

# Golden place in the sun

The search for gold has stimulated an exploration boom in this highly prospective corner of West Africa

**B**URKINA Faso has a land area of just 274,000km<sup>2</sup> and a population of barely 15 million but is at the centre of considerable exploration interest at the moment.

Despite the burgeoning interest from mining companies during the past few years, Burkina Faso remains one of the world's poorest countries, with a per capita GDP of just US\$1,200.

The country is landlocked, being surrounded by Mali to the north, Niger to the east, Benin to the south east, Togo and Ghana to the south, and Côte d'Ivoire (Ivory Coast) to the west.

The economy of Burkina Faso is heavily dependent on external assistance and has few exports (cotton and, increasingly, gold being the most noteworthy products). Agriculture, which is highly vulnerable to variations in rainfall, accounts for about one-third of GDP.

This reliance on agriculture is about to change, according to the president of the Mining Association of Burkina Faso, Elie Ouederaogo. Six mines have been brought into production during the past five years but Burkina Faso is "just at the beginning" of its mining story, says Mr Ouederaogo.

He told *Mining Journal* that there are more than 60 exploration and mining companies in the country, with most from Canada, Australia or South Africa.

Mr Ouederaogo describes exploration as "intense, with new discoveries being announced, on average, every six months. He notes that most of the effort, so far, has been on the search gold, although he is confident of the prospects for further manganese, copper and zinc discoveries, in particular.

## DIFFICULT HISTORY

Upper Volta (Haute Volta) was established on March 1, 1919, when the French colonial government separated the territory of Burkina Faso from Upper Senegal and Niger. The new colony's first governor, François Edouard Hesling, initiated an ambitious programme of road building, and promoted the growth of cotton for export.

The colony was dismantled in September 1932, being split up between the Ivory Coast, French Sudan and Niger. The Ivory Coast received the largest share, which contained most of the population, as well as the cities of Ouagadougou (Burkina Faso's

current capital) and Bobo-Dioulasso.

The decision was reversed during the intense anti-colonial agitation that followed the end of World War II. The colony was revived (back to its previous boundaries) in September 1947 (as a part of the French Union). The country became the Republic of Upper Volta (and a member of the Franco-African Community) when self-government was achieved in December 1958.

The Republic of Upper Volta achieved independence from France in 1960, with the national flag taking its colours from the names of the three Volta rivers. The country was renamed Burkina Faso on August 4, 1984, by President Thomas Sankara.

Burkina Faso means 'the land of upright people' in Moré and Dioula, the major native languages of the country. Literally, Burkina can be translated 'men of

*Blaise Compaoré, president of Burkina Faso, speaks at the 64th annual UN General Assembly in New York, September 2009*

*Photo: Bloomberg News*

"New discoveries are being announced, on average, every six months"



integrity' from the Moré language, and Faso means 'father's house' in Dioula. The inhabitants of Burkina Faso are known as Burkinabè.

After gaining its independence, the country underwent many governmental changes until arriving at its current form, a semi-presidential republic. The country suffered repeated military coups during the 1970s and 1980s, with the current president, Blaise Compaoré himself coming to power in a military coup in 1987. President Compaoré has won every multiparty election during the past 23 years.

The constitution of June 1991 established a semi-presidential government with a parliament which can be dissolved by the president (elected, at that time, for a term of seven years).

The parliament consists of two chambers: the lower house, known as the National Assembly, and the upper house, the House of Representatives. There is also a constitutional chamber, composed of ten members, and an economic and social council whose roles are purely consultative.

The constitution was amended in 2000 to reduce the presidential term to five years (taking effect from 2005). The amendment would have prevented the sitting president, Blaise Compaoré, from being re-elected but the constitutional council ruled in October 2005 that the amendment would not apply to President Compaoré until the end of his second term in office. He was re-elected in November 2005 (helped by a divided political opposition).

A new election is due later this month. Mr Ouederaogo is adamant that the outcome will not affect the mineral exploration scene generally, or the ongoing discussions about royalty rates specifically (see below).

## NATURAL ENVIRONMENT

Burkina Faso's 15 million people belong to two major West African cultural groups; the Voltaic Mossi and the Mande (whose common language is Dioula). The Voltaic, who make up about one-half of the population, claim descent from warriors who migrated to present-day Burkina Faso from Ghana and established an empire that lasted more than 800 years.



Most of the population are concentrated in the centre and south of the country. From the south, hundreds of thousands of Burkinabè migrate to the Ivory Coast and Ghana, many for seasonal agricultural work.

Over 80% of the population is engaged in subsistence agriculture and nomadic stock-keeping. In the south and southwest, especially, agriculture consists of growing sorghum, millet, maize, peanuts, rice and cotton.

The country owes its former name of Upper Volta to three rivers which cross it: the Black Volta (or Mouhoun), the White Volta (Nakambé) and the Red Volta (Nazinon). The Black Volta, along with the Komoé, which flows to the southwest, is one of the country's only two rivers which flow year-round.

