic-altered, 'crackled' to brecciated monzonite and plagioclase porphyry comprise the zone. Chalcopyrite is the main sulphide phase, but bornite is locally abundant—a feature that distinguishes the Wishbone zone from the other known deposits at Mount Polley. Magnetite is uncommon and, unlike the Cariboo and Bell deposits, the Wishbone zone does not have a magnetic geophysical signature. The zone has an apparent average grade of more than 1% Cu, about 0.4 g/t Au, and 7.5 g/t Ag. At present metal prices, the zone would be suitable as a 'starter' pit.

Late season trenching uncovered copper-gold mineralization at several other locations that may extend the Wishbone zone well to the southeast. There may also be potential for additional zones to the southwest. Future exploration will include reevaluation of several nearby zones, such as the Road zone and may include a reinvestigation of the **Lloyd 2** deposit, where Big Valley Resources Inc. outlined a geological resource of 2.93

million tonnes grading 0.53% Cu and 0.40 g/t Au in the mid to late-1990's. Both prospects lie a short distance north of the Wishbone zone.



Photo 7. Pat McAndless, VP of Exploration for Imperial Metals Corporation, and Mike Cathro, Regional Geologist with BC Ministry of Energy & Mines, examine mineralization at the Wishbone (Northeast) zone, Mount Polley property.

In a related program, four holes were drilled to test the potential below the current planned pit on the unmined Springer zone. The first hole, which was vertical, was mineralized over its entire 466.3 metre length. It averaged 0.61% Cu and 0.49 g/t Au for the 267.5 metres it extended beneath the existing pit design depth. The company recently raised C\$10 million to support an expanded exploration drill program on the Wishbone area, and to further explore the potential for economic mineralization beneath both the Springer zone and the Bell pit. The Cariboo pit has been mined out. The mine was commissioned in 1997 and was placed on "care-and-maintenance" in September 2001, after producing approximately 60 781 tonnes (134 million pounds) of copper and 11 518 kg (370 300 ounces) of gold. The combined 'remaining probable reserves' at the Springer and Bell zones is 18.7 million tonnes grading 0.397% Cu and 0.385 g/t Au. If column leach testing of high oxide copper mineralization from the upper part of the Springer zone is successful, it may lead to development of a heap leach facility at the mine.

Taseko Mines Ltd. completed the largest diamond drilling program in the region on its **Gibraltar** (093B 005-008, 011-013, 051, 061-063) property, east of McLeese Lake. The property surrounds the inactive Gibraltar mine, which has been on standby status since 1998. Gibraltar has a 35 000 tonne per day mill. The mine opened in 1972 and during its 27 years of operation produced approximately 876 794 tonnes (1933 million pounds) of copper and 9026 tonnes (19.9 million pounds) of molybdenum from four open pits (Gibraltar West, Gibraltar East, Granite Lake and Pollyanna). The property's existing proven and probable reserves as of

December 31, 1998, were 148.7 million tonnes averaging 0.305% Cu and 0.01% Mo. The deposits occur within the Early Triassic Granite Mountain pluton, a zoned subalkalic porphyry copper-molybdenum system. Mineralization is developed mainly in the Mine Phase tonalite within a broad zone of shearing and well-developed sericite and chlorite alteration.

More than 33 500 metres of drilling targeted a series of zones within a pronounced, deposit-sized Induced Polarization geophysical anomaly. The anomaly extends along the eastern and northern perimeters of the area of the main deposits. In some cases, the targets are further defined by significant intersections of copper mineralization encountered in widely spaced holes from previous drilling campaigns. The primary target was the 98 Oxide Zone (Photo 8), centred about 1.1 km east-northeast of the Pollyanna pit. Hole 98-05 intersected two zones of copper mineralization, and enriched copper oxide mineralization, averaging about 0.5% copper, was encountered in the upper part of the hole to a depth of approximately 30 metres.



Photo 8. Drill set-up on 98 Oxide zone, Gibraltar property. Photo courtesy of George Barker, Gibraltar Mines Ltd.

The 98 Oxide zone occurs in propylitically altered and strongly foliated quartz-rich granodiorite or trondjemite. Oxide minerals are dominated by malachite, azurite, cuprite and tenorite, and chalcopyrite occurs with pyrite and molybdenum in late, cross-cutting quartz veins. The hope is that the zone will contain a copper oxide deposit of sufficient size to support resumption of Gibraltar's 10 million pound per year capacity solvent extraction-electrowinning plant. An Induced Polarization anomaly measuring 1200 metres by 600 metres, located about 1.2 km southeast of the 98 Oxide zone, was also drilled. Other drill targets included the TK Zinc and Highway zones. Late in the year, Taseko announced that it may be able to borrow between \$18.5 and \$35 million from its reclamation fund to help restart the mine.

