



Exploration and Technology Innovation Update

for the half year ended 31 December 2016

GREENFIELDS EXPLORATION

During the second half of 2016, greenfields exploration activities were undertaken in Australia, Colombia, Brazil, Argentina, USA, Guinea, and Tanzania. Greenfields Exploration completed 1,173m of Reverse Circulation (RC)/diamond drilling (DD) and 39,555m of aircore drilling in Australia. Total expenditure for the second half of 2016 was \$16m.

In **Australia**, the Butcher Well and Lake Carey farm-in agreement was signed between AngloGold Ashanti and Saracen Mineral Holdings Limited. AngloGold Ashanti has acquired earn-in rights for 340 km² of tenements on and along the western margin of Lake Carey in the Laverton district of Western Australia, including those hosting the historically-mined Butcher Well gold deposits. AngloGold Ashanti can earn up to 70% of the JV by spending AUD \$15m within 48 months from commencement date to earn 51% and a further AUD\$10m within 24 months thereafter to earn 70%. The conditions precedent for the agreement were met on December 22nd, 2016 and the first phase of drilling at Butcher Well is expected to commence in the first quarter of 2017.

Elsewhere in the Laverton district, aircore drilling was completed over 100% AngloGold Ashanti-held targets with 526 holes drilled for a total of 34,977m. Drilling encountered strong carbonate-sericite ± silica alteration with minor pyrite or arsenopyrite in several holes with brecciated quartz veining also observed. Results were received from drilling at Ahab, Nemo, Poseidon and Pioneer, including several encouraging results from both Ahab and Pioneer. These positive aircore samples from Pioneer were followed-up by a six RC holes with three diamond tails (702m/471m) and results of this drilling will be available in first quarter in 2017.

At the Strawbridge Project, the planned aircore drilling programme was completed with 61 aircore holes drilled for a total of 4,738m during 2016, in the third quarter. Results from the aircore drilling and geochemical sampling completed in 2016 were disappointing, with no significant results returned. The project is currently under review.

In **Colombia**, a re-evaluation of the regional geology at Guintar led to identifying subtle multi-element epithermal signatures in gravels associated with N-S trending graben structures to the east. Follow-up on this target, Nuevo Guintar, indicates a potentially preserved, epithermal target. Detailed mapping, soil sampling and ground geophysics is underway delineating the drill target.

In **Brazil**, work concentrated on the Tromai Project which covers the large tenement package (~2,000km²) covered by the JV Agreement with Luna Gold. The JV officially initiated in August and regional mapping and soil sampling programmes are underway, as is a high resolution aeromagnetic and radiometric survey (11,200km completed). This data is being compiled and interpreted to prioritize drill targets. In parallel, considerable effort has also been placed on obtaining environmental permits for planned drilling expected to start in the first quarter of 2017.

In **Tanzania, Guinea, Argentina**, and the **USA** early stage Greenfields evaluation and reconnaissance programmes progressed.

BROWNFIELDS EXPLORATION

During the second half of 2016, Brownfields exploration activities were undertaken across the globe, completing 327,601m of diamond drilling for a total expenditure for the second half of \$34m (capital) and \$31m (expensed).

South Africa: Borehole UD59 was successfully completed and delivering five VCR intersections with variable grades reported. The mother hole intersected reef at 3,888m. The rig has been demobilized and site rehabilitation is complete.

Borehole UD60 intersected the VCR at a depth of 3,650m and yielded a significant gold value. The short deflection drilling programme has been completed and a total of six reef intersections obtained.

Borehole UD58A intersected moderate grade VCR at a depth of 3,794m. Short deflection drilling is underway but was delayed due to lengthy fishing operations to recover rods stuck on a steel sliver following a casing break at 1,050m. Fishing operations have successfully cleared the hole and the first short deflection intersected reef at 3,799m. The hole remains on target to complete deflection drilling and demobilization by May 2017.

Tanzania: At Geita Gold Mine exploration activities included Mineral Resource conversion drilling at Nyankanga Block 5, Star & Comet Underground drilling (Cut 2 and 3), Mineral Resource delineation at Star & Comet Cut 2 NW, Cut 3 and Matandani as well as reconnaissance exploration drilling at Prospect 30 and completion of a drillhole at Geita Hill East as part of the 3D seismic survey program. 90 holes totalling 18,200m were completed for both surface and underground exploration drilling programmes.

