

SURINAME

By Peter W Harben & J M Harris

Peter W Harben Inc, New Mexico 88011, USA (www.peterharben.com)

Suriname is located in northeastern South America, bounded to the north by the Atlantic Ocean, to the east by French Guiana, to the south by Brazil, and to the west by Guyana. Formerly Dutch Guiana or Netherlands Guiana, the country was a Dutch colony until 1949 when citizens were allowed to elect a parliament to pass legislation on domestic matters, but the Dutch Government continued to control defence and foreign affairs. Following independence in 1975, a military coup overthrew Suriname's democratically elected government, and although democracy was restored in 1987, the military continues to hold sway.

Nevertheless, recent government's policies have aimed at developing activity in the private sector and attracting foreign investment, especially in the mineral resources sector. The government has approved a standard mineral agreement, which allows production and sale of minerals in the open market without restriction, access to foreign exchange at competitive rates, provisions for a tax deduction on reinvestment, and guarantees for the repatriation of capital and profits. The benefits include a royalty rate reduction to 2.25%, nominal licence fees for exploration and production, and exemptions for mineral rights holders from import duties on equipment used for mining, milling, and future expansions. Expenditures on prospecting, exploration, and other pre-production costs can be written off during the first five years of operations. In addition, ecotourism has been encouraged through the permanent protection of 1.6 Mha of untouched tropical forests in the country's dense interior. The country has had a continuing problem with garimpeiros, often illegal, and Brazilian gold miners who may constitute some 10% of the population and also create environmental concerns. Suriname and Brazil are planning to co-operate on a survey of the situation.

The traditional base of Suriname's economy has been its bauxite mining and refining which accounts for more than 15% of the country's GDP and 70% of its export earnings. Alcoa Inc's Suriname Aluminum Co's (Suralco) Coermotibo mine produces 2 Mt/y and is expected to double output within the next decade. A joint venture of Suralco (76%) and Billiton Maatschappij Suriname NV (BMSNV) of the Netherlands (24%) produces 1 Mt/y of bauxite at the Accaribo mine in the Para District, about 15 km from the refinery and 35 km south of the capital Paramaribo. When reserves have depleted, bauxite production will switch to the nearby Lelydorp III deposit, which has reserves of 19.5 Mt at a grade of about 53% Al_2O_3 , and will produce 2 Mt/y of ore. Reserves are estimated to be adequate to maintain operations until 2006. In 2003, Suralco broke ground on a US\$65 million expansion of its Paranam alumina refinery designed to increase capacity by 250,000 t to a total capacity of approximately 2.2 Mt/y. The expansion is expected to be

completed by July 2005. Affiliates of Alcoa and BHP Billiton own 55% and 45%, respectively, of the Paranam facility.

In addition to the clearance for the expansion of the Paranam alumina refinery, recent government agreements for bauxite exploration and exploitation included permission for Alcoa/BHP Billiton to jointly develop some 630 Mt of bauxite resources at Bakhuijs, 300 km southwest of Paramaribo. The two companies had initially proposed individual plans to mine bauxite. (The agreement also states that the companies will jointly exploit bauxite from two other areas where reserves are expected to last until 2032. Suralco has a concession in eastern Suriname and Billiton has a concession in central Suriname.) The exploration phase will cost US\$16 million (34.7 billion Surinamese guilders) and will last 22-25 months during which time BHP Billiton will try to prove reserves of at least 180 Mt of bauxite, the minimum amount for the refinery to be feasible. Alcoa will conduct the feasibility studies for the aluminium smelter and the hydroelectric dam. Alcoa and BHP Billiton have also agreed to invest US\$70 million (152 billion guilders) in the expansion of the existing bauxite refinery at the Suralco plant.

The Guiana Shield is a focus for mineral exploration as a result of the Cristinas gold discovery (12 Moz) by Placer Dome in Venezuela and the start up of commercial production by Cambior at the Omai gold deposit in Guyana (4 Moz). The deposits occur in Lower Proterozoic greenstone belts, which are hosts for high grade, shear-hosted gold deposits elsewhere in the world, such as the 50 Moz. Ashanti mine in Ghana.

In 2003, Cambior Inc received all the necessary permits and subscribed to the political risk insurance required to begin the construction and development of the Rosebel gold project approximately 80 km south of Paramaribo, and based on an estimated capital cost of US\$89 million (as of the end of 2003). The final construction phase started in the fourth quarter of 2003, commissioning in January 2004, and commercial production in February 2004. From February to December 2004, Rosebel is expected to process 4.6 Mt of ore at an average grade of 1.8 g Au/t and a gold process recovery of 92.5%, for a production of 245,000 oz of gold. This production excludes a permanent gold circuit inventory of 4,000 oz that will be retained in the carbon-in-leach (CIL) circuit for the duration of the operations. There is no plan to mill hard rock material in 2004. The primary source of mill feed will be the Pay Caro and East Pay Caro deposits, located in the north limb of the Rosebel property. The waste-to-ore ratio for 2004 is estimated at 1.9:1. The mine operating cost for 2004 is estimated at US\$184/oz. The increase in cost relative to the August 2002 feasibility study is primarily attributable to higher power costs as a result of the indexation to the gold price.

Capital expenditures for 2004 are estimated at US\$18.8 million, and include amounts to complete the construction programme (US\$6.0 million), acquire mine equipment (US\$4.3 million) and carry out exploration and development drilling (US\$4.0 million). A total of 34,000 m of diamond drilling will be

executed between March and December 2004 to expand reserves at known deposits and to find new deposits.