At the dormant **QR** gold mine (093A 121), located 58 kilometres southeast of Quesnel, Cross Lake Minerals Ltd. and joint venture partner Gold Giant Ventures Inc. continued to re-evaluate the property's existing reserve and resource base, and also explored several prospective areas of the property. The junior companies are in the process of purchasing the mine site from Kinross Gold Corporation. Mineralization at QR occurs in propylitically altered, epidote-rich basaltic tuffs and fragmental volcanic rocks (Photo 9) of the Late Triassic Nicola Group near an Early Jurassic diorite stock. QR operated from 1995 to 1998 and produced 120 030 ounces of gold, both from open pit mining of the Main and West zones and from underground development of the Midwest zone (Photo 9). The existing on-site resource is estimated to be 900 000 tonnes averaging 3.1 g/t Au. Work completed in 2002 and 2003 is expected to provide additional near surface resources on the Northwest and central West zones. The open pit potential of the Northwest zone was indicated last year by several drill intersections, including hole CL-02-2007 that cut 16.7 metres averaging 4.71 g/t Au.



Photo 9. Aerial view of the Main zone pit and infrastructure at the dormant QR gold mine. Photo courtesy of Ken MacDonald, BC Ministry of Energy and Mines.

A 3D Inversion Induced Polarization survey identified a chargeability anomaly 400 metres east of the mined Main zone. The new target is projected to occur at a depth of about 100 metres below surface at the contact between basalt and overlying siltstone. In December 2003, one diamond drill hole tested this deep target while ten other holes tested both the near surface and down dip potential of the partially mined Midwest zone. The latter holes followed up positive results from drilling that took place earlier in the year, including a shallow intersection that graded 5.1 g/t Au over 15.0 metres. Assay results from the December program had not been released at the time of writing. Drilling is expected to resume in February, 2004.

On the **Cariboo** (093A 201) property, operator Cross Lake Minerals Ltd. drilled an epithermal gold target first identified by Corona Gold Corporation in 1989. Corona diamond drill hole 89-6 intersected 8.5 metres of quartz-

carbonate vein material averaging 5.26 g/t Au. Results from the 2003 Cross Lake drilling program have not been released. The company also examined its **Cantin Creek** epithermal gold prospect. Assays from two drill holes completed in 2003 have not been released.

Skygold Ventures Ltd. and joint-venture partner Wildrose Resources funded extensive soil geochemical sampling and a 23 line-kilometre Induced Polarization survey over a broad area on the **Spanish Mountain** (093A 043) gold prospect near Likely. Several gold anomalies were outlined that have coincident elevated arsenic and molybdenum values. The main anomaly follows a northwesterly trend that lines up with the LE zone. In 2000, Imperial Metals Corporation mined a 1900 tonne test sample from LE that averaged 3.1 g/t Au. Host rocks are the basal black clastics of the Triassic Quesnel Group. Mineralization occurs mainly as stringers and stockworks of pyrite +/- quartz and locally as discrete visible gold-bearing quartz-sulphide veins; some, like the "M" vein, can exceed more than one metre in width. Prospecting discovered a new 0.3 m wide quartz vein 1.3 km south of the LE zone that assayed 156.7 g/t Au. Trenching and drilling are planned to evaluate the established trends in 2004.

Platinum Group Metals Ltd. and Sydney Resource Corporation outlined a 1.5 kilometre long northwest-trending gold, silver and base-metal soil anomaly on the **Simlock Creek** gold property, east of Yanks Peak. The property, which has a history of placer gold mining, is underlain by Downie Succession metasedimentary rocks. Lenses of mineralized limestone and six gold-bearing mesothermal veins occurrences have been identified within the trend; locally these produce bonanza-grade assays, for example, a 160 cm chip sample grading 78.38 g/t Au.