Mineral Resource conversion drilling took place from surface at Nyankanga Block 5 where a total of 1,556m RC and 1,632m DD was completed, with the programme set to conclude in the first quarter of 2017. Several significant intercepts were reported with one hole reporting a particularly high intercept. Modelling and interpretation has shown that the Cut 9 orebody sits at the intersection between the Ioda fault and Nyankanga fault zones, where both structures cut through a folded package of BIF. Vein and fault geometry indicate a shallow NW plunge for the mineralisation.

Mineral Resource delineation drilling at Star & Comet Cut 3 was completed and tested the projected mineralisation below the Mineral Resource pit shell. 4 holes totalling 150m RC and 729m DD drilling were completed and the results confirm down-plunge continuity of the orebody, which remains open-ended.

Underground Development exploration activities continued at Star & Comet with 5 ore drive levels developed into the Cut 2 orebody. Drilling of 9,189m DD was completed across the Cut 2 and Cut 3 orebodies. Mapping and underground drilling indicated a flattening of the Cut 2 mineralisation and a plunge towards the NNW, which has been further confirmed by recent surface and underground drilling. Infill drilling (1,827m) into the Cut 3 orebody was initiated late in the last quarter of 2016 from underground to refine the high grade interpretation. To the NW of Cut 21,677m of DD was completed from surface to test the down-plunge extension of the orebody. Drilling is currently ongoing. Results have been received for two drillholes that successfully intersected the anticipated mineralised zones, confirming the NW plunging mineralisation down to 1,075 level.

Assay results received from Geita Hill East drilling confirmed down-dip continuity of the targeted underground ore zone with a significant intercept reported approximately 120m below the deepest previous intersection. The mineralisation is controlled by a narrow, deposit-scale brittle to ductile shear zone.

At Matandani drilling was initiated from outside the pit. Four out of 7 planned holes were pre-collared (440m RC) and one hole completed (494m DD). Results are pending.

Two RCDD holes (827m) were completed at Prospect 30. Encouraging assay results were received that correspond well with the geological model interpretation. Follow up drilling is planned.

The 3D Seismic Survey data acquisition within the central Geita area was successfully completed during the third quarter over an area of approximately 20km², utilising 6,000 wireless receivers and UNIVIB vehicles as the seismic source. Vertical Seismic Profiling and Full Waveform Sonic data was collected from a newly drilled hole at Geita Hill and a re-opened historic drillhole at Nyankanga. A 3D seismic interpretation session of the initial processed data was conducted in Perth during December, which covered identification of major reflectors, seismic domains and fault zone. Preliminary targeting during the session led to identification of 9 ranked targets. A final interpretation and targeting session on site is planned for the first quarter.

Guinea: At Siguri Gold Mine a total of 27,483m were drilled. Exploration activities included infill drilling at Seguelen PB2, Seguelen PB2 East, Silakoro, Tubani and Kami and reconnaissance drilling at Silakoro.

Drilling at Seguelen consisted of 3 drill programmes: infill within the planned pit shell, testing of potential extension of the shallow mineralisation along the bedding direction to the east of PB2, and testing the 'gap' area south of PB2. A total of 15,264m was completed (13,513m RC and 1,751m DD). Analytical results have generally been in-line or higher than predicted by modelling and mineralisation is open in both upside programmes.

Infill drilling at Silakoro continued during the second half of the year. Gold mineralisation occurs in the central and eastern side of the drill target, trending approximately NE-SW. Reconnaissance drilling to test potential northeast extensions of the mineralisation was also undertaken and returned several significant mineralised intercepts. In total 4,616m RC and 1,023m DD was drilled.

At Tubani, infill drilling (3,393m RC and 432m DD) was undertaken. To date some significant intersections have been returned; however, the mineralised intersections are thinner and of lower grade than predicted by the Mineral Resource model.

At Kami, 1,422m of RC was drilled in the SE area of the pit. To date, 45% of the drill programme has been completed and all assays have been returned for the completed holes.

