

Creating **enduring value** beyond mining

ANNEXURE TO THE MINERAL RESOURCES AND
MINERAL RESERVES SUPPLEMENT 2021



GOLD FIELDS

Supplementary information

Regional geology and brief history for each asset

Gold Fields is a globally diversified gold producer with nine operating mines in Australia, Peru, South Africa and West Africa (including the non-managed Asanko joint venture (JV)) and one mine construction project in Chile. The Group had a total attributable annual gold-equivalent production of 2.34Moz in 2021 (2.24Moz attributable gold-equivalent production in 2020), and has attributable gold-equivalent Mineral Reserves of equivalent 48.6Moz and Mineral Resources of 111.8Moz. The Group's shares are listed on the Johannesburg Stock Exchange (JSE), with its American Depositary Shares trading on the New York Stock Exchange (NYSE).

The purpose of this Annexure to the Mineral Resources and Mineral Reserves Supplement (the Supplement) is to provide additional information on the regional geology for each of Gold Fields' four operating regions and to summarise the history of each of the assets. This information should be referenced in conjunction with the Supplement and aims to streamline the Supplement itself to assist market analysts, shareholders, potential investors and other stakeholders to effectively review the Company information provided.

This Annexure should be read with Gold Fields' 2021 Integrated Annual Report (IAR) and Supplement. For abbreviations refer to p137; and for glossary of terms refer to p139 of the Mineral Resources and Mineral Reserves Supplement.

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Americas region

Regional geology

The Cerro Corona copper-gold porphyry is **one of 14** known Tertiary-aged porphyry Cu-Au-Mo deposits and **19** epithermal Au-Ag deposits located in the Cajamarca metallogenic province (CMP) of northern Peru. There are **two** well-mineralised districts within the CMP. These are the Yanacocha district in the south of the province, which is host to what once was the largest producing gold mine in South America. The other is the Hualgayoc mining district in the north, one of the oldest mining districts in Peru and best known for its historic silver production and more recent base metal production.

This well-known district has been an important silver producing area since Inca times, with more than **50Moz** of silver and significant amounts of lead, zinc and copper produced from vein and manto-type deposits since the Spanish conquest in the 16th century. The Hualgayoc mining town was established in 1771. The regional structure is characterised by large open folds of Cretaceous-aged sedimentary units, predominately limestones, with axial planes striking approximately 315° and steep south-west dips. Faulting is generally restricted to normal and oblique slip faults with offsets of a few metres to tens of metres.

The Salares Norte deposit is located in Chile in the Western Cordillera, next to the limit with the Puna province. The topography and surrounding geology are typical of the Puna environment, which is characterised by closed basins discharging surface water into salt flats (salares in Spanish), an elevated plateau with elevations above 3,600m above mean sea level (amsl) and widespread Upper Tertiary and Quaternary volcanism. The arid climate and consequent low erosion has preserved much of the original volcanic landforms.

Salares Norte is near the southern-end of South America's Central Volcanic Zone (CVZ). The CVZ is a long belt of Quaternary volcanoes extending from 16°S in southern Peru to 27°S in the Ojos del Salado/Tres Cruces volcanic complex located along the Chile-Argentina border.

The deposit lies at the northernmost end of the Maricunga metallogenic belt as it was originally defined, extending from 26°S to 28°S. The Maricunga is a large belt, more than 200km long and 35km wide, characterised by Late Oligocene – Early Miocene and Middle Miocene magmatism with associated epithermal (less common) and gold-rich porphyry style (predominant) deposits.

The immediate district surrounding Salares Norte (within a radius of about 30km) is dominated by the presence of Upper Tertiary (Neogene) volcanic and pyroclastic rocks ranging in age from Late Oligocene – Early Miocene to Quaternary. This relatively young, post-Incaic deformation volcanic cover has translated into a relatively smooth topography characterised by the absence of north-south trending basement block bounding faults which characterise the Maricunga Belt to the south.



Cerro Corona open pit

Americas region (continued)

Cerro Corona – brief history



In 1979, exploration identified porphyry-style mineralisation in the Cerro Corona area. Between 1992 and 1993, sampling by the Gubbins Group identified gold mineralisation in the leached cap of the Cerro Corona deposit. Copper-gold porphyry mineralisation was discovered through the drilling of nine diamond core holes and completion of an exploration adit into the mineralised zone.

From 1994 to 1996, Cerro Corona - then held by Barrick - drilled 140 reverse circulation (RC) drill holes totalling 9,476m and 118 diamond core holes totalling 35,254m. A draft feasibility study (FS) was completed by Kilborn. From 1997 to 1998, RGC Limited drilled six diamond core holes totalling 2,760m, while a preliminary FS was completed by Fluor.

In 2001, Minproc completed a number of FS, which ultimately indicated a Mineral Reserve of ~95Mt. In 2003, Gold Fields, through a subsidiary, signed a definitive agreement with Sociedad Minera Corona S.A. for the purchase of the Cerro Corona deposit and adjoining mining concessions.

