NORTHEAST-CENTRAL BRITISH COLUMBIA

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SUMMARY

Mineral exploration activity in the Northeast-Central region increased significantly in 2002. Exploration expenditures jumped 50% to an estimated $10.9 million and the amount of diamond drilling increased roughly 40% to approximately 70 000 metres. The number of major exploration projects increased from 14 to 22. The largest drilling program took place at the Kemess North porphyry gold-copper prospect. Other major exploration projects sought mainly gold-enriched porphyry, skarn, vein and coal deposits – many generated very encouraging assay results. Activity in the Peace River Coal Fields slowed somewhat, but several advanced stage projects are moving towards feasibility and development.

Two mines operated during the year. The Kemess South mine continued to improve its operating efficiency by increasing both throughput and gold and copper recoveries. Higher average gold prices contributed to the success of the operation. The Bullmoose mine was on pace for record production as the waste rock: coal ratio diminished in the South Fork pit. However reserves are nearly exhausted and the metallurgical coal mine will close in April, 2003.

METAL MINES

KEMESS SOUTH

In 2002, Northgate Exploration Ltd. made several key improvements at its **Kemess South** mine (Photo 1), a 48 000 tpd open pit gold-copper operation in the Toodoggone, about 300 kilometres northwest of Mackenzie. The changes increased mine efficiency and reduced the overall cost of producing an ounce of gold. Two new column flotation cells were added to the mill circuit mid-year and resulted in a significant increase in both gold and copper recoveries. For the year these averaged 70% and 81% respectively. The average gold and copper grades of the concentrate were also increased. The concentrate haulage fleet was increased to 22 triple-axel units, in part to deal with concentrate that accumulated at the mine following transportation delays caused by the washout of a bridge along the route to the load-out in Mackenzie. A cyclone sand operation, designed to recover clean tailings (i.e. non-ARD generating), was constructed at the dam and trials were conducted late in the year. The clean sand will be used in dam construction and will reduce the need to transport waste rock from the pit to the dam. A new 32 cubic yard P&H cable shovel was commissioned in October and will further enhance production in the pit. Reserves as of December 31, 2001, stood at 132.6 million tonnes grading 0.704 g/t Au and 0.233% Cu. Production for 2002 totaled 8781 kg (282 300 oz) of gold and 33 070 tonnes (72.9 million lbs) of copper from milling 17.3 million tonnes of ore. Average mill throughput for the year was 47 420 tonnes per day.

OTHER MINES

The **Gibraltar**, **Mount Polley** and **QR** mines, all located in the Cariboo, are currently on 'care-and-maintenance' status. The economics of each operation is re-evaluated on a regular basis while alternatives to traditional milling and metal recovery, such as hydrometallurgical processing, and measures that would result in lower overall mining costs, are investigated.

COAL MINES

BULLMOOSE

The **Bullmoose** mine (Photo 2), owned by partners Teck Cominco Limited (61%), BHP-Billiton (29%) and Nissho Iwai (Canada) Ltd. (10%), is the only major operating coal mine in the region. It is located near the town of Tumbler Ridge and produces medium-volatile bituminous coal from the Lower Cretaceous Gates Formation. Production in 2002 increased substantially to an estimated 2.1 million tonnes of clean coal as the stripping ratio shrunk dramatically. The work force at the mine also declined through the year and by the end of 2002 totaled 220. Teck Cominco announced its plans to close the mine in early April, 2003.

Photo 1. View of the Kemess South mine looking east.

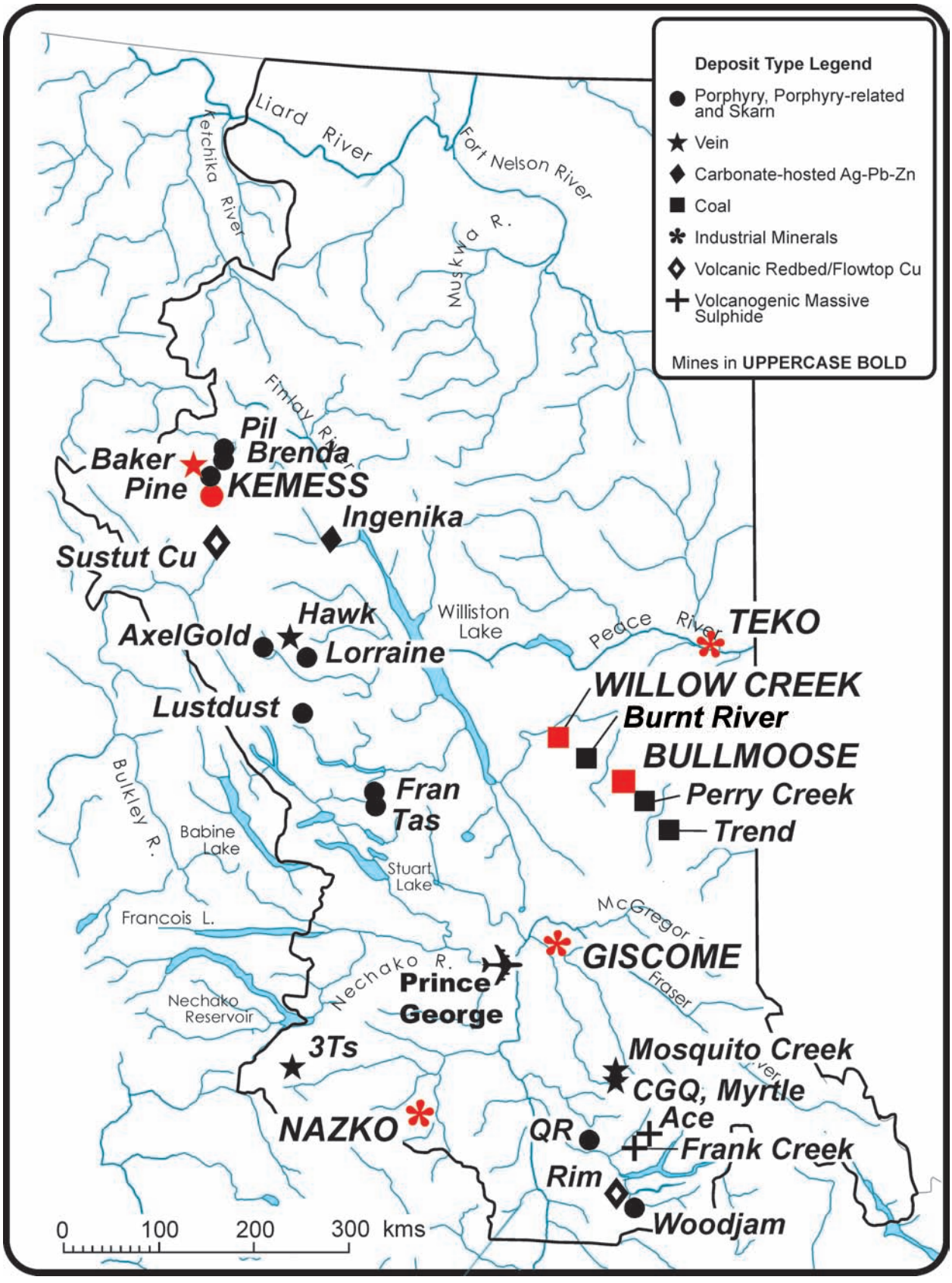

Figure 1. Operating mines and selected exploration projects, northeast-central British Columbia - 2002.

Photo 2. Aerial view of the South Fork pit at the Bullmoose mine near Tumbler Ridge.

Reclamation of the mine site has been ongoing for several years, but will become a higher priority upon closure, and is expected to continue for at least 2 to 3 years. The Bullmoose mine, which opened in 1983, has produced and shipped approximately 32 million tonnes of metallurgical coal to Japan.

WILLOW CREEK

The **Willow Creek** property, 45 kilometres west of Chetwynd, is owned by Globaltex Industries Inc. (67%) and Mitsui Matsushima Canada Ltd. (33%). Late in 2001 and early in 2002, the operator, Pine Valley Coal Ltd., mined and shipped a total of 84 400 tonnes of coal to Japan. Coal came mainly from a single pit developed on the '7' seam, but a subordinate tonnage was excavated from the thinner '6' seam that occurs up-section. The coal measures at Willow Creek occur within the Cretaceous Gething Formation on the east limb of the Peace River anticline. They are low-volatile bituminous in rank and are suitable for the Pulverized Coal Injection (PCI) market, a partial replacement for coke in the steel-making process. Current established mineable reserves for the property total 12.3 million tonnes. A new feasibility study, completed in September, 2002, estimated initial capital costs of about $24.1 million to upgrade the site for annual production of 950 000 tonnes per year over a 14-year mine life.