Canarc Resources Corp.'s Sara Kreek mine, 160 km south of Paramaribo, averages 10,000 oz/y from the small, open-pit placer operation. Gold production was first recorded from Sara Kreek in the late 1800s, when English and Dutch companies exploited the alluvial deposits. At their peak, several large dredges were in operation and a 200 km long narrow-gauge railway was built from Paramaribo to Sara Kreek, to service the hundreds of families living there. The gold fields produced over 500,000 oz. gold, then fell dormant for 50 years, until Suriname Wylap Development Corp modernised the placer mines and operated briefly in the late 1980s. Canarc acquired its property interests in 1993 and funded the re-commencement of placer gold mining in 1995.

The gold prospects at Sara Kreek exhibit shear-hosted or porphyry-type mineralisation related to quartz-carbonate veins or stockworks within volcano-sedimentary greenstone belts intruded by tonalite-diorite plutons along major crustal breaks within the Guyana Shield. Deposit potential here is estimated to be in excess of 1.0 Moz. Lode mining is based on a shallow open-pit truck-and-shovel operation, no drilling or blasting, an 8:1 strip ratio and an 8.5 month mine life. The placer mine is an open pit, excavator and hydraulicing operation. Processing returns 85%+ recovery using gravity methods. The ore is cleaned and screened in a trommel, reduced to ¼ inch in a crusher, ground to 80%-200 mesh in a ball mill, and the gold is separated using Falcon concentrators and a shaking table. A bulk sample for metallurgical testing consistently returned higher grades than the channel sampling. The placer mine recovers coarse gold only, using sluice boxes. Base case production for the DP mine is 13,600 oz. over 8.5 months, net capital costs estimated at US\$1.05 million and total operating costs of just US\$62 per oz! Similar positive exploration results were found at the ED, WP and PP prospects, leading management to believe that production will come from several high-grade open pits that could eventually coalesce into one large lode-gold mining operation.

The exploration targets at Sara Kreek are shear-hosted gold deposits with potential for several million tonnes containing several million ounces gold to a depth of 300 m. The two main gold mineralised shear zones have been traced semi-continuously over 13 km of combined strike length on the property. A second high-grade, open-pit lode mine is amenable to production in the near term. The Exploitation Concession measures 17 km x 19 km and covers 22,500 ha. Canarc owns a 100% interest (subject to a 20% net profits interest or a 1.5-5.5% net smelter royalty) in the subsurface mineral rights, as well as an 80% interest (reverting to 50% after payback of investment) in the surface mineral rights.

Benzdorp, located in southeastern Suriname, some 300 km southeast of Paramaribo, is historically the most prolific gold-producing region in the country. Gold production was first recorded in the region in the late 1800s when English and Dutch companies exploited the alluvial deposits. Since then

the Benzdorp district has produced over 1 Moz of gold, half from bucket-line dredging and half from small-scale hydraulic mining ('porknocking'). The Jungle Queen dredge alone produced over 500,000 oz over a 40 year period. In recent times, hundreds of illegal small-scale miners produce 10,000 oz/y of gold by reprocessing the river gravels. Most of the known gold prospects occur in the easternmost 5% of the property within a northeast-trending greenstone belt of meta-volcanic and meta-sedimentary rocks intruded by dioritic plutons. Every creek in the district has produced, or is currently producing, placer gold.

In 2003, Canarc acquired the Benzdorp property exploration concessions from Grassalco, the state mining company, and transferred them to its Surinamese JV company, Benzdorp Gold NV. The arrangement was finalised in early 2004 with the signing of the Articles of Incorporation by the President of Suriname and representatives of Canarc and Grassalco.

Canarc acquired its property option in 1996 and has conducted extensive exploration programmes including soil sampling, deep auger drilling, and deep bulldozer trenches. At 1,380 km², Benzdorp is one of the largest mineral properties in the country, although the main focus so far has been four gold prospects measuring 42 km x 31 km, totalling 138,000 ha. Canarc owns 40% of the voting shares of Benzdorp Gold NV and holds an option to earn an additional 40%, currently in escrow, by paying US\$300,000 to Grassalco, spending US\$3,000,000 on exploration and delivering a positive feasibility study. Grassalco's 20% of the voting shares gives it the right to receive either a floating net revenue interest of 1.5% to 6% based on the price of gold, or a 20% net profits interest after Canarc recovers all of its capital investment with interest.

Canarc's recent focus has been on trenching of the large JQA porphyry-style bulk tonnage target and the Pointu Kreek shear-type high-grade target that flanks JQA to the west. The company reported excellent gold recoveries from the saprolite mineralisation in the JQA prospect area; an 80% recovery rate was achieved from saprolite ore using simple gravity and flotation methods without recourse to crushing or grinding, indicating very low costs on a per oz or per tonne basis. Although additional gold recoveries are still possible through optimisation of the gravity and flotation circuits, Process Research Associates Ltd (PRI) recommends a test programme of grinding the soft and clay-rich saprolite ore. Reconnaissance prospecting and sampling on the Benzdorp property is attempting to extend the known belt of gold mineralisation north and south of the JQA prospect.

Late in 2003, Canarc announced drill results from the JQW prospect area, as well as copper assays from drilling in the JQA discovery area. Drilling at JQW encountered broad zones of alteration and veining in porphyritic rocks similar to those found in the JQA area. However, drill holes BZ03-24 to 28 generally returned narrower intervals of gold mineralisation, suggesting that JQW may be a different part of the mineralised system.

There could be similarities with the Boddington gold deposit in Western Australia (0.8 g/t Au, 0.12 % Cu), with by-product copper at Benzdorp potentially making a significant contribution to project value. The Phase 2 drilling programme in the JQA discovery area is designed to drill approximately 25 holes averaging 300 m in depth on a 100 m-spaced grid in order to estimate a partial gold-copper resource by the end of June 2004.