Burkina Faso is typified by undulating savannah and, in the north, by limited rainfall. Much of the country is covered by a peneplain, which forms a gently undulating landscape. Although relatively flat (the average altitude is 400m), there are a few isolated hills (the last vestiges of a Precambrian massif) and in the southwest there is a steeply-sided sandstone massif, where the highest peak (Ténakourou) reaches 749m.

The basin of the Niger River drains almost one-third of the country's surface. The country also contains numerous lakes, with the principal ones being Tingrela, Bam and Dem. Water shortages are a problem, however, especially in the north of the country. Burkina Faso's fauna and flora are protected in two national parks and several reserves.

Burkina Faso has a primarily tropical climate with two very distinct seasons. In the rainy season (May/June to September – shorter in the north), the country receives 600-900mm of rain, and the harmattan (a hot dry wind from the Sahara) blows in the dry season.

Three climatic zones can be defined:

- **Sahel** - A relatively dry tropical savanna, the Sahel extends beyond the borders of northern Burkina Faso, from the Horn of Africa to the Atlantic Ocean, and borders the Sahara to its north and the fertile region of the Sudan to the south. The area receives under 600mm of rainfall per year and has high temperatures (5-47°C).

- **Sudan-Sahel** - Situated between the latitudes 11°3' and 13°5' north, the Sudan-Sahel region is a

## FAVOURABLE GEOLOGY

The geology of Burkina Faso is dominated by Palaeoproterozoic rocks that underlie most of the country. Younger rocks crop out only in the far west and southeast of the country, respectively as part of the Taoudenni and Volta sedimentary basins.

The majority of the Palaeoproterozoic terrain consists of granitoids, with subordinate migmatitic gneisses, cut by a large number of predominantly northeast to north-northeast-trending greenstone belts hosting the volcanosedimentary rock sequences of the Birimian Supergroup.

These greenstone belts host the majority of the country's mineral occurrences, notably gold, zinc, manganese, copper, nickel and antimony. Neoproterozoic phosphate rocks occur in the southeast of the country close to the borders with Benin and Niger, and small bauxite occurrences and marble deposits are found in the westernmost Neoproterozoic and Palaeozoic sedimentary cover. Burkina Faso's natural resources also include limestone, marble, pumice and salt.

transitional zone with regards to rainfall and temperature.

- **Sudan-Guinea** - Further to the south, this zone receives more than 900mm of annual rainfall, and has cooler average temperatures.

### POLITICAL SCENE

The mining sector is quickly increasing in importance, and this inward investment has benefited from a mining code that was adopted in 2003. Under this mining code, the advantages conceded to mining companies included:

- Customs duties reduced from 7.5% to 2.5% (during the construction phase);
- No state free-carried interest in small-scale mines (10% previously);
- Corporate income tax cut to 25% (35% before);
- Withholding tax on dividends set at 7.5% (from 12.5%).

Moreover, the country's regional mining code, the Union Economique et Monétaire Ouest Africaine (UEMOA) prevails over the national code, and on some points it is more favourable. The government also limits state participation to a maximum of 10% in

large-scale mining operations.

Importantly, the West Africa region is also working toward a unified mining code (through the 15-member Economic Community of West African States). This code is intended to boost investment in

the region and, importantly, help in reduce the perceived operating risk.

For the past eight months the government of Burkina Faso has been discussing new royalty rates, and other profit-sharing initiatives, with mining companies active in the region. Mr Ouederaogo expects a deal in the near future, and said that the two sides were looking for a "win-win compromise". The government will share some of the benefits accruing to mining companies from the sharply higher metals prices, while offering added security and

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certainty for companies making long-term decisions.

Mr Ouederaogo conceded, however, that Burkina Faso was not yet a fully fledged 'mining country'. To achieve this status, the relevant administration needs to be "reinforced", he said. This administration will need to understand the issues and implement the necessary policies, although he is sure that the government itself now appreciates what needs to be done.

In the meantime, there is a shortage of drilling equipment in the country, with rigs being drawn in from neighbouring countries, especially Mali. Mr Ouederaogo described this as "good news" because it demonstrated the heightened level of exploration activity in Burkina Faso.

### SEARCH FOR GOLD

West Africa has historically produced and delineated over 280Moz of gold. The region includes eight gold deposits of over 5Moz each (the total rising to 11 if historical production is included).

According to London-based precious-metals consultancy GFMS, West Africa is the fastest-growing gold-producing region in the world. Mine production in the region has grown at a compounded annual rate of over 4% during the past ten years, compared with total global mine supply which actually declined slightly over the same period. Annual gold production from the region was some 6Moz last year, and the annual rate of output is expected to exceed 8Moz next year.



Moreover, the region's exploration potential remains substantial. Around the world, most of the prolific gold mines are on greenstone belts, and these belts cover about 3 million km<sup>2</sup> of West Africa (half of the total land area).

Only a few countries in West Africa have been well explored, and a report by Clarus Securities estimated that within two years the region will be producing more gold than South Africa.

Clarus highlights the region's potential by comparing it with Canada, which has a comparable greenstone belt exposure (around 50% of total land cover). Over US\$3 billion is typically spent on exploration in Canada each year (some US\$10 billion over the past 10 years), compared with barely an annual US\$2 billion in the whole of West Africa during the past few years.