INDUSTRIAL MINERAL MINES

Canada Pumice Corporation produced 23 000 cubic metres of screened and sized tephra from its **Nazko** quarry west of Quesnel. The material is used for landscaping, sporting facilities, growing and filtration media and lightweight aggregate applications. Shipments have been transported by rail as far east as Toronto. 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** limestone quarry of Pacific Lime Products Ltd., near the community of Giscome east of Prince George, produced small quantities of crushed limestone for use in local pulp mills.

The **Teko** pit, 4 kilometres west of Taylor near Fort St. John, is a joint Ministry of Transportation and Highways, British Columbia Assets and Lands Corporation, and British Columbia Railway venture. It was a major aggregate crushing operation in 2001 and was reactivated for an 8 to 10 week period in the fall of 2002. During that time an estimated 320 000 tonnes of product was generated for use as road construction material mainly for the oil and gas sector in northeast British Columbia.

EXPLORATION TRENDS

An estimated $10.9 million was spent on exploration in the region (Figure 2) during 2002. This figure represents more than a 50% increase over last year's total ($7.2 million) and marks the third consecutive increase in annual exploration expenditures for the region. The amount of exploration drilling also increased for the third consecutive year.

TABLE 1
2001 MINE PRODUCTION AND RESERVES, NORTHEAST-CENTRAL REGION

Mine (Operator)	**Employment**	**Production (approx.)**	**Reserves (Jan. 1, 2002)**
Kemess South (Northgate Exploration Ltd.)	440	8781 kg (282 300 oz) Au, 33 070 tonnes (72.9 M lbs) Cu	132.6 million tonnes grading 0.704 g/t Au and 0.233% Cu
Bullmoose (Teck Cominco Ltd.)	220	2.1 million tonnes of metallurgical coal	Mine to close in April, 2003; reserves exhausted
Willow Creek (Pine Valley Coal Ltd.)		84,400 tonnes PCI coal	12.3 million tonnes
Nazko (Canada Pumice Corp.)	4	23 000 m^3 tephra	

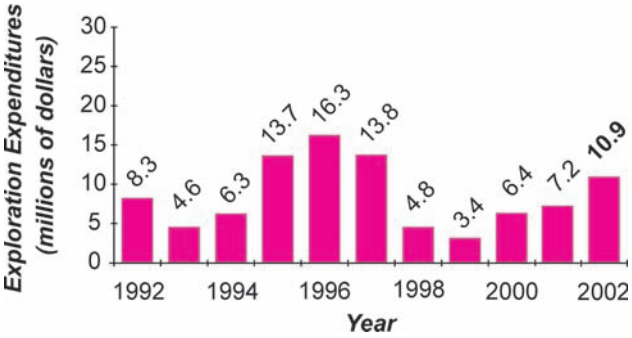

Figure 2. Annual Exploration Expenditures, Northeast-Central Region.

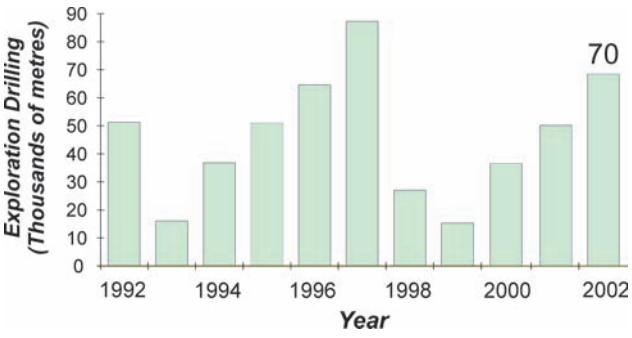

Figure 3. Annual Exploration Drilling, Northeast-Central Region.

It totaled 70 000 metres in 2002, up more than 20 000 metres from last year (Figure 3). Approximately 23 000 metres of the drilling represents deposit appraisal and the remainder is considered to be exploration drilling (advanced and early-stage). The total number of Notice of Work (NoW) applications received for projects in the region was 472, down more than 14% relative to 2001 (Table 2). This was due primarily to the subdued level of placer activity. There were 22 major exploration projects (those that involved mechanical disturbance and expenditures in excess of $100 000), eight more than in 2001 (Table 3). A number of 2002 projects produced very encouraging results and bode well for future exploration successes.

Recovery and stabilization of the price of gold at well above the US$300 mark heavily influenced exploration in the region in 2002. The search for gold-bearing mineral deposits accounted for about 84% (or $9.2 million) of the exploration dollars spent in the region. Porphyry copper systems, in particular those with potential for significant gold enrichment, continue to be the most sought after targets in the region, and accounted for 59% of total exploration spending. Seven of the twenty-two major exploration projects, including AxelGold, Brenda, Fran, Kemess North, Lorraine, Tas and Woodjam, focused on gold-enriched porphyry systems. Five major metallic mineral projects keyed on epithermal or mesothermal gold deposits; three others, Lustdust, Pine (VIP) and QR, targeted auriferous skarn mineralization; two explored polymetallic volcanogenic massive sulphide targets; and the last two examined volcanic redbed copper deposits. Most of these projects generated encouraging drill assay results. There were three major coal projects, Burnt River, Perry Creek and Trend. Each major project is reviewed in the Exploration Summary section following.

EXPLORATION SUMMARY

TOODOGGONE CAMP

There was a revival of exploration in the Toodoggone camp in 2002. Exploration was focused primarily on bulk tonnage deposits associated with Early Jurassic calc-alkalic intrusions. Companies carried out four major exploration programs and completed several smaller, early stage projects that may lead to more advanced work in the coming years.

The largest exploration program in the region was conducted by Northgate Exploration Ltd. on its **Kemess North** (094E 021) porphyry gold-copper deposit (Photo 3) located about 5.5 kilometres north of the Kemess South open pit. Northgate fought thick accumulations of snow during the initial stage of the project that began in early June. The company re-conditioned and upgraded a former exploration trail to provide low cost access for the expanded drilling program. A total of 44 additional core holes further evaluated Kemess North. Drilling completed in 2000 and

TABLE 2
NOTICE OF WORK (NOW) SUBMITTALS FOR PROJECTS IN THE NORTHEAST-CENTRAL REGION

Type of NoW	Year							
	1995	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**
Mineral	221	184	164	115	86	112	109	93
Placer	498	440	415	403	393	422	397	320
Coal	3	4	5	5	2	1	9	8
Other	67	58	57	56	42	33	34	51
Total NoW	**789**	**686**	**641**	**579**	**523**	**568**	**549**	**472**

2001 identified a resource of 442 million tonnes grading 0.40 g/t Au and 0.23% Cu for the deposit. Northgate also tested the Nugget (12 holes) and Kemess East (4 holes) targets. These lie to the west and southeast of Kemess North, respectively, and had received only limited attention in the past.

Results at Kemess North were generally encouraging and expanded the dimensions of the higher-grade 'porphyry dome' core of the deposit to 700 metres by 400 metres. The central portion of the deposit is up to 370 metres thick and is characterized by intense silica-flooding that is accompanied by magnetite-pyrite and lesser chalcopyrite as disseminations, patchy networks and narrow semi-massive to massive bands. This zone of replacement occurs along the contact between a quartz monzodiorite sill and overlying intermediate volcanics of the Takla Group. Based on the results of this year's drilling the company is proceeding directly to pre-feasibility.

Drilling at Nugget intersected a porphyry system with characteristics similar to those of Kemess North. Three subhorizontal quartz monzodiorite bodies were intersected in hole KN-02-23. The hangingwall contact of each monzodiorite interval displayed intense silica-replacement with associated magnetite, pyrite and chalcopyrite mineralization. Both the intrusive material and host intermediate volcanic flows are altered and mineralized (Photo 4), but these diminish in intensity away from the contacts, where a series of weakly mineralized sheeted quartz veinlets are developed. Each zone corresponds with significant gold and copper assays (e.g. 62.0 metres grading 0.55 g/t Au and 0.134% Cu). This setting is likely a narrower version of the 'porphyry dome' core of the Kemess North deposit, where virtually all textures are obliterated. The best intersection at Nugget averaged 0.455 g/t Au and 0.191% Cu over 115.6 metres. Hole KN-02-55, collared approximately 300 metres west of the edge of the proposed Kemess North pit, intersected two significant intervals of gold-copper mineralization. There remains an untested area roughly 700 metres long between this hole and the Nugget zone. Two of the four Kemess East holes intersected narrow intervals of gold mineralization and will be followed up in 2003.

Stealth Minerals Ltd. evaluated several gold prospects on its vast **Pine** property that straddles the Finlay River,

Photo 3. Drilling in the East Cirque, Kemess North project.

