was driven in 1987 and the mine is producing today. Other structures have been intersected while miners were drifting underground, Muschocho's Steven Brunelle told *The Northern Miner Magazine*. But follow-up work on these structures will have to wait. "We're not drilling to increase tonnage," he said. The main concern, at this point, is to develop the known deposit.

Geologically, Magnacon is a typical quartz-vein host deposit that can fairly easily be followed underground. Reserves stand at 1.4 million tons of proven and probable ore grading 0.244 oz gold per ton. Where the angle of the deposit is steep enough, shrinkage stoping will be the preferred method, but where the deposit flattens out panel mining will be used.

Magnacon Fact Sheet

Location: . . . . . 45 km west of Wawa, Ont.
Major owners: . . . . . Flanagan McAdam Res. (50%), Muscocho Res. (25%), Windarra (25%) Minerals
Operator: . . . . . Muscocho
Reserves and category: . . . . . 1.4 million tons of proven and probable ore grading 0.244 oz gold per ton
Metal to be produced: . . . . . Gold
Discovery date: 1980
Production decision: . . . . . March, 1988
Start-up date: . . . . . First quarter, 1989 (commercial production)
Budgeted capital costs: . . . . . $30 million (approximate)
Actual capital costs: . . . . . N/A
Cash operating costs: . . . . . $75 per ton (projected)
Means of access: . . . . . 10x16-ft decline
Extent of horizontal workings: . . . . . Six levels to 600 vertical ft
Mining method: . . . . . Shrinkage stoping
Mining equipment: . . Trackless. 18-ton DUX trucks and 3.5 cu-yd Wagner scooptrams
Production rate: . . . . . 600 tons per day
Milling: . . . . . Merrill-Crowe, cyanide leach
Major contractors: . . . . . Mine: Patrick Harrison & Co. Mill: Orocon Inc.
Current status: . . . . . Pre-production

PASCALIS

Entering production in September, 1989, the Pascalis gold mine will add another 35,000 oz of annual production to Cambior Inc.'s growing gold output. In fact, the company is projecting a record 240,000 oz of production for 1990 – well up from the 185,000 oz produced in 1988.

Located 15 miles east of Val d'Or, Que., the Pascalis mine will be a low-grade operation, mining and milling ore averaging 0.1 oz gold per ton. Reserves total 1.2 million tons in the proven and probable catagory. Despite the low grade, Pascalis is expected to make money as a result of good mining widths and excellent ground conditions. Not typical of most gold deposits in the Rouyn-Val d'Or area, which usually occur as shear-hosted quartz veins, Pascalis gold is associated with a vertical dyke striking for 1,000 ft and averaging 30 ft in width. At depth, the dyke extends to below 1,000 ft. As a result of excellent deposit geometry, Cambior will utilize long-hole stoping – a bulk-mining method.

Providing access is a 1,250-ft 3-compartment shaft and 850 ft of lateral developments on each working level. Mining and milling at a rate of 1,100 tons per day, the operation will produce a gold concentrate on-site. Additional cyanidation processing will take place at Cambior's nearby Vezina mill north of Rouyn. The Vezina facility is one reason capital costs were kept to a low $6.75 million. Total project costs, including exploration, will total $15.5 million, Cambior estimates. The cost of producing an ounce of gold is forecast at $260 (C).

When it was discovered in 1982 by Soquem (the predecessor of Cambior) on a property owned by New Pascalis Mines, the deposit was extremely encouraging. Initial results included Hole 104 which intersected a wide 111.9-ft section of core grading 0.16 oz gold per ton. All the good news was quickly discounted by a calculation in 1985 that severely cut back reserves of 800,000 tons grading 0.158 oz gold per ton to a far more sobering 348,000 tons grading 0.198 oz gold.

After Soquem was privatized and renamed Cambior, the new company went back in and completed an underground program. The work enabled Cambior engineers to increase reserves at the expense of grade. Economic viability was maintained because of the good widths of the deposit and its amenability to low-cost bulk-mining methods.