There are currently 30 operating mines in the region; 25 are open-pit mines and five combine open pit and underground mining. Near surface mineralisation is easy exploration and less costly to develop which explains the current distribution.

Clarus highlights that with current pit depths averaging 250m (there is a range of 35-600m) and mineralisation traced to depths of about 2.5km at Obuasi in Ghana (AngloGold Ashanti Ltd) and 1.3km at Loulo in Mali (Randgold Resources Ltd 80%) the underground potential is yet to be fully tested in the region.

The region's weighted-average cash costs were US\$404/oz (US\$298-US\$740/oz range) in 2009, which compares favourably with the global industry average of US\$457/oz last year.

The topography in the region is relatively flat, which not only allows for ease of exploration but enables good oxidation of near surface mineralisation which enhances recoveries. In addition, this flat topography coupled with cheaper labour cost culminates in a low discovery cost in the region (estimated by Clarus at an average of barely US\$11/oz). Moreover, with mining contributing to a significant part to the GDP of individual countries in West Africa, mining receives considerable political support in the region.

Clarus expects gold output in West Africa to continue increasing because of booming exploration in the region's relatively less-explored countries. Clarus highlights Burkina Faso in its list of these under-developed nations, noting that the country had the greatest exposure to unexplored greenstone belts.

# Corporate gold activity

Burkina Faso accounts for an exceptional 21% of West Africa's total greenstone belt exposure. This mineral potential is being investigated by a number of mining companies, some of which are outlined below.

## Ampella Mining

Ampella Mining Ltd has been exploring in Burkina Faso since listing on the Australian Securities Exchange (ASX) in August 2007. The company is targeting the Proterozoic Birimian Greenstones, with permits covering a total area of almost 2,000km<sup>2</sup>.

Two months ago, Ampella revealed plans to raise almost A\$43 million (currently US\$43 million) for exploration at the company's Batie West gold project (by offering 21.5 million shares at A\$1.95 each).

Batie West includes the Konkera deposit, where a maiden resource was announced at the end of 2009. The resource of 18.6 Mt at 2g/t Au for 1.2Moz (1.0g/t Au cut-off, 16 g/t Au top-cut) was calculated using data from 132 reverse circulation holes and 32 diamond-drill holes.

The maiden Konkera resource contains a "high-grade component" of 6Mt at 3.2g/t Au for approximately 612,000oz (2g/t cut-off). The Konkera resource estimate is principally contained within the top 100m from surface and further deep drilling has been undertaken to extend the mineralisation.

At the time, Ampella said: "Konkera is the first of many strong gold anomalies that will be drill tested for gold mineralisation along a 110km long gold-bearing shear zone within the virgin Batie West gold province".



Ampella subsequently purchased three permits to strengthen its position in Batie West, bringing the total number of permits to nine, covering 1,800km<sup>2</sup>. The new permits, known as Dounkou, Niorka and Bottara, are situated at the centre of the project and cover about 10km of the shear zone.

## ALS LABORATORY GROUP

ALS's services to the mining sector include the provision of geochemistry, mineralogy and environmental monitoring. The company established a presence in West Africa with the acquisition of Canadian laboratory company ABILAB, and now has a minerals division in Ouagadougou.

## Avocet Mining

Avocet Mining plc has accelerated its exploration programme in northern Burkina Faso during the second half of this year. In September the company intersected gold mineralisation during drilling on the Souma Trend property, near its 90%-owned Inata gold mine (acquired as part of the acquisition of Wega Mining ASA in mid-2009). The holes tested a portion

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## Tanlouka Gold Project / Burkina Faso, West Africa

- New gold discovery
- Drilling to resume in November

[www.channelresources.ca](http://www.channelresources.ca)  
TSX.V: CHU

## Fox Creek Lithium / Potash Brine Project

- Process testing underway



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of a 16km-long gold soil geochemical anomaly.

This intersection followed reports the previous month of positive results from drilling at the company's Dynamite prospect on the Souma Trend. The holes intersected mineralisation associated with minor quartz veining within sheared and altered gabbro.

In mid-year, Avocet sold the Houndé group of licences to Avion Gold Corp for 10.3 million Avion shares.

Avocet's Inata mine commenced production in December 2009, and reached its target rate of 10,000oz/month in May this year. The mine achieved 40,461oz in the three months to end-September at an average cash cost of US\$526/oz.

The operation is expected to produce at least 120,000oz/y for seven years from NI 43-101 mineral resources containing 1.7Moz. It is anticipated that additional gold resources from nine exploration licences surrounding the 26km<sup>2</sup> mining permit will be defined in due course.

The gold mineralisation at Inata can be traced over a continuous 4km strike length and occurs within silicified volcanoclastic rocks, porphyries and vein quartz that occur within a large shear zone. The proven and probable reserves will be mined from three principal pit areas: Inata North, Central and South. Three smaller pits will be developed during the life of the project.



Airborne geophysical survey conducted by Avocet

### Blackthorn Resources

Blackthorn Resources Ltd (formerly AIM Resources

Ltd) has a diverse portfolio of African assets in Burkina Faso, Ghana and South Africa.