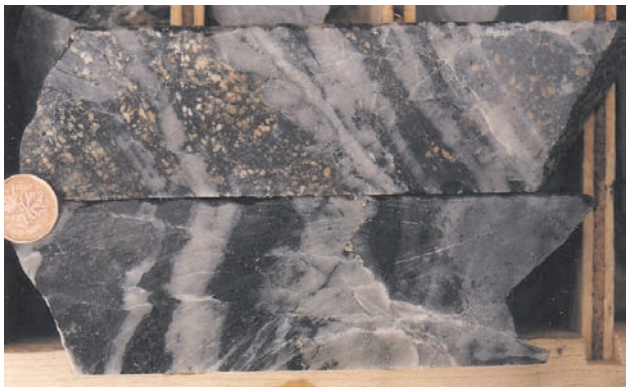

Photo 4. Sheeted veins cutting silicified quartz monzodiorite (above) and andesite (below), Nugget zone.

about 20 kilometres north of the Kemess South mine. Trenching on the **Wrich Hill** (094E 047, 048) epithermal gold prospect, located south of the river within view of the Kemess North drills, exposed a 150-metre wide zone of silica and clay-altered dacitic tuff of the Toodoggone Formation that lies immediately east of the northwest-trending Wrich fault. Two sub-parallel zones, 20 to 50 metres in width, are characterized by chalcedonic-quartz stockworks, brecciation and silica-flooding. Pyrite occurs in trace amounts as fine wispy disseminations. Earthy hematite, limonite and manganese oxide are locally abundant. Assay results from 4 excavated trenches and surface sampling define the zone along its north-northwest strike for more than 150 metres, although mineralized float occurs over a length of 1.2 kilometres. Trench 2 cut a zone of silicified dilational breccia that averaged 2.04 g/t Au and 10 g/t Ag over 48 metres, including a 2-metre interval that graded 17.33 g/t Au. Sampling of the nearby **Goat** prospect generated some spectacular assay results, including a 40-centimetre chip sample from the Black quartz-carbonate vein that graded 165.8 g/t Au and 397 g/t Ag.

North of the Finlay River, Stealth completed bedrock mapping, geochemical and geophysical surveys, and trenching on its **VIP** (094E 082) skarn system (Photo 5). Chalcopyrite-bearing, mainly garnet-actinolite-epidote-calcite-magnetite skarn, developed along the con-

Photo 5. Trench dug on the VIP auriferous skarn occurrence, Pine property.

tact between a screen of limy volcanic-sedimentary rocks of the Pennsylvanian-Permian Asitka Group and granodiorite of the Early Jurassic Black Lake intrusive suite. A total of 17 trenches were dug to examine several east-northeast trending bands of gold-silver-copper skarn mineralization, that range from 10 to 20 metres wide, on the West, North and East zones. Most of the trenching occurred on the East zone where the favourable horizon was traced for more than 500 metres along strike. The best trench assay from the East zone averaged 1.41% Cu, 32.6 g/t Ag and 5.81 g/t Au over 6 metres. The most encouraging trench assay from the West zone averaged 2.77 g/t Au and 0.22% Cu over 24 metres; this interval included 6 metres grading 9.4 g/t Au, 22.75 g/t Ag and 0.72% Cu that is hosted within a crowded feldpsar porphyry dyke.

In July, 2002, Northgate Exploration optioned the **Brenda** (094E 147) porphyry gold-copper property, 25 kilometres northwest of the Kemess South mine, from Canasil Resources Inc. Northgate evaluated the property with high resolution magnetic, radiometric and satellite imaging surveys and produced a number of drill targets. Four holes totaling 1649 metres were drilled in the general vicinity of the White Pass zone, an area marked by intense alunite alteration. Previous drilling had intersected significant gold+/-copper mineralization at shallow depths. Northgate's program targeted the porphyry system at greater depths and encountered mineralization associated with potassic alteration and silicification of intermediate flows of the Triassic Takla Group. The setting is similar to that at Kemess North. The best assay from the 2002 drilling was 25.7 metres grading 0.417 g/t Au and 0.028% Cu from a down-hole depth of 296.1 metres in hole BR-02-02. Northgate plans to continue drilling in 2003.

Further north, owner/operator Sable Resources Ltd. explored its **Chappelle** property, which surrounds the Baker (094E 026) mine, for both high-grade gold and bulk tonnage gold+/-copper mineralization. Nine drill holes and two trenches evaluated a 300 metre by 1000 metre gold soil geochemical anomaly in the Black Gossan area, where oxidized pyritic andesite of the Triassic Takla Group forms a prominent gossan. Five holes targeted I.P. resistivity lows east and west of the B zone, a high-grade gold vein that has been mined on a seasonal basis. Results from the work have not been disclosed.

Finlay Minerals Ltd. identified seven coincident geochemical-geophysical (I.P. and Mag) anomalies on its **Pil North** property, centered approximately 35 kilometres north of the Kemess South mine. The zones are underlain by phases of the Early Jurassic Black Lake intrusive suite, and are characterized by propylitic to phyllic alteration and pronounced gossans. The East and Milky zones have a polymetallic geochemical signature characterized by highly anomalous gold and silver values, and inconsistent copper and zinc values. At the East zone, hand trenching exposed diorite that is brecciated and flooded with silica and small amounts of barite, galena and sphalerite. At the Milky zone, a 10-metre interval of Potassic feldspar-magnetite-quartz stockwork, associated with phyllic alteration in monzonite, averaged 0.52 g/t Au. Both zones are priority targets for 2003.

Doublestar Resources Ltd., in partnership with Northgate Exploration Ltd. and Procon Mining and Tunnelling Ltd. conducted an infill and definition drilling program on the Southeast zone at the **Sustut** (094D 063) volcanic redbed copper deposit, which is located approximately 65 kilometres south of the Kemess South mine. The Southeast zone is a gently dipping tabular body that has an estimated resource of 5.937 million tonnes grading 1.87% Cu and 6.11 g/t Ag, based on a copper cut-off grade of 0.70%. The 2002 drilling provided the data required to calculate a 'measured mineral resource' that is consistent with National Instrument 43-101 (NI 43-101) standards. Baseline environmental, geotechnical and metallurgical studies were also conducted. Mineralization consists of disseminated chalcocite, bornite, chalcopyrite and native copper in volcanic conglomerates, grits and sandstones of the Upper Triassic Moosevale Formation of the Takla Group. In November, Doublestar announced that a full feasibility study on the project would be completed in the first quarter of 2003. The project will require development of an 11 kilometre access road that would branch off from the existing Omineca Mine Access Road (OMAR).

OMINECA MOUNTAINS

Activity in the Omineca Mountains region increased in 2002 with major diamond drilling programs at several properties including Hawk, AxelGold, Lustdust and Lorraine.

On the **Hawk** (094C 138-140) property (Photo 6), located 70 kilometres northwest of Germansen Landing, mesothermal gold veins were the target of a mapping, geochemical sampling and diamond drilling program by Redcorp Ventures Ltd. The property is underlain by the Duckling Creek syenite complex, one of several components of the Late Triassic to Early Cretaceous Hogem Intrusive Suite. Previous work by Amoco and UMEX in the 1970s, focused on the copper-molybdenum potential of the property. Exploration by Cyprus (Gold) Canada and

Photo 6. Bob Carmichael of Redcorp Ventures examining the Radio North vein, Hawk property.

TABLE 3
MAJOR EXPLORATION PROJECTS IN NORTHEAST-CENTRAL BRITISH COLUMBIA.