Pascalis Fact Sheet

Location: . . . . . Val d'Or, Que., area
Major owners: . . . . . Cambior Inc.
Operator: . . . . . Cambior
Reserves and category: . . . . 1.3 million tons at 0.10 oz gold per ton proven and probable
Metal to be produced: . . . . . Gold
Discovery date: 1982
Production decision: . . . . . October, 1988
Start-up date: . . . . . September, 1989 (commercial production)
Budgeted capital costs: . . . . . $15.5 million (including exploration)
Actual capital costs: . . . . . $6.75 million
Cash operating costs: . . . . . $260(C) per oz gold produced (projected)
Means of access: . . . . . 3-compartment shaft, 1,250 ft deep
Extent of horizontal workings: . . . . . 850 ft on each level
Mining method: . . . . . Long hole, 6½-inch diameter
Mining equipment: . . . . . Trackless
Production rate: . . . . . 1,000 tonnes per day
Milling: . . . . Pyrite flotation and gravimetric separation, on-site; cyanidation of concentrate and refining at nearby Vezina mill
Major contractors: . . . . . N/A
Current status: . . . . . Pre-production

PREMIER GOLD

It is only fitting that Westmin Resources, Pioneer Metals and Canacord Resources named their mine project near Stewart, B.C., Premier Gold. After all, an orebody that produced 4.7 million tons with a recovered grade of 0.38 oz gold, 8.0 oz silver and significant base metals from 1919 to 1965 deserves some kind of tribute. And that will be assured when the famous Silbak Premier mine and the nearby Big Missouri mine, a former producer of lesser proportions, are brought back into production as a combined 2,220-ton-per-day operation in the spring of 1989. Accessible by gravel road from Stewart, the $88-million open-pit mine will have an average annual output of about 77,000 oz of gold and 890,000 oz of silver in its first four years.

Westmin and its partners made a production decision in early 1988 after spending about $12 million on exploration focused primarily on prospective surface zones of mineralization. Under an agreement that merged the projects, operator Westmin has a 50.1% interest, Pioneer Metals holds 40%, and Canacord has a 9.9% participating interest. Tournigan Mining has a 5% net profits royalty after payback of pre-production expenditures.

Mineralization at Silbak Premier consists of quartz-potassium feldspar carbonate-sulphide veins and breccia zones, as well as peripheral stockwork veining. At Big Missouri, semi-massive to massive lenses, pods and sulphide stringer zones occur within sericite-altered andesite and cherty tuff horizons as elongate, conformable, tabular zones. Ore mineralogies are similar at both properties: pyrite, sphalerite, galena and lesser chalcopyrite are the main sulphide minerals. Electrum (associated with sphalerite, galena and silver minerals) is the main gold mineral, while electrum, tetrahedrite and polybasite are the main silver minerals. Ruby silver is locally abundant at Silbak Premier.

Silbak Premier's diluted mineable reserves are 6.5 million tons grading 0.063 oz gold and 2.34 oz silver per

ton, while diluted mineable reserves at Big Missouri are 1.9 million tons of 0.091 oz gold and 0.67 oz silver per ton, sufficient for a 10½-yr mine life. There are reserves in other categories, and Westmin says numerous near-surface and deeper mineralized structures remain to be explored.

Mill construction should be completed in April, 1989, with commissioning to follow from April to July. When mining begins, ores from the Glory Hole pit at Silbak Premier and six pits at Big Missouri will be hauled to the plant at Silbak Premier. A large ore stockpile will be maintained to provide millfeed while mining is suspended during the winter. Mining will incorporate normal drill and blast methods with variable bench heights in waste and ore. The waste-to-ore ratio at Silbak Premier is 5.1:1, while Big Missouri averages 3.7:1. The milling process includes crushing, semi-autogenous grinding, cyanidation and carbon-in-leach. Recoveries of 94% for gold and 72.4% for silver are expected. Residues will be treated for cyanide destruction with sulphur dioxide technology and will flow by gravity to the tailings pond.