An airborne magnetic and radiometric geophysical survey was carried out over portions of Block 1 and Block 2 and this survey was also extended to cover the Saraya West license. The data is being processed. A Lidar survey was carried out over Saraya and Foulata in Block 2, and Kounkoun in Block 3 to provide an accurate estimation of the extent of artisanal mining activities at this point in time.

The geochemical soil sampling programme on the Saraya West EPL was concluded. Assay results are in the process of being reviewed, along with the new geophysical data received. To date three conceptual targets have been defined at the Saraya West exploration licence area based on the lithological contact with geophysical and geochemical anomalies.

Significant grade engineering and geometallurgical programmes are underway.

Ghana: At Iduapriem Gold Mine exploration focused on drilling at Block 7&8, Nueng and Block 1W, as well as concluding of the soil geochemistry programme across the western lease. A total of 6,467m drilling was completed (4,497m DD and 1,970m RC).

Mineral Resource conversion drilling at Blocks 7&8 totalled 2,757m (575m RC and 2182m DD). The drilling was focused in the Block 7 area to upgrade Inferred Mineral Resource to Indicated Mineral Resource within the current pit design and improve confidence in the modelled structural interpretation. Reef duplications in the area have been confirmed, especially associated with the main thrust fault, and the Mineral Resource model is being updated accordingly.

A geochemical soil survey was carried out during the third quarter over the Nueng target, between Block 1 and Block 2. This was followed up with a drilling programme in the fourth quarter: a total of four holes for 1,087m were drilled (282m RC and 805m DD). To date there has been no intersection of conglomerate.

At Block 1 a total of 1,523m drilling (406m RC and 1,117m DD) was completed to the west of the historic Block 1 pit. The program aimed to verify drillhole results and establish the extension of conglomerate reefs west towards the Nueng target area. Significant intersections were reported showing conglomerate reef packages extending about 300m along strike.

Two holes were drilled for a total of 357m (75m RC and 282m DD) to investigate spatial deviations between grade control and Mineral Resource models for the Ajopa pit.

Ten (590m RC) holes were completed in the Mile 5 area as a follow up on gold-in-soil anomalies. Assay results show gold occurrences mainly in the south east of the target area. Further mapping after the

initial drilling shows two main vein trends: north-south and east-west. Limited further drilling will be undertaken to further aid modelling and assessment of mineralised veins in the area.

The geochemical soil sampling programme continued and focused on the western lease area including Mile 5 West, Badukrom, Ajopa NW and Ajopa NNW. Data validation is ongoing and only partial results have been returned to date.

Democratic Republic of Congo: At Kibali, near mine exploration took place at the Rhino-Agbarabo-Kombokolo area, Sessenge Southwest, Pamao, Kanga Sud, Ndala Village and Aerodrome, while regional exploration was focused on the Kalimva-Ikamva targets in the north and Aindi Watsa-Dilolo-Zambula in the south. A total of 15,506m was drilled (14,096m RC and 1,410m DD).

At Rhino, 8 trenches were completed with 7 returning encouraging intersections. A close-spaced follow up RC drilling programme was completed with 5,311m drilled in 123 RC holes. The consistency and down plunge continuity of the high grade shoot was further confirmed by a diamond hole drilled 130m down plunge from surface. A 793 hole auger sterilisation/upside potential programme was conducted over the Rhino-Agbarabo area and positive results were recorded towards the northeast of Rhino. A 20-hole, 1,020m RC drill programme at the Agbarabo East target was conducted with the holes drilled over four fences to follow-up results from trenching and sampling of historical and artisanal pits. The results confirmed continuity of mineralisation. At Kombokolo, five trenches were completed.

15 RC holes was completed at Sessenge SW, targeting down plunge, near-surface, high grade oxide intercepted in trenches. Results support the three lenses identified previously, albeit with the mineralisation flatter-dipping than initially projected from trenching. A potential fourth lens was also identified in the northwest.

At the Pamao deposit, six diamond holes and four trenches were completed. Most results have been returned, which were positive and show continuity of two mineralised lenses along 700m strike, with mineralisation open towards the northwest and southeast.

At Zone 1 of the Kanga Sud target a fence of 6 RC holes was completed, testing the down plunge continuation of mineralisation. Results confirmed the mineralised lenses; however, the target shows reduced potential due to the shallow weathering and low overall grade. 12 RC holes were completed at the Ndala target to follow up on trenching results. Lower than predicted overall tenor and continuity of grade argue against further work at this time.