Property (Operator)	MINFILE	NTS	Commodity	Deposit Type	Work Done
Ace (Barker Minerals Ltd.)	093A 142	93A/11W	Cu, Pb, Zn, Au, Ag	vms	5 ddh, 646 m; geophys; geol
AxelGold (Rubicon Minerals Ltd.)	093N 196	93N/13W	Au, Cu	porphyry	10 ddh, 1250 m
Baker / Chappelle (Sable Resources Ltd.)	094E 026	94E/06E	Au, Ag	epithermal vein	14 ddh, 734 m; trench
Brenda (Northgate Exploration Ltd.)	094E 147	94E/07E	Au, Cu	porphyry	4 ddh, 1649 m; airborne geophys
Burnt River (Western Coal Corp.)	093P 007-008	93P/05W	coal	sedimentary	28 rdh, 1323 m; spot coring
Cariboo Gold Quartz [Bonanza Ledge, BC Vein] (International Wayside Gold Mines Ltd.)	093H 019	93H/04E	Au	pyrite replacement, mesothermal vein	18 ddh, 3394 m; trail constr;
Fran (Navasota Resources Ltd.)	093N 207	93N/16W	Au, Cu	porphyry	27 ddh, 4105 m; geophys
Frank Creek (Barker Minerals Ltd.)	093A 152	93A/11W	Cu, Pb, Zn, Au, Ag	vms	6 ddh, 813 m; trench; geophys; geol
Hawk (Redcorp Ventures Ltd.)	094C 138-140	94C/04E	Au, Ag	mesothermal vein	12 ddh, 1534 m; grid
Kemess North (Northgate Exploration Ltd.)	094E 021	94E/02E	Au, Cu	porphyry	60 ddh, 34380 m; airborne geophys
Lorraine (Eastfield Resouces Ltd.)	093N 002	93N/14W	Au, Cu, PGE	magmatic-porphyry	6 ddh, 1105 m; geol
Lustdust (Alpha Gold Corp.)	093N 009	93N/11W	Au, Ag, Zn, Cu, Pb	skarn, manto, porphyry	19 ddh, 7790 m; geol
Mosquito Creek Gold (Island Mountain Gold Mines Ltd.)	093H 010	93H/04E	Au	pyrite replacement, mesothermal vein	4 ddh, 402 m; trench; prosp; geochem
Perry Creek (Western Coal Corp.)	093P 015	93P/3W	coal	sedimentary	40 rdh, 1500 m; spot coring; bulk sample
Pine [VIP, Wrich Hill] (Stealth Minerals Ltd.)	094E 047-048, 094E 082	94E/02E	Au, Ag, Cu	epithermal vein (Wrich Hill) skarn (VIP)	grid; IP; mag; trench; geochem
QR (Cross Lake Minerals Ltd.)	093A 121	93A/12W	Au	skarn (propyllite)	19 ddh, 1692 m; trench; geochem
Rim (Phelps Dodge Corp. of Canada Ltd.)	-	93A/05E	Cu, Ag	volcanic redbed copper	grid; IP; Mag/VLF-EM; 5 ddh, 806 m
Sustut Copper (Doublestar Resources Ltd.)	094D 063	94D/10E	Cu, Ag	volcanic redbed copper	27 ddh, 2289 m infill & geotech program
Tas (Navasota Resources Ltd.)	093K 080	93K/16W	Au, Cu	porphyry	7 ddh, 1270 m
Trend [Roman Mtn.] (Consolidated Goldbank Ventures Ltd.)	-	93I/15W	coal	sedimentary	9 rdh, 525 m; trench
Tsacha-Tam-Taken (Southern Rio Resources Ltd.)	093F 055, 068	93F/02W, 03E	Au, Ag	epithermal vein	11 ddh, 1313 m; resistivity
Woodjam (Wildrose Resources Ltd.)	093A 078	93A/6W	Au, Cu	porphyry	5 ddh, 1009 m

Castleford Resources in the 1990s focused on high-grade gold veins and identified the Radio North, Radio South, SW and AD veins. In 2002, Redcorp extended the strike length of the Radio North and Radio South veins and linked them up to the SW vein, generating an overall strike length to the zone of more than 3 kilometres. These narrow, sub-vertical veins have a west-northwest trend and occur in weakly altered, pale pink syenite. Veins are consist of quartz with pyrite and chalcopyrite with or without visible gold. Surface samples produced assays of up to 123 g/t Au. Five drill holes encountered discrete veins over 1300 metres of strike length; the best intersection assayed 18.79 g/t Au over an estimated true width of 0.2 metre. However, the most encouraging drill results were obtained from the AD vein, which crops out about 1.5 kilometres to the north. The AD vein is associated with sericitic alteration in granite and includes stockwork and breccia zones that result in more significant widths. Veins are generally steeply dipping and

trend westerly. The best intersection from two holes drilled on the AD assayed 4.66 g/t Au, 25.06 g/t Ag and 0.48% Cu over a true width of 5.0 metres (including 8.6 g/t Au, 35.4 g/t Ag and 1% Cu over a true width of 1.6 m).

The Zulu and Rainbow veins, discovered in 2002, were also evaluated. These veins occur between the Radio-SW and AD zones. The Zulu vein was traced on surface for more than 450 metres. It was tested by five holes over a 60-metre strike length and to a depth of 100 metres. The best assay from Zulu came in hole HK02-011 that averaged 4.43 g/t Au over an estimated true width of 1.8 metres. In contrast to other veins on the property, the Rainbow vein has a shallow dip to the north—an orientation previously unrecognized on the property. Redcorp is expected to further evaluate the high-grade, mesothermal gold vein potential of the property in 2003.

Wheaton River Minerals Ltd. optioned the **AxelGold** (093N 196) alkalic porphyry prospect, 55 kilometres north of Takla Landing, from operator Rubicon Minerals Corporation. The property lies west of the Pinchi fault and is underlain by a multi-phase syenite intrusion of uncertain age that cuts sediments of the Paleozoic Cache Creek Group and volcanics of the Triassic Takla Group. It has potential for both bulk mineable low-grade gold and structurally-controlled high-grade gold deposits. Rubicon completed an 8-hole, 1250-metre drilling program designed to test strong gold-in-soil anomalies in the Gossan Hill area of the property. Previous drilling and trenching tested pyritized syenite porphyry cut by narrow calcite-fluorite-quartz stringers containing trace amounts of tetrahedrite, stibnite and molybdenite. Diamond drilling conducted by Imperial Metals in 1987 intersected a mineralized intrusion that assayed 2496 ppb Au over 7.3 metres (in hole AX87-3) and 352 ppb Au over 36.6 metres (in hole AX87-5). Unfortunately, the 2002 program did not produce any significant results and Wheaton River relinquished its interest in the property.

Eastfield Resources Ltd. conducted two modest phases of diamond drilling on its **Lorraine** (093N 002) copper-gold porphyry system, located about 190 kilometres northwest of Fort St. James in the Swannell Ranges. The Lorraine property is underlain entirely by the Hogem intrusive suite, a Late Triassic to Middle Jurassic multiphase intrusion of calcalkaline to alkaline composition that is intruded by Early Cretaceous granites. The highest and most continuous grades of mineralization occur in syenitic phases and, locally, in biotite pyroxenites. Mineralization typically consists of fine to coarse-grained disseminations of chalcopyrite and bornite, however net-textured sulphides in pyroxenite have also been noted. Drilling was successful in extending the Lower Main zone further to the southwest. Hole 2002-62, collared 87 metres southwest of hole 2001-48, intersected 51 metres grading 0.89% Cu and 0.61 g/t Au within a 149-metre interval that averaged 0.57% Cu and 0.38 g/t Au. In addition to drilling, 11.6 line-kilometres of IP were completed on several targets including the All Alone Dome, where a 500-metre by 500-metre chargeability high, that coincides with a large copper soil anomaly was outlined. The present geological resource estimate for the property is 32 million tonnes grading 0.66% Cu, 0.17 g/t Au and 4.7 g/t Ag. Drilling is expected to continue at Lorraine in 2003.

Owner/operator Alpha Gold Corp. conducted another aggressive diamond drilling campaign in 2002 on its **Lustdust** (093N 009) polymetallic prospect, located 210 kilometres north-northwest of Prince George. The property lies 2 kilometres west of the Pinchi fault and is underlain by deformed oceanic rocks of the Cache Creek Terrane that have been intruded and altered by the Eocene Glover stock, an elongate body of monzonite, and also a series of related feldspar megacrystic dikes and sills. The company drilled 19 holes for an aggregate length of approximately 7790 metres. The drilling program was focused on extending the strike and down dip potential of previously identified auriferous skarn mineralization in the vicinity of Canyon Creek. The 'Canyon Creek' skarn is a north-northwest trending garnet-dominated body that lies immediately east of the Glover stock. Skarn mineralization occurs on the limbs and in the core of a north-northwest striking, tightly folded sequence of phyllites, argillites, cherts, mafic volcanics and carbonates.

Skarn mineralization is best developed within a geochemically receptive calcareous mafic tuff unit (Photo 7) that has been traced for more than 500 metres along strike and ranges in width from 3 metres to more than 110 metres. The highest gold-copper grades occur at the contact between the marble and altered tuff where skarn bodies with local massive sulphide replacements have developed. Hole 02-09 cut a 90-metre thick skarn assemblage within which a 9.7 metre intersection of semi-massive sulphide assayed 36.7 g/t Au, 182.6 g/t Ag and 2.89% Cu. The mineralization is within a continuous auriferous polymetallic vein, manto, skarn and porphyry system that occurs over a strike length of approximately 3 kilometres. A follow-up diamond drilling program is being planned for 2003.

In the Manson Creek area, Angel Jade Mines Ltd. trenched and sampled a number of mesothermal veins, in-

Photo 7. Exposure of weakly altered, non-mineralized calcareous mafic tuff, Lustdust property.

cluding one on the **Rainbow** property. The vein occurs near the McCorkell stone monument and is likely part of the Fairview mineral occurrence (093N 023) that has produced free gold. The showing consists of a 6-metre wide anastomosing quartz-carbonate vein within altered mafic volcanics that are part of the Manson Lake ultramafic complex. Mineralization consists of tetrahedrite, chalcopyrite and pyrite. The property was optioned to Seymour Exploration Corporation who intends to conduct a small drilling program in 2003.