Premier Fact Sheet

Location: . . . . . 20 km north of Stewart, B.C.
Major owners: . . Westmin Resources (50.1%), Pioneer Metals (40%), Canacord Res. (9.9%)
Operator: . . . . . Westmin
Reserves and category: . . . . . 7.45 million tonnes of mineable ore grading 2.46 g gold per tonne and 69.602 oz silver per tonne.
Metal(s) to be produced: . . . . Gold and silver
Discovery date: 1904
Production decision: . . . . . January, 1988
Start-up date: . . . . . May, 1989 (commercial production)
Budgeted capital costs: . . . . . $88 million (excluding power)
Actual capital costs: . . . . . N/A
Cash operating costs: . . . . . $22.44 per tonne (projected)
Means of access: . . . . . Open pit
Extent of horizontal workings: . . . . . N/A
Mining method: . . . . . N/A
Mining equipment: . . . . . Two rotary drills, two bulldozers, a hydraulic shovel, a grader, a front-end loader, 6, 35-tonne haulage trucks
Production rate: . . . . . 2,000 tonnes per day
Milling: . . . . . On-site, crushing, SAG mill, grinding and CIL, carbon acid wash, pressure stripping, zinc dust precipitation, smelting
Major contractors: . . . . . N/A
Current status: . . . . . Pre-production

SAMATOSUM

The Samatosum deposit, under development by Minnova Inc. (70%) and Rea Gold Corp. (30%), is 20 miles east of Barriere, B.C. Although silver is the primary metal credit, the orebody also contains significant base metals and some gold, which should enhance profitability. Open-pit reserves stand at 610,000 tonnes grading 1.2% copper, 1.8% lead, 3.5% zinc, 32 oz silver and 0.052 oz gold per ton.

Much of the orebody is actually a stratabound quartz vein with lesser portions consisting of mineralized and altered wall rock material. Both ore types contain tetrahedrite, sphalerite, galena, chalcopyrite and electrum. The milling operation will have a nominal capacity of 500 tons per day, and total capital and indirect costs for the project are estimated at $32.2 million. The ore will be concentrated on-site and three products will be produced by flotation.

Most of the silver will be contained in a tetrahedrite concentrate, lead and some silver in a galena concentrate, and the zinc in a sphalerite concentrate. "The 3-concentrate approach maximizes the marketing flexibility and, therefore, the net smelter returns of the project," says Minnova.

An open-pit method will be used in the first 2½ years of operation, followed by a transition year to underground and ending with 1½ years of underground mining. Waste material is predominantly non-acid-generating, and this material will buffer the maximum 10% of that waste that has acid-generating potential. Tailings will be deposited conventionally behind an impervious till dam which will be raised by the downstream method. Tailings effluent will be passed through a monitoring and containment pond downstream of the main dam. Water not meeting quality guidelines will be pumped back to the main pond for further treatment.

Power will be provided by B.C. Hydro and fresh water from nearby Johnson Lake.

Samatosum Fact Sheet

Location: . . . . . 39 km (by road) east of Barriere, B.C.
Major owners: . . . . . Minnova Inc. (70%), Rea Gold (30%)
Operator: . . . . . Minnova Inc.
Reserves and category: . . . . . 774,000 tons (fully diluted)
Metal(s) to be produced: . . . . . Silver, gold, copper, zinc, lead
Discovery date: . . . . . July, 1986
Production decision: . . . . . October, 1988
Start-up date: . . . . . July, 1989 (commercial production)
Budgeted capital costs: . . . . . $32.2 million
Actual capital costs: . . . . . N/A
Cash operating costs: . . . . . $110 per tonne (projected or actual)
Means of access: . . . . . Open pit on hillside, adit and incline to underground
Extent of horizontal workings:
Underground: . 80 m high and 200 m long.
Open pit: . . . . . 80 m high and 250 m long
Mining method: . . . . . Open pit and longitudinal cut-and-fill
Mining equipment: (open pit) . . . . . 200-mm-diameter drill, 988 loader, 50-ton rear dump trucks, and Caterpillar D9 dozers
Production rate: . . . . . 422.5 tonnes per day
Milling: . . . . . 36x48-inch jaw crusher, 5½-ft shorthead cone crusher, 8x10-ft ball mill, flotation of three concentrates (copper, lead, zinc), and Larox filter press
Major contractors: . . . . . Proton Systems (engineering, procurement, and construction management)
Current status: . . . . . Pre-production, field construction began Oct 3, 1988

GREENSTONE

In 1986, Greenstone Resources picked up a large land position in the copper/gold belt of Quebec's Chibougamau area. Not even three years later, the holding will yield its first metal concentrate. Greenstone has announced that its Taché prop-