The Environmental Impact Assessment (EIA) was approved in December 2005 and the purchase transaction for the Cerro Corona project was completed in January 2006. Mine construction commenced in May 2006. Building of the Las Gordas tailings dam and quarrying for the relevant construction material commenced in 2007. The mine has been in production since 2008 and utilises open pit mining and sulphide flotation to produce an auriferous copper concentrate via a flotation circuit.

Gold Fields Corona (BVI) Limited, a wholly owned subsidiary of Gold Fields, increased its economic interest in Gold Fields La Cima (CFLC) from the original 80% to 98.6% in 2012, and to 99.53% in 2013.

In 2018, the 2030 life-of-mine (LoM) extension was announced based on a pre-FS, which was further supported by an FS in 2019. This continues to underpin the current LoM plan.

Salares Norte – brief history



Gold Fields discovered the Salares Norte deposit in 2011 through a systematic greenfields exploration programme. This programme focused on the northern-end of the Maricunga metallogenic belt beyond the extent of the known Miocene precious metal deposits. Gold Fields selected the district based on a combination of conceptual models and metallogenic criteria. The identification of favourable spectral targets, surface geochemical anomalies and geophysics, followed by RC and diamond drilling, all contributed to the discovery.

Gold Fields continued drilling the deposit and, in 2013, published a maiden Mineral Resource for the Brecha Principal deposit. Gold Fields published updated Mineral Resources in 2015, 2016 and 2017 based on additional infill and exploration drilling. The most recent Resource model was completed in May 2018 and is used for the current Mineral Resource declaration. A definitive FS (DFS) was completed in December 2018 and supports declaration of the maiden Mineral Reserve.

Gold Fields completed a DFS in 2018 based on developing Salares Norte as an open-pit mine with crushing, milling, leaching and metal extraction using both Merrill-Crowe and carbon in pulp (CIP) circuits at an average 2Mtpa plant throughput and following the approval of the EIA on 18 December 2019. With the completion of the funding strategy, the final notice to proceed (FNTP) with the project was approved by the Board in February 2020.

Detailed engineering progressed to 97% at the end of 2020, procurement to 87% and adjudication of construction contracts to 95%. Bulk earthworks for the plant, mining contractor mobilisation and pioneering for the mine commenced during 2020 Q4. Purchase orders for all major equipment were placed and offsite fabrication started on several critical packages. All major contracts, including mining services, bulk earthworks, water diversion channel construction, electromechanical erection of the processing plant and power supply, were adjudicated and mobilised to site.

The project remains on schedule with first gold scheduled for Q1 2023. The EIA was approved in December 2019. All sectorial permits secured (2020) and permitting for operations progressing to plan.

During 2021, mine pioneering works were completed and pre-strip was 44% complete, with 22.8Mt of waste material moved. Also during the year, construction progressed with major equipment being installed, including the crusher, grinding mills, tailings filters and electrical rooms. Construction works on the camp and plant administration complex were completed in 2021. The heavy mining equipment workshop, main fuel station and freshwater supply pipeline are scheduled for commissioning during 2022. Operational readiness execution is on track. Basic engineering of a solar photovoltaic (PV) plant to provide up to 20% of the renewable energy requirements for the future operation was completed; a permit application will be filed during 2022.

Australia region

Regional geology

The Norseman-Wiluna Archaean Greenstone Belt hosts three of the operations and is part of the Yilgarn Craton, a 2.6Ga granite-greenstone terrain, which is well endowed with gold and nickel mineralisation.

Deposits are hosted within a diverse range of rocks, including basalts and dolerites, fine to coarse-grained sedimentary rocks, and felsic to intermediate intrusions. Host rocks are commonly metamorphosed to greenschist or lower amphibolite facies. Gold mineralisation is typically structurally controlled, occurring within a network of shear zones proximal to major regional faults. The most important gold mineralisation styles are shear hosted quartzcarbonate-bearing breccia lodes and associated quartz vein arrays, together with finely disseminated gold associated with zones of strong hydrothermal alteration. Alteration comprises silica or albite-rich zones, associated with ankerite, sericite, biotite or amphibole, together with pyrite, pyrrhotite or arsenopyrite as sulphide-bearing phases.

Gold Fields holds a 50% interest in the Gruyere project and its associated exploration tenements lie within the Yamarna and Dorothy Hills Greenstone Belts, the easternmost known greenstone belts of the Archaean Yilgarn Craton. The greenstone belts of the Yilgarn Craton are the dominant host for gold mineralisation and mined production in Australia.

The Gruyere deposit is an Archaean orogenic gold deposit, located on a flexure point of the regional-scale Dorothy Hills Shear Zone (DHSZ) within the Dorothy Hills Greenstone Belt, where the shear zone changes from a northerly direction to a north-northwest direction. Gold mineralisation is hosted within the steep easterly dipping Gruyere Porphyry, a medium-grained quartz monzonite porphyry that has intruded the country rocks, elongated in the direction of the shear zone.