Fjordland Exploration Inc. completed three diamond drill holes on the **Woodjam** (093A 078) gold-enriched alkalic porphyry prospect, near Horsefly. The property is optioned from Wildrose Resources Ltd. who remain the operator. The property is underlain by intermediate flows of the Late Triassic to Early Jurassic Nicola Group that have been intruded, altered and locally mineralized by phases of the Early Jurassic Takomkane batholith. Hole 03-30, collared 810 metres east of the Megabuck prospect near the eastern end of a two kilometer-long chargeability anomaly, intersected 15.4 metres of pyrite-chalcocopyrite stockwork with epidote-altered fine-grained andesite that graded 0.90% Cu and 0.04 g/t Au. The intersection is significant in that it may represent an extension of mineralization from the Megabuck prospect where previous drilling encountered intersections as high as 1.39 g/t Au and 0.13% Cu over 58 metres.

Early in the year, Phelps Dodge Corporation of Canada Ltd. completed one drill hole on the **Rim** (Dot Com) property, located just west of Horsefly. The property, which is optioned from Herb Wahl and Jack

Brown-John, is underlain by basalt, analcite-bearing amygdaloidal flows, breccias and clastics of the Late Triassic to Early Jurassic Nicola Group. Mineralization consists of disseminations and narrow stringers of native copper, with lesser bornite and chalcocite. Results from the drilling program were not made public.

Otish Mountain Explorations Inc. examined the **Stope Baby** polymetallic vein system, which is exposed in Moffat Creek canyon 5 kilometres south of Horsefly. The company extended existing grids and completed approximately 30 line-kilometres of Induced Polarization and magnetic surveys. The vein system could represent the distal portion of a buried bulk-tonnage porphyry deposit.

East of Likely, Barker Minerals Ltd. conducted modest trenching, geological mapping and geochemical sampling programs on its **Ace** (093A 142), **Frank Creek** (093A 152), **SCR** and **Rollie Creek** volcanogenic massive sulphide (VMS) prospects. The showings occur within metasedimentary rocks of the Harvey's Ridge Succession. A 0.77-metre chip sample across the F-1 massive sulphide lens at the Frank Creek prospect graded 2.1% Cu, 0.34% Zn, 0.11% Pb and 69 g/t Au.

The company also investigated its Black Bear property that includes the former **Providence** (093A 003) underground silver-lead mine. Past production from the mine was about 79 500 grams silver, 62 grams gold, more than 11 000 kilograms lead, and 43 kilograms zinc. Mineralization consists of argentiferous galena with pyrite, minor sphalerite and gold in several gently dipping quartz veins within felsic tuffs of the basal Nicola Group.

At Wells, International Wayside Gold Mines Ltd. commenced development of a 140-metre long decline to access the high grade **Bonanza Ledge** gold zone on its **Cariboo Gold Quartz** property (093H 019). The mineralized zone is up to 30 metres across and occurs within an overturned, northeast dipping sequence of metamorphosed turbidites, carbonates and tuffaceous rocks of the Paleozoic Snowshoe Group. Bonanza Ledge mineralization consists of multiple semi-massive to massive bands that are individually up to 0.75 metres thick of fine to medium-grained pyrite that has preferentially replaced carbonate layers within a thinly laminated, tan-coloured muscovite-rich phyllite.

The portal (Photo 10) was collared in October following completion of a detailed surface drilling program that further characterized the zone. Underground development reached the mineralized zone during the first week of January 2004, and material was stockpiled prior to being shipped to Imperial Metal's Mount Polley mill for processing. The company is permitted to extract a 10 000 tonne bulk sample. The projected head grade of the bulk sample will be about 23 g/t Au. It is expected that the company will complete the bulk sample in the first quarter of 2004. Characterization of different ore and waste rock types will be conducted to provide base-line

data that is required for an expanded underground development program.



Photo 10. Bonanza Ledge portal, Cariboo Gold Quartz property.

The Bonanza Ledge zone has an indicated resource of 337 500 tonnes grading 8.12 g/t Au. The BC vein, a massive quartz±carbonate±pyrite vein on the hanging wall of the Bonanza Ledge zone, has an indicated resource of 296 000 tonnes grading 5.31 g/t Au. Both resource figures, released by International Wayside late in 2002, were calculated using a cut-off grade of 0.7 g/t Au (0.02 ounces/ton).