In August, Blackthorn signed a binding agreement with Glencore International AG for a joint venture concerning the Perkoa zinc project in Burkina Faso. Under the terms of the JV, Glencore would invest US\$80 million in the project in return for a 50.1% interest. The initial US\$50 million would be in equity, with up to US\$30 million in project financing.

Development of Perkoa had been suspended in mid-2008. The zinc mineralisation is hosted by a Volcanic Massive Sulphide orebody situated within the Boromo Greenstone Belt. The Perkoa orebody

contains proved and probable JORC-compliant reserves of 6.3Mt at 13.9% Zn.

The deposit was discovered in the early 1980s by a UN-funded mineral exploration programme. The mineralisation consists of massive pyrite-sphalerite-pyrrhotite-barite ore with minor amounts of lead and copper sulphides. The deposit is, so far, the only VMS identified in the Paleoproterozoic terranes of West Africa.

The company's other activities in the country are centred on seven exploration permits, covering 1,134km<sup>2</sup>, which are prospective for gold and base metals. The first phase of reverse-circulation drilling, in May 2009, intersected gold mineralisation at several zones. The holes tested the Q22, IK and POA prospects, and were a follow-up of targets generated by surveys.

### Channel Resources

Channel Resources Ltd made a new gold discovery at its Tanlouka property in August. The Vancouver-based company had recently resumed exploration drilling at the project with a 10,000m reverse-circulation programme to follow up on two recent discoveries and to assess multiple untested targets.

Exploration at Tanlouka has been focused on the Mankarga zone, a 5km<sup>2</sup> area in the south of the 105km<sup>2</sup> permit. An initial drilling programme of 1,100m in 11 holes was drilled before the onset of heavy rains in mid-year, resulting in the discovery of two separate mineralised zones in targets 1.3km apart. Targets have been outlined by soil geochemical anomalies, high resistivity and chargeability structures, magnetic anomalies, as well as extensive artisanal workings.

Following this initial success, the company has expanded the programme for an additional 10,000m of reverse circulation drilling in approximately 65 holes.

One of the main targets of this programme is the Mankarga 5 structure which was first intersected by holes T2010-7 (48m grading 1.17g/t Au) and T2010-8 (83.5m grading 0.94g/t Au).

“Channel Resources Ltd made a new gold discovery at its Tanlouka property in August”



Foundations being prepared for Blackthorn Resources' Perkoa processing plant

## BANLAW AFRICA

Established in 2000 as a multi-discipline company, Banlaw acts as a contractor for earthworks, infrastructure and mine construction. Other areas of expertise include contract mining, mine infrastructure maintenance and geotechnical services.

The company has particular experience in West Africa, and has the advantage of having its own fleet of earthmoving equipment. Co-founder Richard Levack heads a management team of expatriates and experienced African nationals.

The company has its headquarters at Tarkwa in Ghana, with regional offices in Ouagadougou (Burkina Faso) and Abidjan (Ivory Coast).

The office in Burkina Faso was established in 2006 and, soon after, the company was awarded a number of high-profile and significant jobs (including building facilities at the Inata mine). Other recent contracts in the country have included excavating the box cut for the underground development at Blackthorn Resources' Perkoa zinc mine, aggregate production for concrete and general services to lamgold at Essakane, and initial mining contracting, construction of heap-leach pads and recovery ponds at Cluff Mining's Kalsaka gold mine.

Banlaw employs over 650 people in Africa, and over 100 in Burkina Faso alone.



### Cluff Gold

One of the company's two producing gold mines is the Kalsaka operation in Burkina Faso. Owned 78% by Cluff Gold plc, the mine was commissioned in June 2009, and currently hosts 640,000oz of measured and indicated resources (including 298,000oz of proven and probable reserves), and an additional 160,000oz of inferred resources.

Having achieved commercial production, the next goal for Kalsaka is to improve its production and cost levels. The company notes that "various mining, processing and infrastructural improvements have been made to achieve this goal". With the recently replaced mining contractor, an additional mining fleet, and plant modifications to increase throughput to 1.6Mt/y (from 1.2Mt/y in the feasibility study), Kalsaka is expected to achieve its increased production target of 70,000 ounces for 2010.

Algy Cluff, the company's chairman and chief executive, said that the commissioning of the mine was just the first phase of the open-pit, heap-leaching operation, as further exploration targets would be targeted.

Mr Cluff forecast an expansion of the operation to form a central processing plant as a hub for a number of satellite deposits in the area, which is 150km northwest of Ouagadougou.

The Kalsaka licence is owned by Kalsaka Exploitation Co, in which IMAR-B (a local company) holds 12% and the government 10% (free carried). The exploitation licence covers some 25 km<sup>2</sup> and is valid for an initial term of 20 years.

### Endeavour Mining

In September, Endeavour Mining Corp acquired Etruscan Resources Inc, whose main asset was the 90%-owned Youga gold mine in Burkina Faso. The remaining 10% of Youga is held by the Burkinabe government.