The Australian mines continued to see the real benefits of consistent annual investment in extensional and near-mine exploration (US\$59.4m in 2021).



Agnew wind farm

Agnew – brief history



The Paddy Lawlers prospecting party was responsible for the discovery of gold at Lamehorse Soak in 1894, approximately 10km south of Agnew. The Great Eastern and Donegal leases were pegged in the same year and mining commenced. The discovery and subsequent mining of the Waroonga, Glasgow Lass, New Holland and Cinderella areas all commenced before 1899. East Murchison United commenced the mining of nine underground levels at Main Lode in 1935 and the mine was operational until 1948.

In 1976, Western Mining Corporation (WMC) purchased the Waroonga leases and in 1984 Forsayth NL purchased the Great Eastern leases and modern open pit mining commenced at both Waroonga (450 South) and Lawlers mines in the mid-1980s. Additional discoveries at Redeemer (1985), Cox-Crusader (1987) and Genesis (1990) ensured that both the Emu and Lawlers mills operated at capacity, while additional open pit discoveries at New Holland (1991) and Fairyland (1997) were made before underground mining commenced at New Holland in 1998.

The Lawlers operation was purchased by Plutonic Resources from Forsayth in 1992 and was subsequently acquired by Homestake in 1998. During 2001, Barrick merged with Homestake and Gold Fields acquired Agnew from WMC. The Kim South lode at Waroonga was discovered in 2002, as was the Songvang open pit, with production commencing in 2002 and 2004 respectively. Gold Fields concluded the acquisition of the neighbouring Lawlers mine from Barrick in October 2013.

The ongoing commitment to brownfields exploration at Agnew has seen several new deposits opened up, including the Waroonga North Lower and Kath Lower extensions at Waroonga Underground, Redeemer Zone 2, Redeemer North, Barren Lands and extensional growth of the Sheba South and Hidden Secret deposits at New Holland Underground. Significant LoM extension infrastructure projects were completed during 2020 and 2021, including the Link Drive between the Waroonga and New Holland mines. A solar farm, wind farm and gas electricity facility was also completed during the year. At Agnew, exploration/Resource conversion drilling continued to return positive results from Kath Lower at the Waroonga Mine, supporting Agnew to exceed 1Moz of Mineral Reserves for the first time since 2012.

Australia region (continued)

Granny Smith – brief history



The Goanna and Granny Smith deposits were discovered in 1979 by CSR Limited. In 1988, Placer Pacific acquired CSR's 60% interest with the remaining 40% held by Delta Gold NL.

In 1989, mining commenced in the Granny Smith pit and continued concurrent with the development of the Goanna pit, the Windich pit and nearby satellite pits. In 1992, the Keringal and Sunrise deposits were discovered. The Wallaby deposit was discovered in 1998.

Barrick acquired 100% of Placer Dome shares in 2006. The Wallaby open pit was mined from October 2001 until December 2006 and produced 13.6Mt at 3.44g/t gold for 1.5Moz of gold. Underground mining at Wallaby commenced in December 2005 and, to date, circa 3.5Moz has been produced.

Gold Fields acquired 100% of the Granny Smith gold mine in Q4 2013 as part of the purchase of the Yilgarn South operations.

At Wallaby, underground exploration drilling in 2021 continued to expand the Mineral Resources footprint of the Zone 135 lodes, while exploration recommenced in Zone 150 with a Maiden Inferred Mineral Resource of +500koz declared.

St Ives – brief history



Gold was discovered at the Kambalda Red Hill camp in 1897 and in the following 10 years other gold-bearing locations, such as Victory, were discovered. In 1981, the Victory-Defiance complex (Leviathan area) was discovered.

Gold production commenced at St Ives using a 0.5Mtpa treatment plant (later expanded to 1.2Mtpa). In 1988, a new 3.1Mtpa carbon-in-leach (CIL) facility was constructed at St Ives. During 2001, a 2Mtpa heap leach facility was commissioned during the period when Gold Fields acquired St Ives. In 2004, the 4.7Mtpa Lefroy mill was constructed and fully commissioned in early 2005.

From 2007 to 2012, a number of economic deposits were discovered and mined. These include Cave Rocks (2007), Belleisle (2007), Hamlet (2009), Athena (2010) and Invincible (2012). Production from the Neptune palaeochannel open pit commenced in 2013 and continued through 2021.

The ongoing exploration strategy delivered the Invincible camp in 2013, which remains the mainstay of mine production. First production from Invincible started in Q1 2015. In 2017, development commenced into the Invincible underground deposit with full production reached in 2018. Development of the access decline to the Invincible South underground deposit commenced in 2018 and level development was commenced in 2019.

