

Boungou – Burkina Faso's newest gold mine

Jul 12, 2018



SEMAFO



When TSX-listed SEMAFO poured first gold at its Boungou mine in Burkina Faso, the company added a second feather to its hat of operating mines, having successfully brought its Mana mine into operation in 2008.

This is according to Engineering & Construction VP Sylvain Duchesne.

With 97% of the overall project completed by the end of April, SEMAFO expects to pour first gold from its Boungou mine on budget and on schedule.

Commissioning of the Boungou processing plant is well under way, with 57% completed by the end of April.

This article first appeared in [Mining Review Africa Issue 6 2018](#)



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The crushing circuit, vertimill, pre-leach and tailings thickeners, leaching/carbon-in-pulp (CIP) circuit and water services are already commissioned, with commissioning of the semi-autogenous grinding (SAG) mill, gravity circuit, elution circuit, gold room, compressors and oxygen plant initiated in May.

The mining contractor at the Boungou project – African Mining Services, the contract mining subsidiary of ASX-listed mining services company Ausdrill – had already completed 87% of the pre-stripping work, with 15.6 Mt of the projected 18 Mt extracted by the end of April. A total of 70 000 t of low-grade ore had also been stockpiled on the ROM pad by the end of April.

Located in the Est region in south east Burkina Faso about 320 km east of Ouagadougou, the 773 km² Boungou project hosts four contiguous permits, namely Boungou, Dangou, Pambourou and Bossoari – collectively known as

the Tapoa permit group.

Boungou has a mineral reserve of 11.2 Mt grading at 4.11 g/t of gold for 1.5 Moz of contained gold.

Duchesne notes that approximately 185 Mt of material will be mined from two open pits, namely the west and east flanks, during the eight-year projected LOM at Boungou – delivering 11.1 Mt of ore to the processing plant.

The CIP processing plant has a 4 000 tpd (1.34 Mtpa) throughput and comprises a conventional crushing and grinding circuit (primary crusher and a coarse ore storage bin).

Crushed ore will be conveyed to the grinding circuit, where it will be grinded using a SAG mill in a closed circuit with a pebble crusher and a tower mill feed prep vibrating screen. Secondary grinding is carried out by a vertimill in closed circuit with cyclones and a gravity circuit, where about 40% of the gold will be recovered up front, Duchesne explains.

This will be followed by a high cyanidation leach circuit, a CIP adsorption circuit, and a carbon stripping circuit.

The solution will lastly be sent to an electro-winning circuit for gold removal and then for on-site smelting into gold doré.

Life of mine head grades sent to the processing plant are expected to average 4.1 g/t with a gold recovery of 93% for an average 226 000 ozpa of gold, Duchesne notes.

SEMAFO's production guidance at Boungou mine for 2018 is 75 000 oz, of which 65 000 oz are expected to be produced while in commercial production and 10 000 oz in the pre-production period.

Once in commercial production, which is expected to take between six and eight weeks from first gold pour, Boungou is expected to produce an average 204 000 oz of gold at an average all-in sustaining cost of US\$516/oz in the first five years of production from 2019 to 2023 at a stripping ratio of 15:1.

"To achieve this, 4 000 tpd of ore will have to be moved to the ROM pad each day, with 65 000 to 75 000 tpd of waste being moved," Duchesne explains.

Developing Siou underground

The next project that the company has already set into motion is the underground development of its Siou deposit, located some 20 km from the Mana mine, which has been producing gold from its open pit since 2014.

Siou underground has a proven and probable reserve of 3.03 Mt grading at 5.29 g/t of gold for 515 800 oz of contained gold, of which the open-pit reserve is 1.57 Mt grading at 3.57 g/t of gold for 181 200 oz of contained gold.

With a five-year mine life, Mana consolidated production is expected to average 209 000 ozpa at an all-in sustaining cost of \$871/oz – between 2019 and 2023 – at a mining rate of 2 000 tpd of ore from Siou underground.

Access to the Siou underground operations will be through a single portal and a 5.5 m x 5.5 m ramp at a 14-gradient slope.