Youga reached commercial production in July 2008 and is forecast to produce an average of 88,000oz/y over almost seven years. The mine is located on the 80km strike length of the Youga gold belt, which extends to the southwest into Ghana as the Bole-Bolgatanga gold belt. Through Etruscan, Endeavour now controls in excess of 1,000km<sup>2</sup> of this belt, and believes that its future growth will come from developing satellite deposits.

Exploration at Youga has improved the understanding of the structural controls on the deposit, and



Drilling at Gryphon's Nogbele deposit

The phase 2 programme is nearing completion, and returns from the first five holes showed "significant mineralisation", according to the company.

The primary objective of the programme was to test the Main Zone mineralisation, which CEO Len Brownlie says was confirmed to a depth of 160m by the work.

### Gryphon Minerals

Gryphon Minerals Ltd is focused on West Africa, the company having divested its non-core Australian assets to Renaissance Minerals Ltd earlier this year. In Burkina Faso, the company's efforts are centred on the wholly-owned Banfora gold project in the southwest of the country.

These efforts were helped in

September last year when the International Finance Corp (IFC, a member of the World Bank Group) confirmed plans to assist Gryphon in Burkina Faso.

The IFC made an equity investment of A\$2 million (US\$1.7 million) to finance exploration and feasibility studies at Banfora. If the exploration is successful, IFC said it will work with the company to implement best-practice environmental and social management. The IFC will also help local businesses become suppliers.

Gryphon recently increased the inferred resource at Banfora to 21Mt at 2.2g/t in the Nogbele and Fourkoura deposits (located 7km apart). This lifted the estimated contained gold to 1.5Moz. Mineralisation remains open at depth and along strike, and 90% of the current resource is shallower than 100m.

The latest update follows an exploration programme comprising 15,000m of reverse-circulation and diamond-drilling, plus 10,000m of rotary air-blast reconnaissance drilling. These holes have been testing five "high-priority targets". This followed drilling that had identified at least three parallel gold zones, about 300m apart at Nogbele.

### lamgold

lamgold Corp operates eight gold mines, one of which is the 90%-owned Essakane operation in Burkina Faso. The Burkinabe government holds the remaining 10% interest. The mine commenced production six weeks ahead of schedule in July, and is expected to achieve more than 500,000oz of production by the end of 2011, and an average 315,000oz/y over more than nine years, at cash operating costs of US\$400-410/oz.

The Essakane property consists of six exploration permits (Tassiri, Alkoma, Gomo, Gossey, Lao Gountouré and Korizéna), covering an area of 1,069km<sup>2</sup>. The Essakane main zone deposit (EMZ) is located in the north central part of the Tassiri permit. lamgold gained control of Essakane following its US\$139 million acquisition of Orezone Resources Inc in February 2009. lamgold president and chief executive Joseph Conway said the deal would take the company "to the next level", and closer to its aim of becoming a 1.8Moz/y gold producer by 2012.

Essakane contains some 57Mt of probable ore reserves at 1.7g/t, for 3.1Moz of contained gold. There are a further 77Mt in the indicated category

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has led to the generation of new drill targets. Follow-up drilling is currently underway at the A2NE and Zergoré deposits, and initial results of this work are expected to contribute to additional mineral resources that will be reported by the end of December 2010, with the balance of the campaign to continue into 2011.

In May, Etruscan Resources had reported intersected high-grade gold mineralisation during reverse-circulation drilling at its Ouaré prospect, part of the Bitou exploration permit, about 40km from the Youga gold mine.

Neil Woodyer, the chief executive of Endeavour commented "we are pleased with the acquisition and solid performance of Youga. In addition, the exploration campaign we have underway within the Youga mine permit area is expected to increase mineral resources and reserves and extend the mine life.

### Goldrush Resources

Goldrush Resources Ltd began exploring for gold in Burkina Faso in January 2006 following the signing of a strategic alliance with High River Gold (now terminated), and acquired 21 exploration permits from that company.

The company's flagship project is

Ronguen, and in September the Vancouver-based company completed Phase 1 of a drilling and trenching programme (funded by two fully-subscribed financings in March and September this year). The better assays from the 12 core holes included 4.47g/t Au over 7.6m (including 33.8g/t over 0.8m), 3.37g/t over 7.2m, 1.49g/t over 9m (including 3.35g/t over 3.15m) and 1.33g/t over 10m (including 6.31g/t over 1.1m).

"lamgold Corp operates eight gold mines, one of which is the 90%-owned Essakane operation in Burkina Faso"

Aerial view of Cluff Gold's Kalsaka operation



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and 16Mt in the inferred category, at similar grades, for a combined additional 4.9Moz.

**Mt Isa Metals**

Mt Isa Metals Ltd (MET) is an Australia-based resource company focused on the discovery and development of large-scale gold and copper deposits. The company holds substantial tenement positions in two world-renowned mineral provinces.

One of these is the Birimian gold province of West Africa, and MET has secured (through option agreements) a large tenement position in Burkina Faso. The company claims that the tenements include "multiple prospects with identified high-grade gold assays and are considered highly prospective for future gold discoveries".

MET began exploring in the country in mid-2010 and has so far recorded high-grade gold assays across eight prospect areas. The targets include the Yactibo, Tapoa and Kongolokoro projects.