During 2021, ongoing exploration saw the Invincible camp continue to grow and it remains a key focus area for exploration and Resource extension drilling. Work continues at Invincible Underground, Invincible South, Invincible Deep and Invincible South Extension to assess the full potential of this major underground camp and maintain momentum on defining Resource extensions and converting Mineral Resources to Mineral Reserves in the LoM plan.

Australia region (continued)

Gruyere – brief history



Gold Road (ASX: GOR) discovered Gruyere in 2013 and in less than a year had defined a maiden Mineral Resource.

After completing a positive Feasibility Study in 2016, Gold Road formed a 50% Joint Venture (JV) with Gold Fields Ltd. Under the Joint Venture Agreement, Gold Fields were appointed the manager to develop and operate Gruyere and Gold Road retained responsibility for exploration on the Joint Venture tenements. The JV, comprised more than 200,000ha of miscellaneous exploration and mining tenements on both the Dorothy Hills Shear Zone (DHSZ) and Yamarna Shear Zone (YSZ) includes, in addition to Gruyere Main pit, declared Mineral Resources and Mineral Reserves for the Golden Highway Trend, including reserves for the Attila, Alaric, Argos and Montagne open pits. Additional declared Mineral Resources not yet converted to reserves include YAM14 on the DHSZ and Orleans on the YSZ and Central Bore underground.

In 2019, construction of the Gruyere project was successfully completed and commissioned with the first gold delivered in June 2019. Commercial levels of production were achieved at the end of September 2019, with ramp-up to name plate capacity in the December 2019 quarter. In 2021, the Gruyere JV achieved material year-on-year growth in both the Mineral Resource (10%) and Mineral Reserve (28%), net of depletion, following the completion of a pit expansion study. An exploration deep drilling programme beneath the Gruyere pit was completed during 2021.

Far Southeast – regional geology

The Far Southeast (FSE) project is located in the mining district of Mankayan in the Cordillera region of Northern Luzon, approximately 250km north of Manila in the Philippines.

The Mankayan district is underlain by a basement of pre-middle Miocene volcanic and intrusive rocks overlain by an extensive cover sequence of Pleistocene dacitic tuffs and breccias, the eruption of which was accompanied by the intrusion of diorite and dacite stocks and domes. Major north-trending strike-slip faults of the Philippine Fault system dominate the structure of the district and have exerted fundamental controls on igneous activity and mineralisation.

The district-scale mineralisation is characterised by intermediate sulphidation veins and fault-controlled high-sulphidation enargite-uzonite deposits that have been mined for precious and base metals principally by the Victoria and Lepanto mines. A number of copper-gold porphyry prospects also exist, which principally include the FSE porphyry deposit itself.

Far Southeast – brief history



The project is held by Far Southeast Gold Resources Inc (FSGRI), a JV between Lepanto Consolidated Mining Company (LCMC) and Gold Fields. To date, Gold Fields has acquired 40% of FSGRI for US\$230m and has the option to acquire a further 20% for US\$110m, incurring initial development costs totalling US\$165m.

For Gold Fields to obtain a further 20% interest in the FSE project, a Financial or Technical Assistance Agreement (FTAA) will be required from the Philippine government. This depends on obtaining the free, prior and informed consent (FPIC) of the local Kankana-ey Indigenous People. In mid-2013, the Kankana-ey Indigenous People voted in favour of the project and a Memorandum of Agreement was signed with the Council of Elders in February 2015. The agreement, together with supporting documentation, is currently being considered by the National Commission on Indigenous Peoples (NCIP) before issuance of a formal certification precondition, which will complete the FPIC process.

In June 2014, the Lepanto Consolidated Mining Company (LCMC) and Far Southeast Gold Resources Inc. (FSGRI) jointly applied for the renewal of Mineral Production Sharing Agreement 001 (MPSA 001), which is the mineral tenement jointly held by the two companies in which most of the FSE deposit occurs. The initial 25-year term of MPSA 001 was due to expire in March 2015.

In February 2015, LCMC and FSGRI commenced arbitration proceedings against the Philippine government on whether FPIC is also required for the renewal of the MPSA. In November 2015, the arbitration panel issued an award that FPIC may not be imposed as a requirement for the renewal of MPSA 001, and that the MPSA should be renewed under the same terms and conditions.

In December 2015, the Republic of the Philippines filed a petition to vacate the arbitral award with the court – a decision which the court rendered in May 2016. After the court denied a motion for consideration, LCMC and FSGRI subsequently filed a petition for review with the Court of Appeals in July 2016.

In May 2018, the Court of Appeals ruled in favour of MPSA 001 renewal without need for FPIC and, in response, the government filed a motion for reconsideration (MR). The MR was denied by the Court of Appeals on 14 January 2019. The government filed a petition for review in the Supreme Court on 12 March 2019. LCMC and FSGRI filed their comment to the petition on 10 June 2019. Also, in 2019, pursuant to a Supreme Court decision that the NCIP's jurisdiction is limited only to disputes between members of the same Indigenous group, the NCIP dismissed legal proceedings filed by Indigenous clans against LCMC and FSGRI on the grounds of lack of jurisdiction. Closure Orders on 12 mines by former anti-mining Environment Secretary were reviewed and largely reversed in 2018 and only three Closure Orders were upheld for proven environmental violations. This indicates that administrative regulations and processes are working in the country.