An 80 hole, 4,000m, RC drill programme was completed at Kalimva-Ikamva over four fence lines. The results generally returned lower grades than expected, although there remains potential for higher grades further down plunge. Mapping and litho/soil sampling were also completed around the Kalimva-Ikamva prospect.

Sub-regional mapping was undertaken over the Aindi Watsa, Dilolo, and Zambula target areas. In the Aindi Watsa area, work was carried out to follow up high grade mineralisation recorded in 2 DD holes drilled early this year. 5 Trenches tested the surface projection of these mineralised zones and the results support the continuity of the mineralisation towards the west. A further trenching program has been proposed to test the mineralisation observed in the Aindi Watsa-Dilolo Gap area.

Republic of Mali: At Sadiola a total of 9,667m drilling (8,955m RC and 712m DD), was completed across SSP North, FNa, FNb-c, Tambali and Voyager East.

At SSP North 11 RC holes and 4 DD holes were drilled. Results confirmed the continuity of the NNE trending oxide and sulphide mineralisation below the current pit. Significant oxide intersections were recorded on the west of the Sadiola pit, but returned poor to mixed results below the pit. The continuity of the NNE-trending, SE dipping mineralisation at depth was confirmed, despite variable grades. Samples for metallurgical test work were collected from the RC holes and as grab samples within the pit.

A total of 4,517m RC was drilled in the FN area to test for NNE trending mineralisation on the area around the FN pits. Significant shallow sulphide mineralisation was intersected below the FNa Pit, while

the area around the FN3 pit returned disappointing results. One 160m DD hole was drilled to aid definition of the structural controls for the significant shallow sulphide mineralisation intersected below the FNa pit. The deeper drilling also serves as a sterilisation program for potential SSP waste dumping over this area.

At Tambali, 10 RC holes were drilled (1,746m) to the northeast of the existing (and SSP satellite) pit. Most holes confirmed the dispersed low grade mineralisation with 2 holes intersecting significant shallow transition/sulphide and deep sulphide mineralisation. The mineralisation appears to be located close to the metagreywacke-quartz feldspar porphyry contacts and trending towards the Sadiola pit. One DD hole (152m) was drilled to test the NNE extension of the mineralisation and to assist with interpretation of the widespread disruptive quartz feldspar porphyry units in the area.

6 RC holes (882m) were drilled to test an arsenic anomaly at Voyager East, an oxide target on the far east of the Sadiola lease. Although the assay results were disappointing, the presence of carbonate and arsenopyrite associated with quartz feldspar porphyry in the drilling means the area remains prospective, particularly where shearing may either exploit or intersect lithological contacts.

A total of 4,016 samples were analysed by XRF, including drilling samples from FE2S, termite samples from Voyager East and rock samples from field mapping. Historic core from the Sadiola deeps drilling was also scanned to determine mineralisation and alteration characteristics.

In **Argentina**, drilling continued at Cerro Vanguardia. Most of the drilling meters continuing to be completed at the nearby Claudia JV. During H2, 10,657m were drilled, including 3,889m at the Claudia JV. Other work completed to support target generation included trenching and channel sampling programs to refine drill targeting and an HLEM geophysical survey at the Claudia JV.

In **Brazil**, exploration continued at the Cuiaba, Lamego and CdS production centers for AGABM with 74,107m drilled from the combined surface and underground drilling programmes. Targets included ore body extension at Cuiaba and CdS. Follow up infill drilling to support mine planning and Mineral Resource conversion was also completed.

At Serra Grande, 33,177m were drilled as part of the exploration and Mineral Resource conversion programmes. Drilling target generation activities included mapping and soil sampling programs. A ground magnetic EM geophysical survey was also completed to support drill target generation.

In **Colombia**, the Gramalote JV completed 4,441m of drilling to support site and infrastructure investigations. The saprolite infill drilling program continued to better define the thickness and gold mineralisation in the horizon. Work to update and refine the geological model progressed to support the pre-feasibility study. Drilling started on targets within the JV regional tenements outside the main project area.