**Orezone Gold**

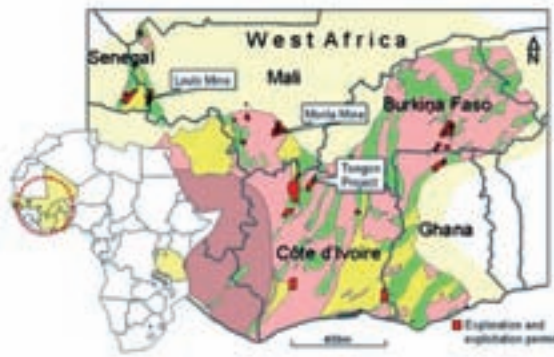
Canada-based Orezone Gold Corp was formed in 2009 from the repackaged assets of Orezone Resources after the latter sold certain assets (including the Essakane mine) to Iamgold (see above). The new company's properties include Seguenega, Bondigui and Bomboré.

Seguenega covers an area of 164km<sup>2</sup> in northwestern Burkina Faso, about 200km north of Ouagadougou. There are three major mineralised zones (RZ, Bakou and Gambo) located within a 2.5km<sup>2</sup> area on the flanks of a large intrusive complex.

The Bondigui property covers 340km<sup>2</sup> in the Houndé Greenstone Belt in southwestern Burkina Faso, about 270km southwest of Ouagadougou.

Orezone's flagship project is the 100%-owned Bomboré, which is on the main highway from the capital city, Ouagadougou, 85km away. A year ago, the company announced positive metallurgical tests, saying: "all results for the near-surface oxide and transition (mixed oxide/sulphide) resources are better than estimates previously used for an in-house scoping study, and will therefore enhance the economics of the project".

Last month an infill and expansion drilling programme at Bomboré raised the possibility of a



*Randgold Resources is not yet very active in Burkina Faso, despite significant developments in neighbouring countries*

The company's assets in the region include, in Mali, the Morila (58,174oz in the September quarter) and Loulo (78,200oz) gold mines, and the Goukoto project (where a feasibility study is due by the end of this year). In the Ivory Coast, Randgold's Tongon gold mine reached commercial production earlier this month, and the company has advanced projects at Kibali (DRC) and Massawa (Senegal).

As well as advancing these strategic projects, Randgold is active on "generative work and research", most notably in Burkina Faso and southern Mali. The company announced recently that "target generation has since identified new exploration opportunities, which are in the process of being followed up".

**Riverstone Resources**

Riverstone Resources Inc has been actively exploring in Burkina Faso for the past seven years. During that time, the company has built a portfolio of six gold projects, one of which hosts a current NI 43-101 compliant gold resource of 1.14Moz, and is being drilled further to expand the known resource before commencing pre-feasibility studies.

The original resource estimate for the flagship Karma project was completed in May 2009, and a new estimate is planned for completion early in 2011.

The project consists of four contiguous permits (held 100% directly or under option); Rambo, Kao, Goulagou I and Goulagou II. These are located within a few kilometres of each other and preliminary assessments indicate that these deposits provide the potential for development using a centralised gold processing facility.

The independent NI 43-101 compliant resource study at Karma, completed in May 2009, estimated a resource totalling 1.14Moz. Since that time, a new discovery has been made at the Nami site, an area of current artisanal mining activity.

Riverstone has also been working on its other five projects in Burkina Faso. Work on the Ligidi project has identified a very large geochemical anomaly, and grid sampling of loose rocks in one area has identified a zone 1,000m long by 300m in width, identified within a 1g/t contour, where the average grade of the

second treatment option. The programme had been designed to confirm oxide mineralisation for a heap-leaching operation, but results have raised continuity and grade of fresh-rock mineralisation below the oxides.

The deposit now boasts 1.6Moz of indicated resources and 1.9Moz of inferred resources, making it the second largest gold deposit in the country.

Overall gold contained within open-pit outlines rose by 59%, with average grade rising by 48%. The company said it would include carbon-in-leach treatment of the fresh-rock resources in a scoping study expected to be completed during the March 2011 quarter.

Orezone said about 80% of the resource occurs within 80m of surface, but remains open at surface and at depth. Equal priority had been given to drilling of both mineralisation types.

Orezone's president and chief executive, Ron Little, said the resource increase made Bomboré "the largest undeveloped gold deposit in Burkina Faso".

**Randgold Resources**

Randgold Resources Ltd is one of the most active gold-mining developers in West Africa but has, as yet, relatively little in Burkina Faso. (Resolute Mining Ltd is in a similar position.)

*"MET began exploring in the country in mid-2010 and has so far recorded high-grade gold assays across eight prospect areas"*



rocks is 2.6g/t Au.

Three of the projects (Yaramoko, Solna and Bissa West) have been optioned out, with the partner spending US\$4.5 million on exploration. Riverstone will retain a 40% interest in the projects. Drilling on the Yaramoko project has confirmed a promising new discovery directly south of Semafo's Mana gold mine.