There were positive developments for FTAA's in the country during 2020. An FTAA is a form of mining tenure that allows majority foreign ownership and control of a mining project. An FTAA generally has an initial term of 25 years, renewable for another 25 years. The first FTAA in the country (FTAA 001) became due for renewal in June 2019 and the mining company involved (ASX and TSX listed) commenced the renewal process with the Department of Environment and Natural Resources (DENR) in March 2018. The DENR favourably endorsed the FTAA 001 renewal to the Office of the President in June 2019. In December 2020, the Office of the President, whose approval is required for an FTAA, instructed the DENR to engage the Department of Finance and commence negotiations with the mining company to finalise the terms of the FTAA 001 renewal.

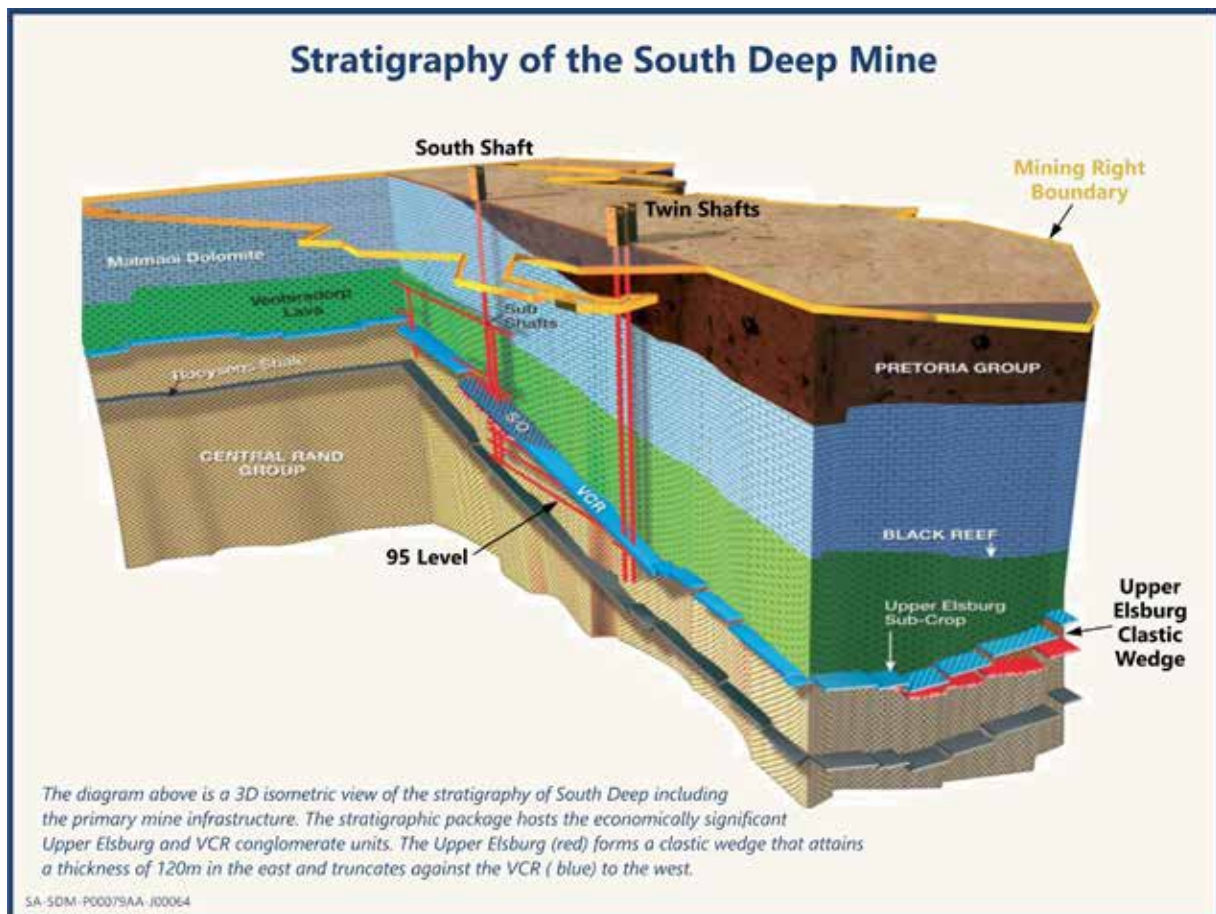
There were no material developments relating to the FSE project in the Philippines during 2021. Gold Fields reversed previous impairments of its investment in FSE, resulting in a carrying value of US\$114m at the end of 2021, based on the fair value less cost of disposal of the investment, which was indirectly derived from LCMC's market value on the Philippine stock exchange.