Cross Lake Minerals Ltd. completed 4 drill holes totaling 491 metres on its contiguous **Ingenika** and **Swannell** lead-zinc-silver properties, located southwest of Ingenika Arm. The intent of the program was to identify silver-rich lead-zinc mineralization similar to that discovered at the former I*n*genika mine and nearby Onward prospects. Both occurrences are semi-massive to massive lead zinc silver veins and/or mantos hosted by silicified dolostone of Cambrian age. Three holes that were drilled to test a large base metal soil anomaly on the Swannell property, did not intersect mineralization. The fourth hole targeted a suspected extension to the Swannell base-metal showing and intersected a zone of brecciated limestone carrying coarse-grained sphalerite and traces of galena that graded 4.6 g/t Ag, 1.90% Zn and 0.37% Pb over 2.1 metres.

The **Fran** property (Photo 8), located near Inzana Lake approximately 70 kilometres northeast of Fort St. James, was explored by Navasota Resources Ltd. The property covers a high-level porphyry gold-copper system that is associated with an Early Jurassic granodiorite-quartz diorite stock and thermally altered fine-grained volcanic sediments and cherty argillites of the Upper Triassic Inzana Lake succession. Mineralization consists of disseminations and weak stockworks and veinlets of pyrite-chalcopyrite within pyrrhotite-bearing biotite hornfels, brecciated zones of the intrusion and in shear zones. The company conducted a major diamond drill program within a 1500-metre long northwest-trending gold geochemical anomaly (the 'Bullion Alley' trend) where several showings had been previously identified. Several holes intersected narrow quartz-pyrite-chalcopyrite veins carrying visible gold within a plagioclase porphyry phase of the intrusion and produced high-grade gold assays. The best intersection graded 33.12 g/t Au over 2.0 metres. Navasota concluded that the system lacked significant lateral extent and dropped its option on the property late in the year.

Photo 8. Winter drilling on the Fran property.

Navasota optioned the nearby **Tas** property from Derry Halleran and proceeded to drill 7 holes to test the West zone and a strong gold geochemical anomaly. The property is mainly underlain by augite-phyric intermediate flows of the Triassic Takla Group and covers numerous gold showings. One such showing, the Ridge zone, was the site of a small bulk sampling program in 1993 that yielded close to 1100 grams of gold from milling 32.4 tonnes of massive sulphide vein material. Drill holes that tested the gold geochemical anomaly encountered a swarm of plagioclase porphyry dykes and intrusion breccia locally carrying disseminated to semi-massive and massive pyrite, pyrrhotite, lesser chalcopyrite and traces of arsenopyrite. Hole TS-066 cut 12.45 metres of semi-massive to massive pyrrhotite-pyrite-chalcopyrite grading 2.3 g/t Au and 0.23% Cu. Further drilling is planned early in 2003.

Nation River Resources Ltd. drilled one hole and deepened an existing hole on its **Skook** property immediately north of Chuchi Lake. The program evaluated the porphyry copper-gold potential of part of the 'Skook Halo' (093N 140) where disseminated pyrite, pyrrhotite, and minor chalcopyrite and bornite occur in bleached and altered tuffaceous sediments of the Chuchi Lake succession near its contact with the Hogem intrusive suite. Results from the drilling program have not been announced.

ROCKY MOUNTAIN FOOTHILLS

The **Prophet River** property of Strategic Metals Ltd. covers the Cay (094G 017) occurrence, a Mississippi Valley-type germanium-gallium-zinc prospect. The 14-unit property, which lies 55 kilometres west of the Alaska Highway between the Prophet and Muskwa rivers, and is underlain mainly by dolomite and limestone of the Devonian Stone and Dunedin formations. In 2002, Strategic dug a series of hand trenches and test pits to evaluate a 2.5-kilometre zinc soil geochemical anomaly. A bulk sample taken in 1987 reportedly assayed 6.28% zinc, 0.36% lead, 400 g/t germanium and 30 g/t gallium. Sphalerite, galena, pyrite and pyrobitumen occur in the hinge, and to a lesser extent in the limbs, of an anticline within silicified and/or brecciated limestone. Assays results have yet to be received by the company.

PEACE RIVER COAL FIELDS

Advanced exploration and deposit appraisal of several key coal properties in the Peace River Coal Fields continued in 2002.

Western Canadian Coal Corp. completed a 28-hole, 1323–metre rotary and core drilling program on its **Burnt River** coal property, located 50 kilometres south of Chetwynd. The program was part of a study to evaluate the feasibility of a 750 000 tonne per year mining operation. Drilling successfully evaluated coal measures along the northwest trend of the Dillon Anticline. However, geological mapping and two holes that tested the structure to the

southeast identified the potential for additional low strip ratio coal. The company's short-term objective is to outline 8 million tonnes of low strip ratio coal within an existing 33 million tonne high strip ratio coal resource. The coal measures at Burnt River are classified as low volatile bituminous/semi-anthracite and are suitable for PCI markets. In some cases low volatile coal with minimal rheology can be added to coke oven blends in small quantities to improve yield without deteriorating coke quality or increasing coke oven pressure.

Western Canadian Coal Corp. conducted a rotary and core drilling program on its **Perry Creek** metallurgical coal property located between the Quintette and Bullmoose mines near Tumbler Ridge. The deposit occurs in a broad syncline with gently dipping limbs. The deposit occurs in a broad syncline with gently dipping limbs. The coal measures occur in the Lower Cretaceous Gates Formation, have a rank of medium-volatile bituminous and are of metallurgical quality. Approximately 25 six-inch diameter core holes were drilled on the 'J' seam in order to provide a 3.5 to 4.0 tonne bulk sample for a pilot-scale testing. The shallow northeast-dipping coal measures are beautifully exposed at a site proposed for development of an adit (Photo 9). The upper part of 'J' seam, the J1 and J2 splits, has a thickness of more than 6 metres. A 1.5 to 1.75 metre thick siltstone bed separates J2 from the 2-metre thick J3 seam. Exploration rotary drilling took place in three areas of the property to establish the locations of potential starter pits within a larger open pittable deposit.

The **Trend (Roman Mountain)** property is located immediately south of Babcock Falls and was last explored in 1974 (Dennison) and 1985 (Quintette Operating Company). In 2002 Consolidated Goldbank Ventures Ltd. conducted a trenching and rotary drilling program on the north-facing flank of Roman Mountain, where the steeply northeast dipping limb of a syncline exposes the Middle Gates Member and five coal seams. Seams D, E, F, G/I and J have a combined thickness of more than 15 metres. A narrow bed of pebble conglomerate is a consistent marker for the immediate hangingwall of D seam. Limited test pitting was conducted to accurately locate the position of the seams and nine rotary drill holes were completed. The program provided information on five of the seams and confirmed their thicknesses along strike to the northwest and southeast of previously drilled areas.

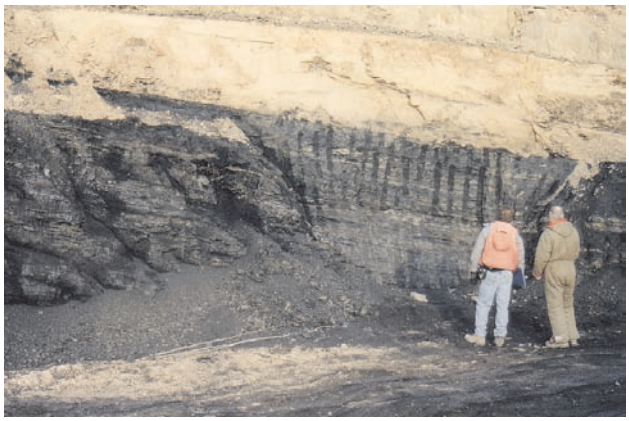

Photo 9. Upper part of the 'J' seam exposed at proposed adit site, Perry Creek property.

In addition to coal exploration, interest in the coalbed methane (CBM) potential of the Peace River coalfield also continued in 2002. The coal measures in the belt contain an estimated 60 trillion cubic feet (Tcf) of methane. A total of 5 wells were drilled in 2002. The number of holes is considerably less than those drilled for coal, but the total expenditure was probably greater because of depth and use of larger drilling equipment. Two of these wells in the Hudson Hope area were permitted as test holes (maximum depth 600 metres and no production allowed). Three holes were permitted as experimental schemes. These holes were drilled in the Highhat Mountain, Wolverine and Flatbed Creek areas. Data from these wells is confidential, but at this time none are in production.