**SearchGold**

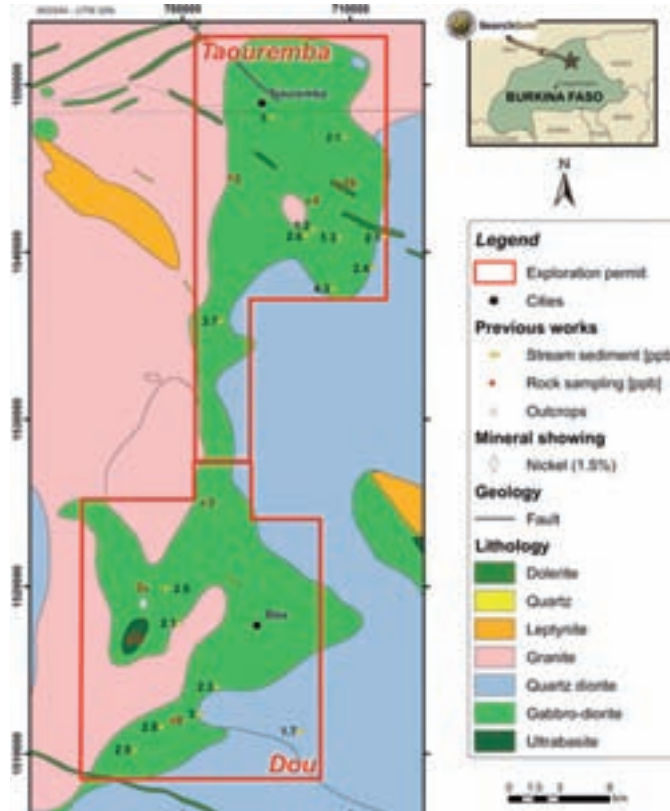
Montreal-based SearchGold Resources Inc's assets in Burkina Faso include two new wholly-owned permits (Dou and Taouremba), which cover 241km<sup>2</sup> and 211km<sup>2</sup>, respectively, in the Sanmatenga and Seno provinces, approximately 300km north of Ouagadougou. The company's 100%-owned Zitenga II project, with an area of 184 km<sup>2</sup>, lies 40km northeast of Ouagadougou.

SearchGold entered into an option agreement in September 2008 with Somika SARL to acquire an eventual 100% interest in the 400 km<sup>2</sup> Arae-Gassel gold property in northern Burkina Faso (the property directly adjoins Avocet's Inata licence area).

At that time, SearchGold agreed to pay US\$110,000 in cash, issue Somika with 800,000 shares and incur a total of US\$750,000 in exploration expenditure over the first year. Under the terms of the deal, Somika would retain a 3% net smelter return but SearchGold has the right to purchase up to half of this NSR for US\$1.5 million.

In July 2010, SearchGold completed an agreement with Swala Resources plc for the private UK company to purchase the remaining 60% of Arae-Gassel for 4.57 million shares (10% of Swale's issued capital).

SearchGold's CEO, Philippe Giaro, described Swala's management as "a team of acknowledged



SearchGold's Dou-Taouremba permit

Wona project (focusing, particularly, on the NE extension).

**Severstal**

ZAO Severstal increased its exposure to Burkina Faso last year with the acquisition of High River Gold Mines Ltd. The latter operates the 90%-owned Taparko-Bouroum open-pit, located 200km northeast of Ouagadougou. The mine poured its first gold in July 2007, and has proven and probable reserves of 8.86Mt at 2.81g/t for 800,000oz. The operation is expected to produce 100,000-140,000oz/y, at a total cash cost of US\$234/oz, for a further six years.

High River's assets included the Bissa gold project, which can support an open-pit operation capable of 95,000oz/y according to a feasibility study by consultant Genivar. The study, announced two months ago, included contributions from consultants SRK and AMMTEC.

Mineralisation at Bissa occurs within laterite, saprolite, transition and fresh rock zones. SRK considered gold

African experts, which is exceptionally well suited to aggressively develop the company".

Mr Giaro added "recent drilling results from Arae-Gassel have further outlined the potential of the project. The consolidation of the property in one entity will allow Swala to fast track its development."

Swala's management team comprises mainly ex-Anglo American senior executives. The company says it intends "to leverage its mining, political, technical and exploration skills to establish a strong foothold in Africa".

mineralisation within laterite-saprolite and transition-fresh rock had sufficiently differing economic characteristics to justify different cut-off grades, and reported separate estimates for each type.

The study designed conventional open-pit truck-and-shovel mining at a rate of 4,300t/d of ore and up to 25,000t/d of waste, exploiting resources within 14 pits in seven zones.

The ore would be fed to a processing plant comprising crushing, ball-milling and carbon-in-leach gold extraction. Gold recovery would be by pressure-stripping and electrowinning, followed by on-site smelting to doré.

Gold recovery was estimated at 91%.

Capital costs were estimated at US\$123 million, comprising US\$110 million in pre-production costs and US\$13 million in sustaining costs. Average total cash costs were

estimated at US\$467/oz of gold produced over the seven-year life.