The nearby Cow Mountain deposit comprises the Sanders, Pinkerton and Rainbow zones that were part of the historic underground Cariboo Gold Quartz mine. This bulk tonnage prospect has an existing indicated open pit resource of about 6 million tonnes averaging 2.23 g/t Au. An extensive underground exploration drilling program designed to expand the zone from the 1200 level down to the 1500 level is planned for next year. About 1.5 kilometres west of Wells, near the former **Mosquito Creek Gold** mine (093H 010), Island Mountain Gold Mines Ltd. completed soil sampling, trenching and diamond drilling in search of high-grade gold mineralization in both replacement lenses and mesothermal veins. Much of the work focused on areas underlain by 'Bonanza Ledge' stratigraphy, which is structurally below the property's 'Mine Trend' strata, where mining of carbonate-hosted replacement mineralization took place at the Island Mountain, Aurum and Mosquito Creek Gold mines. The Island Mountain soil grid was extended westward to cover the Tea Pot vein, a coincident Induced Polarization anomaly and several reconnaissance gold soil anomalies. The results outlined a northwest trending gold anomaly about 350 metres south of the property's long established 'Mine Trend'. Trenching identified narrow, arsenopyrite-bearing replacement lenses at the Fender Bender zone that produced assays of 1 to 3 g/t Au, and exposed silicified limestone with associated quartz veins at the Lightning

and Crystal zones. Mineralization at the Crystal zone displays well-developed boxwork texture, evidence that cubic pyrite was once present; panning of C-horizon soil samples produced free gold. Several panel samples of the Crystal zone assayed in excess of 100 g/t Au. Follow-up drilling intersected a quartz-pyrite stockwork zone bordered by silicified wallrock that averaged 27.0 g/t Au over 2.3 metres. An aggressive exploration program is proposed for 2004.

Twelve kilometres to the west, Island Mountain completed a soil grid on its **Dragon** property, which includes the headwaters of Dragon, Montgomery, Timon and Rucheon creeks. These drainages produced mercury-rich gold placers that were derived from an unknown bedrock sources. Mercury can be a pathfinder element for replacement mineralization.

Williams Creek Exploration Ltd. completed a five-hole drill program on its **Westport** (093H 027) property in hopes of intersecting the southeasterly continuation of the high-grade Bonanza Ledge gold replacement zone. The areas tested were several high-chargeability, low-resistivity anomalies identified during an Induced Polarization survey. Drilling encountered several narrow quartz-pyrite veins that produced high-grade gold assays, including a 1.2 metre intersection in hole DDH-03-01 that graded 156.3 g/t Au.

International Wayside Gold Mines Ltd. initiated a 15-hole diamond drill program late in the year on the **Myrtle** (093H 025) claim group, located immediately northeast of the Bonanza Ledge zone. The property, on option from Gold City Industries Ltd., hosts an auriferous quartz-carbonate-pyrite stockwork that returned impressive gold assays from drilling conducted in 2002, such as 17.68 metres grading 9.12 g/t Au in hole M02-01. Several of the proposed drill holes will test the down-dip potential of the new Ethel vein, where grab samples from a 2003 trenching program produced bonanza-grade assays. The drilling program will extend into 2004.

Golden Cariboo Resources Ltd. completed an extensive soil geochemical grid over its **Cariboo Hudson** (093A 071) property, and smaller soil geochemical grids on the Shy Robin Gulch area of its **Grouse Creek** and its **Maude Creek** properties. Each property has potential for both high-grade gold vein and 'Bonanza Ledge' replacement style mineralization. Results will guide further exploration in 2004.

Consolidated Pacific Bay Minerals Ltd. trenched several prospective mesothermal vein occurrences on its **Nugget Mountain** property. The property includes the Skarn (093A 090) prospect, and the B zone, Jewelry Shop and Hibernian (093A 051) occurrences. No results from the work have been released.

METAL MINES

The **Kemess South** (094E 094) open pit gold-copper mine (Photo 11), located in the Toodoggone region about 300 kilometres northwest of Mackenzie, is the only large operating metal mine in the region. Northgate Exploration Ltd. owns and operates the 50 000 tonne per day operation that employs close to 400 workers. The company continues to improve overall efficiency and in 2003 completed several upgrades to its mill that resulted in higher mill availability, higher average daily mill throughput, and increased metal recovery. As well, a new 32 cubic yard P&H cable shovel, commissioned in October 2002, increased production capability in the pit. The company completed construction of a cyclone sand plant that is designed to recover clean sand-sized material from the tailings. The clean sand is used for dam construction and has eliminated the need to transport waste rock from the pit to the dam.