South Africa region

Regional geology

South Deep is located in the West Rand Goldfield on the north-west rim of the Witwatersrand Basin. This basin comprises a 6,000m-thick sequence of predominantly clastic sedimentary rocks, the upper part of which, the Central Rand Group, is characterised by the occurrence of auriferous and uraniferous quartz-pebble conglomerates (reefs) that are sporadically interspersed between finer-grained quartzitic units. All major reef units are developed above unconformity surfaces. The angle of unconformity is typically greatest near the basin margin and decreases toward more distal areas. The most fundamental control to the gold distribution remains the association with quartzpebble conglomerates on intra-basinal unconformities.

The Witwatersrand Basin reefs are considered to represent extensive fluvial deposits into a yoked basin, some 350km long in an east-northeast direction, and 200km wide in a north-northwest direction. The reefs are continuous as a consequence of the regional nature of the erosional surfaces. Preferential reef development within channel systems and sedimentary features such as facies variations and channel frequency assist in mapping out local gold distributions.



The diagram above is a 3D isometric view of the stratigraphy of South Deep, including the primary mine infrastructure. The stratigraphic package hosts the economically significant Upper Elsburg and VCR conglomerate units. The Upper Elsburg (red) forms a clastic wedge that attains a thickness of 120m in the east and truncates against the VCR (blue) to the west.

South Deep – brief history



In 1990, Western Areas Gold Mining Company Limited (WA) transferred land and mineral rights to South Deep Exploration Company Limited. WA and South Deep Exploration Company Limited merged in 1995. This period also saw the sinking of Twin Shaft and access development from South Shaft commenced.

In 1999, Placer Dome/WA (PDWA) JV was formed and, in 2000, the mine was renamed to South Deep gold mine. The new South Deep gold plant was commissioned in 2002 and the South Shaft plant was decommissioned. The sinking of the main shaft was completed and in 2004 the Twin Shaft system was commissioned.

During late 2006 and early 2007, Barrick Gold Corporation (Barrick) acquired a majority interest in Placer Dome Inc. Gold Fields acquired Barrick's 50% JV interest in the PDWA JV and, in 2007, Gold Fields acquired all remaining WA shares and consequently owns 100% of South Deep gold mine. Between 2008 and 2009, all conventional mining was stopped and low-profile mechanised destress mining was initiated.

In 2010, a new-order mining right was granted, with the addition of the contiguous area known as Uncle Harry's. Following this in 2011, Newshelf 899 Proprietary Limited (Newshelf) was established holding a 100% interest in South Deep gold mine. Newshelf is a 90% subsidiary of Gold Fields and the remaining 10% is held by outside shareholders as part of the black economic empowerment transaction.

In 2017, the high-profile destress method was successfully implemented and the rebase plan initiated. In 2018, major restructuring was initiated in support of a new operating model designed to improve operational efficiency, reduce operating costs and leverage cash flow. The restructuring plan was embedded in 2019, incorporating a reduced workforce and mobile equipment levels aligned to overall mining activity that increased focus on the core productivity process and supported a recalibration of the cost base. In 2020, the mine continued to progress on most of the performance metrics relative to 2019, including production quality and efficiency measures with a notable improvement in stope compliance improving year-on-year from 79% to 88%.

Reprocessing of the existing 3D seismic data was completed in 2021 and is currently undergoing modelling and reinterpretation. In time, the updated models will be integrated with the long-inclined borehole drilling focused on the South-of-Wrench (SoW) Mineral Resource to further enhance ore body confidence. The mine's drilling strategy and standard operating procedure aims to profile an appropriate resource confidence level to support and de-risk the short, medium and long-term mine design, mine plans and schedules.

During 2021, South Deep demonstrated significant progress towards steady state production of 12t Au/year while delivering strong financials. This sets a positive base towards the major challenge and milestone for executing the restructure plan, continuing the LoM ramp-up and establishing sustainable business improvement.

West Africa region

Regional geology

The Damang and Tarkwa ore bodies are located within the Tarkwaian System, which is an important gold mineralised stratigraphic component of the Ashanti Belt in south-western Ghana. The Ashanti Belt is a north-east striking, broadly synclinal structure made up of lower Proterozoic sediments and volcanics underlain by the metavolcanics and metasediments of the Birimian System. The Tarkwaian unconformity overlies the Birimian and is characterised by lower-intensity metamorphism and the predominance of coarse-grained, immature sedimentary units.

Asanko deposits are located in the Asankrangwa Belt, hosted within the Kumasi Basin sediment in south-western Ghana. The belt is located east of the Ashanti Belt, which hosts the Tarkwa and Damang mines. The geology of Asankrangwa comprises strongly deformed Birimian metasediments, with minor granitic intrusions and mafic igneous rocks. The lithological units are cut by deep north-west dipping primary and sedimentary structures. It is this geological and structural architecture that has been important in the localisation of gold mineralisation. Gold mineralisation is linked to at least two separate deformation events and fluid emplacement, with certain similarities to the gold deposits of the Ashanti Greenstone Belts.