The location of the portal will allow mining in the northern part of the Siou pit to continue uninterrupted.

The ultimate size of the underground mining operation will be more than 600 m along strike by 200 m deep with 25 m between levels.

Two types of long-hole stoping mining will be used – 80% transversal long hole mining for stopes wider than 10 m and 20% longitudinal long hole mining for stopes smaller than 10 m.

“Development of the Siou underground portal is expected to begin in the third quarter of 2018 and take 18 months to develop at a cost of \$51.7 million at a payback period of less than a year,” Duchesne notes.

SEMAFO appointed African Underground Mining Services (AUMS) in May to provide turnkey mining services for Siou underground under a 70-month contract.

Duchesne explains that SEMAFO chose contract mining over owner-operator mining for Siou underground as its trade-off study demonstrated that contract mining would be preferable.

“Because of their underground expertise, contractors can provide turnkey operations,” Duchesne says, adding that the use of contractors also allows for faster start-up due to their readily available equipment and greater access to pools of skilled labour.

“Having solely extracted gold from Siou by open pit for the past four years, we cannot compete with contractors in terms of the rapid recruitment of key management and operations personnel for underground mining,” he notes.

“In addition, significant capital expenditure would have been necessary at the very beginning of the project while the contractor route will allow us to spread repayment of the initial capital expenditure incurred by the contractor over the life of the project,” says Duchesne.

Under the mining services contract, AUMS will be responsible for supplying the mining fleet and a skilled labour force for the development project in addition to ensuring development, production and auxiliary services, while SEMAFO will provide technical services including geology and engineering as well as leveraging the existing surface infrastructure at Mana.

Production from Siou underground is expected in early 2020.

With the Mana and Bounou mines expected to reach the end of their productive lives in the next eight years, respectively, SEMAFO has implemented extensive proximal and regional exploration programmes both at Mana and Bounou as well as targets outside of these projects to extend the life of these mines, and at the same time, aimed at making new discoveries.

Extensive exploration planned

SEMAFO has set a \$26 million exploration budget for 2018 – \$9 million and \$7 million to be spent at Bounou and Mana, respectively, while \$10 million has been allotted to targets outside of these projects.

A total of \$4 million has been set for Nabanga, located about 100 km to the southwest of Boungou; \$3 million to Bantou, located on the Houndé Greenstone Belt, approximately 150 km southwest of the Mana mine; and \$3 million to Korhogo in Côte d'Ivoire.

Exploration at Boungou and Mana

Planned exploration at Mana includes 10 000 m of core drilling, 25 000 m of reverse circulation (RC) drilling and 60 000 m of auger drilling.

The core drill programme will primarily target the Siou area with the aim of assessing the north part of Siou at depth.

The Bara Trend located some 20 km from the Mana mill was extensively drilled in the first quarter of 2018, and included follow-up work on significant RC results and untested auger anomalies.

At Boungou, 42 000 m of RC and 60 000 m of auger drilling will be undertaken during 2018.

The bulk of the RC drill work will test regional gold anomalies on the Boungou proximal, Dangou, Pambourou and 045 Trend sectors, which were identified during 2017.

Other exploration targets

Outside of Boungou and Mana, the most advanced target – Nabanga – has inferred resources of 590 000 oz at 10 g/t of gold. Work will be carried out with a view to adding resources to justify a stand-alone mine.

“Our 2018 programme at Nabanga is designed to test a new geologic interpretation that suggests a shallower plunge of the mineralisation extending along strike and beyond 200 m of vertical depth. Diamond and auger drill programmes began late in March, and are expected to be completed in the third quarter,” says Duchesne.

Meanwhile, the exploration programme at the Bantou target has two objectives: to test the down plunge extension of the Bantou area and to explore regional targets including the Tankoro Zone where historical drilling had revealed interesting results.

A 13 000 RC drill programme began late in the first quarter for completion by the third quarter.

Following encouraging results at Korhogo in 2017, core, RC and auger drill programmes will be carried out on Korhogo in 2018.

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