NECHAKO PLATEAU

Exploration activity in the Nechako Plateau region consisted of one major drill program (3Ts) and several smaller projects. Grassroots prospecting was conducted by a number of individuals who sought to take advantage of an ever-increasing network of logging roads that have been built to access vast areas of trees infested with Mountain Pine Beetle, particularly east of Tweedsmuir Park.

Southern Rio Resources Ltd. carried out a very successful exploration drilling program on its **3Ts** property located in the Nechako Plateau approximately 120 kilometres south of Vanderhoof. The 3Ts property hosts numerous northerly-trending epithermal gold-silver quartz veins and includes the Tsacha (093F 055), Tam (093F 068) and Taken claim groups. On the Tsacha portion of the property, drilled and trenched by Teck Exploration Ltd. in the mid to late 1990s, two holes intersected the main Tommy vein at 200 metre and 400 metre step-outs, and extended the known strike length of the structure to more than one kilometre. Both holes cut the sub-vertical vein beneath a flat-lying micro-diorite intrusion. The intersections were weakly mineralized, but expand the potential for new well-mineralized shoots in this previously unexplored segment of the vein system. A revised resource estimate was calculated in, compliance with NI 43-101, for the main Tommy vein above the sill. The 'inferred resource', calculated using a cut-off grade of 4.0 g/t Au, totaled 470 000 tonnes averaging 7.4 g/t Au and 65.22 g/t Ag.

On the Tam property three holes intersected the Ted vein. They were collared at 50-metre intervals along strike from a core hole drilled in 1996 by Phelps Dodge and trace the vein structure for at least 250 metres along strike. The widest intersection of vein material was 26.9 m grading 1.29 g/t Au and 237 g/t Ag. The best assays were from sections of the vein that were composed of semi-massive bands of fine-grained sulphides and sulphosalts. Hole TT-10 (Photo 10) averaged 1.94 g/t Au and 357.9 g/t Ag over 13.2 metres; and hole TT-11 averaged 3.28 g/t Au and 1117 g/t Ag over 3.0 metres. The company plans to conduct a follow-up drill program early in 2003.

Photo 10. Close-up of core from Ted vein (hole TT-10) showing banded, fine-grained sulphides and sulphosalts.

Further north, Nation River Resources explored its **Cabin** (093F 038) property located about 22 kilometres southwest of Fraser Lake. Mineralization consists of northerly and northwesterly trending polymetallic quartz veins and intensely silicified linear zones associated with argillic to phyllic-alteration in granodiorite of the Topley intrusions. Re-examination of the East vein produced multigram assays. The company drilled one hole on an EM16 conductor in an area of previous trenching and percussion drilling by Nithi Exploration Ltd. Assay results have not yet been made public.

Elsewhere in the Nechako Plateau, Navasota Resources staked the **Yellow Moose** epithermal prospect (093F 058), located 140 kilometres southwest of Vanderhoof, and carried out a preliminary investigation of all known showings on the property. Adam Travis acquired the **Chili** epithermal gold prospect (093C 011), 180 kilometres west of Williams Lake, and re-examined quartz vein and stockwork showings with anomalous gold and silver values.

CARIBOO – WELLS-BARKERVILLE AREA

Lode exploration in Wells-Barkerville area continued to be focused almost exclusively on gold-bearing mesothermal quartz vein and auriferous pyrite replacement mineralization. Host rocks for both deposit types are metasedimentary rocks of the Hadrynian to Paleozoic Snowshoe Group.

Drilling near the former **Mosquito Creek Gold** mine (093H 010) by Island Mountain Gold Mines Ltd. targeted high-grade mesothermal gold veins within the Rainbow unit. Narrow high-grade intersections include 0.3 metres grading 29.04 g/t Au in hole IGM02-02 and 1.8 metres grading 6.96 g/t Au in hole IGM02-04. Trenching of a broad gold geochemical anomaly later in the season uncovered several west-trending quartz veins containing pyrite, arsenopyrite and galena within a pyritic quartzite. Grab samples from these structures graded up to 10.9 g/t Au. Drill pads were constructed late in the year in advance of an early 2003 drilling program.

International Wayside Gold Mines Ltd. continued to explore its **Cariboo Gold Quartz** property (093H 019), located immediately south of Jack of Clubs Lake, for both mesothermal vein and 'Bonanza Ledge-style' replacement mineralization. Drilling of the **Bonanza Ledge** zone produced moderate to high-grade gold intersections. As in other recent programs, drill holes were oriented to intersect projections of both the BC vein and the Bonanza Ledge zone where possible. The best assay came from hole BC02-03 that intersected the BC vein about 180 metres north of the BC Shaft; it averaged 22.97 g/t Au over 15.8 metres and included a 1.15 metre interval that graded 108.25 g/t Au. Approximately 120 metres further north, hole BC02-02 intersected a 4.7 metre segment of the BC vein that averaged 13.16 g/t Au.

Late in 2002, International Wayside announced resource estimates for the Bonanza Ledge and BC Vein zones. The indicated resource for Bonanza Ledge is 337 500 tonnes grading 8.12 g/t Au. The indicated resource for the BC Vein is 296 000 tonnes grading 5.31 g/t Au. In both cases a cut-off grade of 0.7 g/t Au (0.02 ounces/ton) was used. Existing open pit resources for the Cow Mountain (Sanders-Pinkerton-Rainbow zones) total about 6.014 million tonnes averaging 2.23 g/t Au. A revised mining proposal, yet to be formally submitted to the British Columbia Environmental Assessment Office, incorporates the resources from all three zones. The company envisages a 1500 tonne per day mill complex on Barkerville Mountain, a rock dump in upper Lowhee Creek, and a tailings impoundment southwest of Jack of Clubs Lake.

International Wayside optioned the **Myrtle** claim group, located immediately northeast of the Bonanza Ledge zone, from Gold City Industries Ltd. A five-hole diamond drilling program targeted two I.P. chargeability anomalies, outlined in a previous survey by Gold City across the prospective contact between the Baker and Rainbow units. The best assay from results released so far was a 17.68-metre intersection of multiple quartz-pyrite veins (Photo 11) that averaged 9.12 g/t Au. The veins are orthogonal to the BC vein and are a significant high-grade gold target with excellent strike and down-dip potential.

Golden Cariboo Resources Ltd. conducted prospecting and geochemical sampling on its **Grouse Creek** project along strike to the southeast of the Bonanza Ledge discovery.

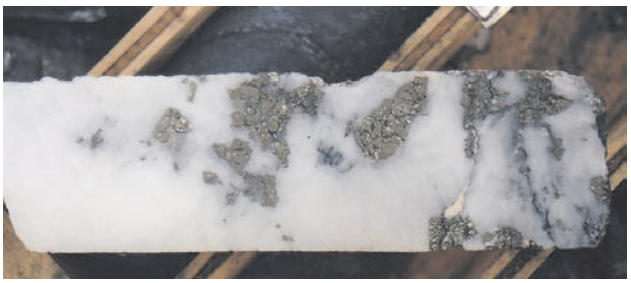

Photo 11. Quartz-pyrite vein mineralization from the Myrtle property.

Further southeast along the trend, Consolidated Pacific Bay Minerals Ltd. drilled two mesothermal gold vein occurrences and trenched several other prospective vein targets on its **Nugget Mountain** property. The veins carry pyrite and arsenopyrite with lesser galena and tetrahedrite in a gangue of quartz. They are generally subvertical, have a northwest strike, and are associated with marked iron-carbonate alteration of the host metasedimentary rock package. Exploration in the 1970's and early 1980's consisted of underground development and bulk sampling of the Skarn (093A 090) prospect, and diamond drilling, surface stripping and trenching of the B zone, Jewelry Shop and Hibernian (093A 051) occurrences. The property was optioned from Mike Danroth, who died tragically during the summer while en route to the claims. Two holes intersected the B zone, with a best assay of 21.1 g/t Au over an estimated true width of 1.35 metres, that further confirmed the high-grade potential of the prospect. Results from two holes drilled on the Jewelry Shop vein system include 2.1 g/t Au over a true width of 5.2 metres.

Ray Maltais drilled 1 hole on his **Beaver** mesothermal vein property, east of Alice Creek, but did not generate encouraging results.

Mark Heinzelman and partners drilled four short holes near the Rainbow adit on their **Mountain** property, located about 1 kilometre east of Williams Creek. Underground development took place in 1937 and included approximately 36 metres of drifting and crosscutting to expose auriferous quartz-pyrite veins that reach thicknesses of 1.5 metres. Drilling did not intersect any veins.

CARIBOO - LIKELY AND HORSEFLY AREAS

Exploration in the Cariboo also targeted alkalic intrusion-related gold-copper deposits within the Late Triassic to Early Jurassic volcano-plutonic arc of the Southern Quesnel Trough, but also volcanogenic massive sulphides within metasedimentary rocks of the older Snowshoe Group.