CAT 785C truck on route to the RoM pad from Teberebie Cut 7 Pit, Tarkwa

Damang – brief history



Several small mining companies operated the Abontiakoon concession near Tarkwa town, leading to the sinking of eight vertical shafts and the excavation of numerous open pits. In 1882, operations at the underground Abosso mine exploited banket conglomerates to a depth of 850m. In 1920, Adjah Bippo and Cinnamon Bippo underground mines to the north were incorporated into the Abosso mine holdings. Abosso mine ceased operation in 1956 with recorded production of 2.7Moz, at an average gold grade of 9.8g/t.

In 1989, Ranger Exploration (Ranger) began an investigation to retreat tailings from the Abosso mine.

Following a drilling programme and subsequent FS from 1993 to 1996, mining a mineralised quartz vein system extending to a depth of 200m was shown to be viable. Gold production started in November 1997. In 2001, Gold Fields and Repadre signed an agreement to purchase Ranger's 90% interest in Damang. IAMGold and Repadre merged to give IAMGold an 18.9% interest in Damang, with Gold Fields retaining a 71.1% interest. Gold Fields acquired the indirect 18.9% IAMGold interest in Damang, increasing its holding to 90% with the remaining 10% held by the Ghanaian government.

The Damang Expansion Project commenced in 2004 to assess the economic viability of the main pit cutback and identify additional sources of ore from areas around the main pit. Following further drilling and a successful FS, the Damang pit cutback and waste stripping commenced in July 2005. Additional Mineral Resources from Rex, Tomento North, Tomento East, Tomento West and Huni were added after completion of the regional prospectivity study in 2006.

At the end of 2016, the investment into Damang to extend the LoM to 2025 commenced and the mine was scheduled to achieve full ore production in 2020 – 2021. The Damang Reinvestment Project (DRP) has targeted a major cutback in the main pit to access the primary higher-grade ore body at the bottom of the current Damang pit. The development agreement reached between the government of Ghana and Gold Fields supported the DRP.

The DRP was initiated at the beginning of 2017 as the best option to secure future cash flows at the mine up to 2025. The DRP progressed according to plan during 2021 and ahead of the original DRP mining schedule, enabling the inclusion of a cutback on the adjacent Huni pit. Current Mineral Reserves are scheduled for depletion in 2025. Importantly, LoM extension opportunities are the focus for studies at Damang.

In 2021, Damang's exploration focused on early-stage exploration (target definition) programmes at Epieso and Tomento East and infill drilling of the Damang Mini-Cutback volume in support of the mine's next pit expansion study. Exploration in 2022 will focus on infill drilling at Damang and Rex.

West Africa region (continued)

Tarkwa – brief history



Sinking of the Abontiakoon vertical shaft was completed in 1935 and a central mill with a capacity of 30ktpm was constructed in the following four years. Several small mining companies operated the Abontiakoon concession, but in 1960 all workings were abandoned and allowed to flood. In 1961, production restarted under the State Gold Mining Corporation and in 1963 the Tarkwa mines were renamed Tarkwa Goldfields Limited. The Apinto shaft was sunk in the mid-seventies.

Gold Fields Ghana (GFG) signed a management contract with the Ghanaian government to operate the mine in 1993 and, in 1996, completed an FS on an open pit/heap leach operation. In 1998, the initial Tarkwa Phase 1 development was completed for an open pit operation, mining 14.5Mtpa (including 4.7Mtpa of heap leach feed ore). In 1999, the Tarkwa Phase 2 expansion was completed to increase the mining rate to 20.7Mtpa and heap leach feed ore production to 7.2Mtpa. All underground operations and the associated processing plant ceased production in this year.

In 2000, GFG acquired the northern area of Teberebie and mining production was increased to 36Mtpa.

Tarkwa implemented owner mining in July 2004 and commissioned a CIL plant with a nameplate capacity of 4.2Mtpa in October 2004. The expanded CIL plant was commissioned in January 2009 and a design throughput of 12.3Mtpa was achieved in September 2009. Conversion to owner maintenance was completed in 2010.

In 2011, GFG acquired the 18.9% IAMGold interest in Tarkwa and now holds 90%, with the remaining 10% held by the Ghanaian government. At the end of 2013, all heap leach operations ceased.

The CIL plant capacity was increased to 13.5Mtpa late in 2014 and further enhancements to increase the capacity to 15.5Mtpa are being considered.

Tarkwa reverted to a contractor mining model in 2018 after a comprehensive trade-off analysis indicated cash flow and all-in costs (AIC) benefits.

During 2020, Tarkwa continued exploration drilling in the Akontansi area, to support Resource to Reserve conversion, which underpinned a successive year-on-year increase in Mineral Reserves post-depletion in 2020.