Metal production for calendar year 2003 totaled 9148 kg (294 117 oz) of gold and 34 554 tonnes (76 177 000 lbs) of copper. Since start-up in 1998, Kemess South has produced 42 826 kg (1 376 917 ounces) of gold and 151 625 tonnes (334 272 000 lbs) of copper. Thus more gold has been produced from the Kemess South orebody than from any other porphyry deposit in British Columbia (Island Copper formerly held the record of 35 268 kg of gold) and at this time the mine ranks as the sixth largest gold producer in the province. Mill throughput averaged 51 049 tonnes per day and totaled 18.63 million tonnes for the year, an increase of more than 7.5% over the 2002 figure. Mill head grades averaged 0.702 g/t Au and 0.225% Cu. Proven reserves at Kemess South as of December 31, 2002, stood at 109.4 million tonnes grading 0.712 g/t Au and 0.234% Cu, however reoptimization of the pit design, scheduled for late 2003, may increase the reserves. Existing reserves at the Kemess South deposit will provide mill feed until 2008. However, the life of the overall operation could be extended to 2019 if the advanced exploration-stage Kemess North deposit is put into production (see the Kemess North discussion in the Exploration Summary section).



Photo 11. View of the Kemess South mine looking west.

The Gibraltar, Mount Polley and QR mines, all located in the Cariboo, remained on 'care-and-maintenance' status. Dramatically improved metal prices encouraged a re-evaluation of each dormant operation and prompted efforts to develop alternatives to traditional milling and metal recovery. For example, heap leaching and hydrometallurgical processing, and logistical changes that would result in lower overall mining costs. Major exploration programs that took place on each property during 2003 are summarized in the Exploration Summary and Table 1. Improving economic conditions may lead to one or more of the mines to reopen in the next 12 to 24 months.

COAL MINES

The **Bullmoose** (093P 001) mine, jointly owned by Teck Cominco Limited (61%), BHP-Billiton (29%) and Nissho Iwai (Canada) Ltd. (10%), closed in early April after reserves were exhausted in the South Fork pit. Production in 2003 was limited to 479 000 tonnes of clean coal. Over its 20-year operating life the mine produced and shipped approximately 34 million tonnes of metallurgical coal to Japan. Reclamation of the mine site will continue for two to three years.

While the Bullmoose and Quintette mines are now closed, the supporting critical infrastructure that was developed in the early 1980s, is still intact. This includes the town of Tumbler Ridge, a 129-kilometre rail link to the existing Canadian Northern Railway main line, and the deep sea port facilities at Ridley Island. Metallurgical and PCI coal markets are expected to remain strong for the next few years and increase the likelihood of new mine developments in the Peace River Coal Fields.

INDUSTRIAL MINERAL MINES

Canada Pumice Corporation produced 20 000 cubic metres of screened and sized tephra from its **Nazko** (093B 060) quarry west of Quesnel. The material is used for landscaping, horticultural, filtration and lightweight aggregate applications. The company is continuing to develop new markets, particularly along the west coast of North America. Canada Pumice has also studied options for a significant expansion of its quarry operation to meet increasing demands for its products.

The **Giscome** (093J 025) limestone quarry of Pacific Lime Products Ltd., near the small community of Giscome east of Prince George, produced a limited volume of crushed limestone for use in local pulp mills.

In 2003, approximately 210 000 tonnes of railroad ballast was mined from British Columbia Railway's **Ahbau** basalt quarry, northeast of Quesnel. Canadian Pacific Railway's Giscome basalt quarry, northeast of Prince George, was inactive. The existing inventory of crushed ballast material at the site was sufficient to

address the company's maintenance requirements in the region.

PLACER OPERATIONS

As in the past several years, placer activity in the region during 2003 continued at a low level. However, with the higher price of gold it is anticipated that several large programs will be take place in 2004, and small-scale mining and testing activities will increase. The largest programs are expected to be in the Manson Creek area. As in the past, most small-scale or recreational placer operations will occur along drainages in the Wells-Barkerville, Likely, Hixon and Omineca placer camps.

OUTLOOK FOR 2004

The improved prices of precious metals, base metals and coal will continue to drive grassroots and advanced exploration for both high-grade and bulk tonnage deposits. Higher commodity prices may also enable one or more mines currently on 'care-and-maintenance' status to reopen. Several coal projects in the Peace River Coal Fields will continue to be advanced towards full feasibility and production. The level of placer gold testing and mining will likely increase in the region's traditional placer camps. A number of companies announced financings late in the year and indicate that exploration in the region will increase again in 2004.

ACKNOWLEDGEMENTS

The author gratefully acknowledges the many contributions provided by mine staff, exploration geologists and prospectors working throughout the region. Without their cooperation compilation of this report would not be possible. The manuscript benefited from many constructive suggestions from co-worker Ken MacDonald and external editor Bill McMillan.