At La Colosa, 1,639m were drilled as the site investigation geotechnical and hydrology drilling programmes continued. A geophysical survey to support the site infrastructure designs was completed.

The Quebradona JV program completed conceptual study work and began field work and a drilling programme to support pre-feasibility study site investigation geotechnical and hydrology data collection.

In **Australia**, at Sunrise Dam drilling targeted Vogue South, Vogue Deeps, north extensions to Cosmo and Cosmo East, Cosmo East down-dip, Elle, Midway Shear and Sunrise Shear. Some of the holes drilled to target Vogue Deeps and Cosmo East down dip are within close proximity to the Carey Shear zone; therefore some of these holes have been designed to pass through Carey Shear and into the footwall. A total of 36,778m were drilled

Mineral Resource conversion drilling of Vogue South was completed and all assay results have been returned and an updated Mineral Resource model is now pending. The southernmost section of this drilling shows mineralisation is still present; therefore a drill position to test the next panel south is currently being investigated.

Drilling of Vogue Deeps continued with the 80m x 80m spaced drill pattern almost complete and the 40m x 80m having commenced. The aim of the drilling is to extend the Vogue ore body beneath the 1600m RL. Significant intercepts have been reported from multiple drill fans with intercepts extending mineralisation to the south and to areas below the Carey Shear zone.

Drilling to test northern extensions to Cosmo and Cosmo East continued. Previous extensional drilling has shown promising results. The continuation further north has been given a high priority to ensure access is not lost to the north once stoping commences.

Drilling targeting Cosmo East up-dip drilling was completed. The results showed some mineralised intercepts. Cosmo East down dip extensions started and is planned to target the next 125m down dip panel in Cosmo East, below current Ore Reserves. Many of the holes also pass through Carey Shear zone. All four of the holes drilled to date have contained visible gold, down dip of Cosmo East. All results are outstanding.

Drilling of Elle, Sunrise Shear Zone and Midway Shear was completed with encouraging results through Elle. Once all assay results are returned, an Inferred Mineral Resource model will be generated.

At Tropicana, the Long Island 100m x 100m drilling programme to test the strike extent and down-dip extensions of the known mineralised system was completed. In the period, additional closer spaced drilling was undertaken at Boston Shaker to deliver an Indicated Mineral Resource, and minor infill drill programmes were completed at Tropicana, Havana and Havana South. A total of 18,948m of RC and 20,821m of DDH drilling were completed.

A Mineral Resource Model update will be completed in January 2017, incorporating Long Island drilling completed during the period. The new model will form the final model for the Long Island mining study, with the outcome of the study to be announced in the first half of 2017.

Regional exploration drilling totaled 30,398m. In detail, this consisted of 20,311m of AC, 7,358m of RC and 2,721m of DD drilling. A number of encouraging Au assay results were intercepted from RC and aircore drilling at the Madras, Angel Eyes, Paradise and New Zebra prospects, with results at the newly established New Zebra prospect, particularly significant.

A small, follow up electromagnetic (EM) geophysical survey at the Beetlejuice prospect from the previous survey was also completed, which concluded that no base-metal prospectivity existed at Beetlejuice.

A significant re-interpretation of the structural architecture of the belt was developed, reconstructing the belt into what it may have looked like in the past and where the mineralised corridors now lie. This interpretation has driven a considerable pipeline of exploration targets moving into 2017 and some of the mineralised intercepts from drilling are reflective of this thinking and subsequent targeting.

TECHNOLOGY AND INNOVATION

The progress that the Technology Innovation Consortium made in 2016 and the highlights of the project are set out below:

1. Reef Boring

1.1 Small range:

In 2016 the Sandvik/Cubex machine was commissioned at the Savuka section of the mine but due to challenges faced during the stage gate reviews, the program had to be discontinued and the machine will be decommissioned.