Tarkwa's exploration programme in 2021 remained focused on the on-lease palaeoplacer potential by delineating new Resources and upgrading known Resource areas at Underlap East and South, Teberebie East and Akontansi-Ridge.

In 2022, the exploration programmes will focus on drill testing at Pepe Central, Resource definition drilling in Akontansi-Ridge and Underlap South, and completing a Resource conversion programme in Teberebie East. Further works will be commenced in Tarkwa North to assess early-stage pipeline targets in search of shear-hosted hydrothermal ore bodies.

Asanko – brief history



Gold rushes occurred in the area between 1898 and 1901, and again in the 1930s. Most of the concessions, however, have no record of the work undertaken on the properties for this period. Interest in the area was renewed in the early 1990s, mainly because of the successful exploration work carried out on the adjacent concession where the Nkran deposit is located. European settlers worked the deposits exploiting adits and drives that extend 80m into the hill on the site of old Indigenous People's workings. Around the Esaase deposit area, artisanal mining in Bonte Area was active associated with the Ashanti Kingdom.

In 1966, drilling was conducted on the Bonte River valley alluvial sediments to determine alluvial gold potential. No detailed records are available. During the 1980s, limited exploration work was undertaken with minor attention paid to the alluvial gold potential. In 1990, the Bonte mining lease in the Esaase area was granted to Akrokeri-Ashanti Gold Mines (AAGM) and later transferred to Bonte Gold Mines (BGM).

From 1990 to 1995, exploration focused on known prospects at Nkran deposit (formerly known as Jabokassie). Regional soil geochemical survey carried out that identified numerous anomalies around Nkran. Early RC drilling phase (details not available) yielded encouraging results over a wide zone of bedrock mineralisation, extending along strike for 600m. The broad, low-lying Nkran had relief of only about 40m with oxidation extending to depths of 40m. In 1995, additional drilling was completed, including diamond core (DDH) and RC, as well as holes using RC pre-collars with diamond tails (RCD). Mineral Resources (Measured, Indicated and Inferred classes) were estimated and reported. A FS was completed and a mining lease was granted.

Alluvial mining continued around the Esaase concession from 1990 to 2002, recovering approximately 200,000oz of alluvial gold and 300,000oz downstream on the Jeni River concession.

In 1996, Resolute acquired the concessions in the Esaase area and reviewed and expanded project scope. Further RC and DDH drilling over 74,168m² was conducted to increase Mineral Resources to a depth of 150m at Nkran and to further assess the known mineralisation at nearby Adubiaso. In July 1996, a revised mine development plan was completed with decision to proceed into production at a rate of 1.4Mtpa. Initial mining commenced at Nkran in early 1997 and further exploration drilling continued. The first gold was poured in May 1997.

In 2001, the Nkran pit closed due to low gold price having produced 590,743oz Au at an average grade of 2.35g/t Au. Extensive exploration work was undertaken throughout 2002.

West Africa region (continued)

Asanko – brief history (continued)



Between 2006 to 2013, Keegan further consolidated concessions and completed extensive exploration work including geophysics – airborne versatile time-domain electromagnetic (VTEM) along 2,266 line-km, soil geochemistry (>4,000 samples) and exploration drilling. Drilling included 112 diamond core (DDH) over 25,190m, 667 RC holes over 106,854m and 321 RC with RCD holes over 100,102m.

In 2011, PMI Gold Corporation (PMI) carried out a 5km² of Induced Potential (IP) ground geophysical survey. PMI also completed a VTEM electromagnetic (EM) and magnetic survey centred over the Nkran pit.

During the period 2013 to 2018, Asanko Gold continued extensive exploration to update the Mineral Resources. During 2018, a total of 43,383m of core was re-logged and a further 4,992m infill RC drilling was completed. From 2015 to 2016, Nkran mine was dewatered and re-opened by Asanko Gold as a deeper opencast operation. Plant refurbishment and expansion was undertaken and the Nkran pit operation restarted in 2016.

During 2018, Gold Fields acquired a 50% stake in Asanko Gold's 90% interest in Asanko. Production from the Esaase pit began in December 2018. The 2019 pre-FS that underpinned the reported December 2019 Mineral Resource and Mineral Reserve estimates is presently under substantive revision by Galiano Gold (the new name for the managing partner). As no updates were available from Galiano in line with Gold Fields' 2021 end-of-year reporting cycle, the Mineral Resources and Mineral Reserves have been excluded from the Gold Fields statement. Mineral Resources and Mineral Reserves are expected to be reviewed and updated in line with Gold Fields' 2022 reporting cycle.

During 2021, exploration focused on infill drilling at Esaase, Miradani North, Midras South and Kaniago West, with down-dip Mineral Resources extension drilling at Dynamite Hill.

The focus in 2022 will be on evaluating and progressing the above mentioned 2021 exploration targets, to close the near-term Mineral Resources gaps and provide potential opportunities for Mineral Reserves conversion.