**"ZAO Severstal increased its exposure to Burkina Faso last year with the acquisition of High River Gold Mines Ltd"**

**Semafo**

Canada-based Semafo Inc operates gold mines in Niger (Samira Hill, owned 80% through Société des Mines du Liptako SA), Guinea and Burkina Faso. In the latter, Semafo owns 90% of the Mana gold mine. Situated some 200km west of Ouagadougou, construction of the mine was completed in 14 months by mid-2008. In 2009, the mine's first full year of production, output reached 153,500oz. Production this year is expected to exceed 170,000oz.

In May this year, Semafo raised C\$120 million to fund a new fleet at its Samira Hill mine and for exploration activities at Mana. The 2010 exploration programme at Mana includes 18,000 auger-drilling samples, ground geophysics, geological mapping and drilling. At end-April the deposit had reserves totalling 1.7Moz.

Meanwhile, the company has completed the first two phases of the plant expansion at Mana, with the third phase due for completion by the end of this year.

The company has also tested two new zones at the



Riverstone activity in Burkina Faso

*continued on page 21*

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Semafo Inc's Mana operation

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Kampti-III gold projects in the southernmost part of the country; the Titao gold-project in the northeast; and the Kiaka gold project.

Volta acquired Kiaka in September 2009 from Randgold Resources Ltd for C\$7.6 million in cash and shares. At that time the size of the deposit was given as 81Mt at 1.01g/t, and Randgold said it did not fit its "development profile, and is better suited to Volta".

The Kiaka exploration permit covers an area of 244km<sup>2</sup> 120km southeast of Ouagadougou. The permit lies at the intersection of the northeast striking Tenkodogo greenstone belt and the north striking Markoye fault, in whose proximity some of the larger gold resources in Burkina Faso have been discovered.

The property hosts several highly prospective targets, the most advanced being the Kiaka Main Zone (KMZ) and the Kiaka Hangingwall South Zone (KHZ). The former is a 2,800m-long, steeply-dipping, northeast-striking, mineralised dilation structure with numerous intersections exceeding 100m at over 1g/t.

In July this year, Volta announced a maiden NI

43-101 resource for Kiaka. The resource estimate, compiled by SRK Consulting, was based on more than 25,000m of drilling by Volta and the previous owner, Randgold.

Indicated resources contain some 1.38Moz of gold, with a further 0.48Moz in the inferred category. The estimate incorporates a strike length of just over 1km and to a maximum vertical depth of 230m.

Higher-grade mineralised bands range from widths of 5m to 20m, and extend with "good continuity" for 100m within a lower-grade corridor. Volta's chief executive, Kevin Bullock, noted that the estimate was "at the upper end of our original gold resource", and that the results demonstrate "significant future potential".

The statement also included a table demonstrating the sensitivity of the block model within the Whittle open pit to a range of cut-off grades. For example, the tonnage in the indicated category drops from 17.0Mt to 10.1Mt in the mineralised bands (at an average grade of 1.64g/t) at an increase in the cut-off grade from 1.00g/t to 1.20g/t Au.

Volta recently announced that metallurgical tests

undertaken by SGS South Africa Ltd indicate that between 40% and 55% of the gold at Kiaka should be recoverable by gravity separation in less than 3% of the mass.

SGS concludes that overall recoveries of over 90% could be expected from a fairly standard process route that includes crushing, milling (to 50 $\mu$  passing 75 micron), gravity concentration with intensive cyanidation of the concentrate, finer milling of the gravity tailings followed by CIL treatment. Mr Bullock described the company as "encouraged by the results".

Volta's Gaoua copper-gold project covers 691km<sup>2</sup> within the prolific Boromo Greenstone Belt. The project includes the 100%-owned, contiguous, Malba, Souhouera and Danyoro permits. Together they comprise a 35km prospective corridor that includes the Mt Biri, Dienemera and Gongondy copper-gold porphyry prospects.

Heliborne geophysical surveying, systematic soil sampling and auger drilling indicate the presence of several additional copper-gold targets in the prospective corridor. Auger drilling testing beneath transported alluvial and lateritic cover has outlined another large copper-gold anomaly at Boussera, located between the Gongondy and Dienemera deposits.

Similar auger drilling significantly extended the copper-gold mineralisation potential to both the west and south of the current Gongondy resource area. Soil sampling has identified a new, continuous and open-ended gold anomaly over 4km at Nassara, located in the southwest of the Danyoro permit.

The Kampti project is on the 245km<sup>2</sup> Kampti permit, located 45km west of Gaoua. It comprises a 22km-long and 4km-wide NNW trending structural corridor, defined by several geochemical anomalies, and by geological mapping and intense artisanal gold-mining activity.

Volta has undertaken some RC drilling on the northern-most target, the Maména-Fofora prospect. Drilling has confirmed significant gold mineralisation, intersecting high-grade gold lenses within lower grade envelopes.

A year ago, Volta signed an earn-in agreement with ACC Resources (a private company with a registered subsidiary in Burkina Faso) whereby ACC must spend a minimum of US\$350,000 over three years in order to earn a 100% interest in Volta's Bansié property, subject to a royalty. Volta has the option to choose a US\$0.65/t royalty or a 2% NSR royalty upon any future production from the Bansié permit.



A selection of photos from Volta Resources' work in Burkina Faso