1.2 Medium Range:

Measure	Description	MKIV Machine				CLR MKIII Machines				VCR MKIII Machine	
		Q1 2016	Q2 2016	Q3 2016	Q4 2016	Q1 2016	Q2 2016	Q3 2016	Q4 2016	Q3 2016	Q4 2016
Quantity	Number of completed holes drilled	9	5	5	4	17	16	4	10	1	7
Quality	Average % of hole on reef	63.80	57.39	61.60	64.12	75.80	67.33	65.30	68.20	72.87	78.70
Machine Availability	Availability is the % of time that a machine is available for use, whether required for use or not	82.70	61.40	87.91	62.30	67.80	65.95	71.81	74.82	50.65	79.39
Machine Utilisation	Utilisation is the % of time that a machine is utilized whilst available	70.60	76.78	66.34	70.59	86.40	87.83	76.88	80.56	81.28	64.20
Machine Performance	Average hours per hole drilled [hrs/hole]	92.3s	94.2	87.15	90	96.2	82.4	82.3	80.48	179.3	92.27

MK IV Machine Test site

During 2016 the MK IV machine was commissioned in the test site and has drilled 23 holes, with four holes drilled in the fourth quarter of 2016. It was determined that the quality of the holes regressed due to the self-pinning cylinders failing during the drilling cycle. This caused the machine to veer off the planned trajectory. Several new designs were investigated with the OEM Atlantis and improvements are ongoing. The addition of active sensors/pegs verified the potential of the machine to orientate, locate and direct itself to the next drilling position.

A decision was made to designate the MKIV for all research and development trials and to ensure that design targets are met on this proto-type machine prior to any further reef boring machine purchases taking place. These trials will include the results from the integrity test and furthermore improvements on the active peg system, hydro-transport, self-pinning cylinders and in hole cleaning. A structural integrity test was conducted by a company specializing in this field of work to determine the integrity of the machine with the report scheduled for finalization in the first quarter in 2017, upon which decisions regards potential alterations or design changes will be made.

MK III Machines

- **Carbon Leader Reef (CLR) prototype site**

Drilling continued with three MK III machines in the CLR block, machines drilled 33 holes in the first half of the year. At the end of the second quarter, geotechnical concerns resulted in a revised extraction strategy that resulted in the loss of some current mining ground and consequently the reduction of one machine.

- **Ventersdorp Contact Reef (VCR) prototype site**

After a premature failure of the 980mm reamer, a decision was made to continue drilling with the 660mm reamer. Work will continue to enhance the design of the 980mm reamer. Seven holes were drilled in the fourth quarter of 2016.

During the year, an MK III machine was installed in the VCR site and drilling commenced in third quarter after commissioning. The usual teething problems associated with a commissioning process were resolved.

Work will continue at both sites in a stage gate approach as more is learnt about the machines from trials as well as from the integrity test. The aim is to achieve consistent performance to prove the economic viability of the project.

2. Ore body Knowledge and Exploration

The year started with the final accuracy trial on the Sandvik/Cubex machine. The aim was to improve on the accuracy and analysis of the drilled holes indicated that the drilled holes did follow a similar trend implying that a correction factor could be applied to ensure an accurate end point is reached. The drilling trials with the Bohrmeister fit-for-purpose drill rig commenced in the fourth quarter after its commissioning at TauTona mine. The first stage gates were met after drilling four holes at the set drilling target rate (8m/hr) and hole depth (100m) at different inclinations. After the compressor started losing pressure the trial was stopped for repairs on the unit. This machine was replaced with the fit for purpose Bohrmeister drill rig during the fourth quarter.

Drilling for the next stage gate will commence in the first half of the 2017 year. This stage gate will aim to improve on the accuracy of the drilled holes. In hole surveying of these holes for data collection remains a technical challenge and design modifications on the deployment mechanism is currently underway.

3. Ultra-High Strength Backfill (UHSB)

To date two plants were successfully commissioned; one plant at the CLR site and the other at the VCR site at TauTona mine. These plants are in full operation and have the capabilities of mixing the dry tailings underground with the other ingredients, thereafter pumping the final product at 4m³/hour over a distance of 600m.

Engineering construction and equipping of the Savuka CLR plant and the TauTona B120 plant will commence as soon as the site excavation is completed in the first half of 2017. In the fourth quarter, the construction of the surface solution plant was completed. This plant is expected to allow for pumping the UHSB solution (UHSB product excluding cement) from surface to the B120 plant underground.

Mponeng extraction ratio improvement project product development is in progress. A range of designs have been tested and the characteristics modelled by Rock Engineering. Final results are pending before a suitable product can be identified.