Cross Lake Minerals Ltd. optioned the dormant **QR** (093A 121) gold mine, located 58 kilometres southeast of Quesnel, from owner Kinross Gold Corporation. Cross Lake joined forces with Gold Giant Ventures Inc. to fund exploration at both QR and the adjoining Cariboo (Most Likely) properties. Traditionally, the best gold grades at QR occurred in propylitically altered, epidote-rich basaltic tuffs and fragmental volcanic rocks (Nicola Group) marginal to the Early Jurassic QR diorite stock. These receptive units produce tabular bodies of mineralization with sulphide content ranging from 1% to 15%, and pyrite far more abundant than chalcopyrite. Mining previously took place from the Main, Midwest and West zones where a total of 120 030 ounces of gold were recovered.

After conducting a review of known mineralized zones on the property, operator Cross Lake conducted a 19-hole, 1692-metre diamond drilling program. One hole was drilled to test the deep North zone target (north of the Main zone pit), 13 holes targeted the near surface Northwest zone, and 5 holes evaluated the West zone between the small North Lobe and South Lobe open pits. The North zone hole intersected four significant mineralized intervals of propylitically altered basalt; the best intersection returned 3.87 g/t Au across 9.0 metres at a down-hole depth of 240.5 metres. The open pit potential of the Northwest zone was confirmed by several intersections, including 16.7 m grading 4.71 g/t Au in hole CL-02-2007. Assays from West zone drilling are not yet available. The companies intend to complete data compilation, engineering studies and continue with field exploration that will likely include trenching and additional diamond drilling.

On the **Cariboo** (093A 062) property, Cross Lake targeted epithermal gold mineralization with a modest trenching program in the vicinity of diamond drill hole 89-6, completed by Corona Gold Corporation in 1989. The drill hole intersected 5.26 g/t gold over an 8.5 metre interval. Results from the trenching program have not been released.

Fjordland Exploration Inc. funded a modest drill program (Photo 12) on the **Woodjam** (093A 078) gold-enriched alkalic porphyry prospect, near Horsefly, to follow up on two large chargeability anomalies that were outlined in 2001. The property was optioned from Wildrose Resources Ltd. who remain operator. They returned to the property in 2002 to conduct a modest drill program (Photo 12). The property is underlain by intermediate flows of the Nicola Group that have been intruded, altered and locally mineralized by phases of the Early Jurassic Takomkane batholith. The property includes the Megabuck prospect, first identified and later drilled in the mid 1970s. Megabuck yielded drill intersections as high as 1.39 g/t Au and 0.13% Cu over 58 metres. This main zone continues to be the focus of exploration drilling. It is outlined by a northeast-trending coincident magnetic and chargeability anomaly. Mineralization consists of chalcopyrite with subordinate pyrite in fractures and in veinlets with quartz+/-magnetite. Narrow, epidote-rich propylitic alteration zones typically envelope the veins. The best intersection from the five holes drilled in 2002 assayed 0.52 g/t Au and 0.11% Cu over 54 metres. A follow-up program is planned for 2003.

Rudy Durfeld discovered a new showing near the Northeast zone while prospecting on his **Redgold** (093A 058) property, centred 3 kilometres south of Quesnel Lake. The property covers the Shiko stock and hosts several

Photo 12. Drilling on the Woodjam porphyry gold-copper property near Horsefly.

alkalic porphyry gold-copper prospects that coincide with chargeability, magnetic and soil geochemical anomalies. Past drilling has generated encouraging assay results over narrow intervals, for example 12 metres grading 985 ppb Au and 1873 ppm Cu, but none of the targets have been thoroughly evaluated.

Late in the year, Phelps Dodge Corporation of Canada Ltd. optioned the **Rim (Dot Com)** property, located just west of Horsefly, from Herb Wahl and Jack Brown-John. The company conducted several line-kilometres of IP and Mag/VLF-EM survey and drilled five holes. The property 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, and lesser bornite and chalcocite. Results from the drilling program were not available at the time of writing.

Barker Minerals Ltd. conducted trenching and drilling on its **Frank Creek** (093A 152) volcanogenic massive sulphide (VMS) prospect, located immediately south of Cariboo Lake. The work was successful in tracing the F1 mineralization over a strike length of more than 400 metres. The F1 showing is one of several VMS occurrences hosted within metasedimentary rocks of the Harvey's Ridge Succession (Hadrynian to Paleozoic Snowshoe Group). Four holes tested the footwall rocks and two holes were drilled in hanging wall siliciclastics. The latter two holes encountered several narrow massive sulphide lenses within iron-carbonate altered quartz-sericite phyllite that contains common porphyroblastic pyrite and ilmenite, and variable amounts of chrome mica. Assays graded up to 89 g/t Ag and 2.08% Cu over 0.45 metres. Gold values were sporadic and lead and zinc values ranged up to 0.54% and 3.42%, respectively. Further exploration has been proposed for 2003.

Barker Minerals also drilled its **Ace** property (093A 142), centered approximately 20 kilometres east of the Frank Creek prospect. Five holes tested a prospective felsite unit within meta-sediments and volcanics of the Downey succession (Hoy and Ferri, 1998). It includes a suspected exhalite that typically contains up to 6 to 8% disseminated sulphide, mainly pyrrhotite-pyrite, with local narrow massive sulphide bands comprised of sphalerite-chalcopyrite+/-galena. Two holes that intersected the mineralized horizon were anomalous in copper, zinc, lead and, locally, gold. The company will continue to explore the prospective 'felsite' unit along its multi-kilometre strike length.

PLACER MINING AND EXPLORATION HIGHLIGHTS

By Ken MacDonald, P.Geo.

INTRODUCTION

The placer sector in northeast-central British Columbia again experienced a decline from the previous year. Although 2002 saw increased gold prices and relatively stable fuel costs, these market improvements did not translate into increased levels of activity for the placer sector. However, unlike last year, operators were emboldened by rising gold prices and optimistic that 2003 will reverse downward trends experienced over the past several years.

One large and eight medium-sized (where volume of washed paydirt exceeded 2000 m^3) programs were conducted in the region this year, which reversed the trend toward smaller testing programs during the last several years. Overall, levels of activity in 2002 followed the overall general decline of the past several years. Accurate estimates of expenditures on exploration and testing are unavailable but are roughly estimated at between $1.5 and $2.1 million. Many operators continued modest testing programs for assessment purposes.

TRENDS

The total area within the region held under placer tenure (excluding crown grants) remained at about the same level as a year earlier. The number of placer leases (production) held in the region remained steady at 446, and the number of placer claims (exploration) increased slightly to 1783. The area held under placer lease totaled about 24 000 hectares, or about 0.07% of the total area of the region. The area held under placer claim totaled just less than 64 000 hectares, or about 0.2% of the region.

The reduction in placer mining activity is reflected in the relatively low number of Notice of Work (NoW) applications submitted to the Prince George Mines Branch office. A total of 327 placer NoWs were filed, compared to 397 in 2001. Of the total, 132 NoWs were for mechanical testing, and 195 comprised handwork. This corresponds to a general shift over time from mechanical testing, when commodity prices and fuel costs were more favorable, to the situation today when relatively few operators are inclined to run expensive testing equipment or engage in large-scale production.

To date 102 or roughly 32% of the operators have responded with a Notice of Completion (NoC) report. However, it is believed that many of the planned programs were not completed due to a variety of factors. Thus the relatively low overall response rate is more reflective of canceled programs than failure to respond. Of particular interest are 71 mechanical programs for which reasonably accurate completion data is available. The responses received represent the majority of mechanical operations on which a planned program was executed. Based on 71 NoCs received to date, all but nine programs consisted of modest exploration testing, and most programs tended to be smaller than originally planned. The programs ranged from 100 m^3 to over 160 00 m^3 of paydirt washed. The total volume of production planned was about 80 500 m^3, while actual recorded production amounted to about 22 000 m^3, a decline of 73%.

As mentioned, in 2002 nine programs achieved placer production of more than 2000 m^3 of paydirt, compared to only one in 2001. No information is available on the quantity of gold recovered, or the grade of material washed. In terms of testing and size: five programs washed between

1000 and 2000 m^3 of paydirt; nineteen programs washed between 100 and 1000 m^3 of paydirt; and forty one programs completed only minimal testing, washing less than 100 m^3 of paydirt each. It is expected that the remainder of the mechanical operators from which no NoC has been received either completed hand testing or paid cash in lieu of assessment work to maintain tenure. Operators have given a variety of reasons for canceling programs, including low gold prices; lack of capital for equipment, parts, or fuel; inability to raise reclamation security; health issues; or employment in other sectors during the seasonal months.

Using the Mineral Titles' *Guide to the Evaluation of Physical Work for Assessment Purposes*, and the limited information provided by the operator on the NoC reports, exploration expenditures can be roughly calculated. Using two methods described in Information Letter 19 (BCMEM Mineral Titles Information Letters), the first based on the sum of labour, supply and machinery costs, and the second based on $50 per cubic metre of gravel processed, exploration spending in the region is estimated to have been between $1.5 and $2.1 million, down slightly from last years' estimate of between $1.49 and $2.24 million. Most small operators spent the bulk of the money on supply and machinery/equipment costs, including fuel, repairs, parts, and maintenance. However, for several larger programs with hired help, the labour component can be considerable, perhaps as much as 25% of the overall expense.

PRINCIPAL AREAS OF ACTIVITY

As in past years, the focus of activity followed the well-established pattern. The Cariboo (including sub-areas) was the principal center of activity followed by the Omineca and Hixon areas. A total of 52 programs were conducted in the Cariboo, subdivided into the Lightning Creek area, the Quesnel River area, the Wells-Barkerville area and the Likely-Keithley Creek area. Major drainages in the Cariboo that saw activity included Cottonwood River, Fraser River, Quesnel River, Cariboo River, Lightning Creek, Ketchum Creek, Snowshoe Creek, Maude Creek and Antler Creek. A total of 19 programs were conducted in the Omineca area, with Slate Creek and Manson Creek the most active drainages. The Hixon area was relatively quiet, with only two significant programs conducted.

OMINECA

The largest program, and only property from which large-scale production was recorded in the District, was in the Omineca region. J.M. Thomas of Angel Jade Mining completed bulk testing from one main mine pit identified from the previous years' testing. A total of about 16 000 m^3 of paydirt was washed. Gold was recovered from gravels believed to represent a buried paleochannel confined to the modern creek valley. Angel Jade designed and implemented a non-conventional floating processing plant (Photo 13). The plant was fed by excavator with oversize removed by conveyor and loader. The program is effectively a mobile placer mine with concurrent reclamation. This design provides better environmental safeguards, and lower operating costs than a conventional stationary design. The operation employed four workers for a period of 10 weeks. A larger program is proposed for the coming field season, and promises to be the largest production mine in the region for 2003. Angel Jade has also proposed development and production from three other sites in the Omineca, and plans to test about 10 other sites.

Vladimir Pogorevc tested about 1800 m^3 of gravel from McConnell Creek, over a period of 16 weeks. Groundwater hampered the operation, but focused digging and a well-designed processing plant made the operation a success. Fine-grained gold is recovered from a buried paleochannel adjacent to the modern alluvial channel. Local variability in depth to bedrock has made definition of the lateral extent of the buried channel difficult. Close attention to processing controls appears to have improved recovery rates compared to a conventional sluice or trommel operation.

CARIBOO (WELLS-BARKERVILLE-QUESNEL)

Mining was active on a small tributary to Summit Creek, northeast of Wells. Harry Robinson and partners mined 2500 m^3 of paydirt from a shallow pit that may represent a buried-channel gravel deposit adjacent to a modern alluvial channel. The operation processed paydirt over a nine-week period.

Further southwest Frank Nestle continued mining on his large lease on Summit Creek (Photo 14), near the confluence with Eight Mile Lake Creek. The operation processed 2000 m^3 of paydirt from one large, deep pit dug to exploit a buried bedrock channel. Depth of pay and groundwater seepage made mining difficult. The lateral extent of the channel is unknown and may be discontinuous due to recent erosion. The deposit is interpreted to be a buried channel in a modern valley system.

Vern Weirs mined approximately 2000 m^3 of paydirt on his lease on Lightning Creek. Production came from one main mining pit, and several test pits located on a low terrace on the north side of the river. The site likely represents a postglacial reconcentration of fluvial and glaciofluvial deposits.

Photo 13. Mobile processing plant in use on Manson Creek, Angel Jade Mining.

Photo 14. Large pit excavated in search of buried bedrock channel on Summit Creek, F. Nestle.

Jack and brother Tim Kleman revisited the Hannador property, previously worked by Gallery Resources Ltd. The brothers anticipated good results from testing on the southwest edge of the property beyond the limits of the previous mining. The site is located on the south side of Lightning Creek in a presumed buried paleochannel adjacent to the modern alluvial channel. Gravel on bedrock did yield gold as anticipated, but the size of the channel remnant did not justify large-scale production. The operation washed about 1300 m^3 of paydirt over a 3-week period.

CARIBOO (LIKELY-KEITHLEY CREEK)

Al Bruce continued his seasonal operation on two claims on the Cariboo River, near Likely. This site is located on a low terrace directly downstream from Quesnel Forks. The deposit is interpreted as a glacial and/or glaciofluvial placer deposit. The historical record identifies many terraces along the Cariboo River that have supported productive mining operations, including exploitation by large dragline/dredge methods. Al washed 3000 m^3 of paydirt from reworked dredge tailings and several test pits.

Edwin Gordon mined about 2000 m^3 of paydirt from one main pit and three test pits. His site is located on the south bank of the Cariboo River, near the confluence of Spanish Creek. The site is similar in setting to larger mines located nearby that exploited large fluvial and glaciofluvial deposits on intermediate to high-level terraces. Placer gold has been recovered from several stratigraphic horizons in the local area, including glaciofluvial gravels overlying till. It's possible that the gold was derived from upstream placer deposits.

Noble Metals were active on their large lease near Likely. The deposit represents a buried paleochannel that roughly parallels the present course of Keithley Creek. The company was unable to complete plans for a major stripping program on its Keithley Creek lease, and settled for limited production of about 2000 m^3 of paydirt from their main mine pit. Thick overburden and subsurface drainage hampered development. By necessity work focused on dewatering the pit face, and benching the face in anticipation of larger production in 2003. The lowermost gravel on bedrock has typically produced the most gold. Progressive reclamation was continued, including the remediation of a road from the pit area to Snowshoe Creek.

The Rasmussen brothers continued development of the Golden Horn property on Cedar Creek. This site has experienced several large-scale mining programs over the years, and continues to produce gold. Recent work has focused on post-glacial gravels and testing for buried bedrock channels that were missed by earlier mining. A total of 2000 m^3 of paydirt was processed over an extensive 28-week season.

Operator/owner Sam Vizi washed about 1000 m^3 of paydirt on his claim located immediately upstream of Quesnel Forks, on the south side of the Cariboo River. This site has been tested repeatedly, over the last several decades, targeting low level terraces. Gold enrichment has been reported from abandoned channel courses and channel junctions, and coarse gravel lags on channel scours are common targets.

HIXON

Len Kozak was again active on his lease on Government Creek, near Hixon. Production focused on a paleoplacer believed to be buried-channel gravel adjacent (and presumably below) the modern stream. Steep topography and groundwater posed a significant challenge to mining gravels that are close to the watercourse. Len processed 3500 m^3 of paydirt in six weeks.

RECLAMATION

Don Carter of Calverson Int. Ltd was recommended for the placer reclamation citation given annually by the Technical and Research Committee for Reclamation in British Columbia. Mr. Carter was nominated in recognition of the outstanding reclamation completed on the Yeates Lake Placer lease located near Lightening Creek. The three-hectare site was last worked in the mid 1990's. Reclamation work was contracted and paid for from a seized reclamation security. Reclamation consisted of extensive earthmoving, demolition of a large camp, removal of scrap and equipment, and recovery of non-combustible waste materials. Pits and trenches were backfilled and re-contoured; topsoil was spread and all areas seeded with forestry mix.

CONCLUSION

Placer activity during 2002 again decreased from the level witnessed in the previous year. Following a trend that has developed over the past several seasons the average size of an operation and the total exploration expenditures continued to decrease. However, unlike recent years, the reason may be less related to depressed gold prices and more to other factors, such as rising fuel costs. The price of gold rose above the US$300 benchmark, and at the time of writing has risen briefly above US$350. It is anticipated that several large programs will be executed in 2003, and the activity levels for small-scale mining and testing will increase, to reverse the general downward trend of previous

years. The largest programs are expected to be conducted in the Manson Creek area. As in the past, the majority of the activity will occur on the streams and creeks in the Wells-Barkerville, Likely, Hixon and Omineca placer gold camps.

OUTLOOK FOR 2003

The improved price of gold will continue to drive grassroots and advanced exploration for both high-grade gold and bulk tonnage gold-copper deposits throughout the Northeast-Central Region. This may result in the re-opening of one or more mines currently on 'care-and-maintenance' status. The level of placer gold testing and mining will increase in each of the region's traditional placer camps. Peace River coal properties will continue to be advanced towards full feasibility and production.

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