GOLD FIELDS

# Mineral Resource and Mineral Reserve Supplement to the Integrated Annual Report

for the year ended 31 December 2015

To be the global leader
in sustainable gold mining


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# Introduction

## Gold Fields (GFI) is a leading international unhedged gold mining company with attributable, annualised production of >2 million ounces (Moz) of gold and >60 million pounds (Mlb) of copper from a portfolio of eight operating assets and a number of exploration projects, grouped into four regions.

The Australia region consists of the St Ives, Granny Smith, Agnew and Darlot operations in Australia, as well as the FSE project in the Philippines. The Americas region comprises the Cerro Corona mine in Peru and the Salares Norte project in Chile. The South Deep Gold Mine is the standalone operation in the South Africa region while the Tarkwa and Damang mines in Ghana comprise the West Africa region.

The Salares Norte project in Chile continues to demonstrate potential for the generation of future value and with a focus on realising this value, it remains a key growth asset in the portfolio. Divestment of 'non-core' projects is ongoing. Woodjam in Canada was disposed of in August 2015 and the Arctic Platinum Project ("APP") in Finland has been earmarked for disposal.

Gold Fields' Mineral Resource and Mineral Reserve strategy is centred on cash flow, profitability and return on investment. Strategic priorities include:

- Build a quality portfolio of productive mines through active portfolio management and operational efficiencies;
- Intensify investment in brownfields exploration and Mineral Resource generation to ensure ongoing Mineral Reserve replacement and operational flexibility;
- Growing through value accretive acquisitions and near-mine exploration;
- Focusing on quality, cash-accretive ounces and minimising marginal mining;
- Divesting growth projects that are not optimally aligned with the Company's business objectives;
- Ensuring a strong sustainable development underpin, with rigorous quality control on environmental compliance and an emphasis on water and power security; and
- Building trust through strong relationships in the communities where the Company operates, based on Shared Value creation, aimed at supporting community development.


*Integrated Annual Report*


*Annual Financial Report*

In anticipation of the current downturn in the gold price, steps had already been initiated to gear the business toward protecting the viability of operations and building a platform for the delivery of long-term cash flow and growth in shareholder value. Importantly, the focus on cash flow and efficient capital spend has not compromised our ability to take advantage of longer-term optionality at the operations, allowing the portfolio to remain leveraged to future gold price fluctuations.

Key initiatives include:

- Using a long-term reserve gold price of US$1,300/oz and US$3.0/lb for copper with an acceptable free cash flow margin to ensure the mine plans are robust and resilient to lower metal prices in the short to medium term. To support this, a reserve gold price of US$1,200/oz and US$2.7/lb for copper is used in the short term (2016/2017)
- Based on metal prices of US$1,500/oz for gold and US$3.5/lb for copper, surface Mineral Resources are constrained using open pit shells, while underground Mineral Resources are spatially constrained within estimated mining volumes. This approach is adopted to eliminate the inclusion of non-contiguous mineralisation from Mineral Resource estimates
- Minimising marginal mining at all the operations
- Committing to continued near-mine exploration to drive the development of a healthy pipeline of high-quality brownfield projects that will, over time, deliver the next generation of mines and further enhance overall cash returns
- Rationalising capital expenditure without compromising operational flexibility and the future integrity of the assets

The Gold Fields Mineral Resource and Mineral Reserve guiding principle is to ensure integrity, transparency and materiality in reporting, compliance with public regulatory codes and internal standards, and to inform all stakeholders on the status of the Group's fundamental asset base.

The information in this report is presented on a Group and regional basis, summarising the changes and current status of each operation and exploration project. This report should be read in conjunction with the Integrated Annual Report ("IAR"), which provides additional information regarding the operations and their financial performance.

## Important notices

1. All Mineral Resource and Mineral Reserve figures reported are 100% managed by Gold Fields unless otherwise stated.
2. Mineral Resources are reported inclusive of Mineral Reserves and Mineral Resources include stability pillars when appropriate (December 2014 statement numbers are shown in brackets).
3. The Mineral Resources and Mineral Reserves are estimated at a point in time and will be affected by changes in the gold price, US Dollar currency exchange rates, permitting, legislation, costs and operating parameters.
4. Rounding-off of figures in this report may result in minor computational discrepancies. Where this occurs, it is not deemed significant.
5. All references to tonnes (t) are metric units.
6. The 31 December 2015 Mineral Resource and Mineral Reserve figures are net of 2015 production depletion.
7. Locations on maps are for indication only.
8. All metals (gold, platinum, palladium, silver, copper and nickel) are reported individually and not as metal equivalents unless alternatively specified.

*Note: For abbreviations refer to page 136 and for glossary of terms refer to page 137 – 'Mineral Resource and Mineral Reserve Supplement 2015.*

# Group highlights

A prime objective for the Australia region, associated with the orogenic style of mineralisation in the Yilgarn district, is a significant investment in ongoing near-mine exploration with a total of A$91 (US$68) million funding brownfield exploration at all of the Australian mines in 2015.

Our multi-year phased investment in exploration is aimed at realising each mine's geological endowment potential through finding and defining high-quality ore bodies that will support the development of the next generation of high-margin mines.

Orogenic style operations characteristically reflect limited LoM profiles typically restricted to 5 – 7 years based on Proved and Probable Reserves. However, orogenic assets generally have a track record of replenishing reserves through cyclical discovery and resource to reserve conversion, thereby extending life in line with the assets geological endowment.

Exploration momentum will be maintained in 2016 with exploration funded at A$86 (US$63) million to deliver growth within the targeted time frame.

Granny Smith remains a standout performer in the Australia region in terms of consistent production as well as Mineral Resource and Mineral Reserve replacement. At the Wallaby underground mine, extensional and infill drilling in Zone 90, extensional and step-out drilling on Zone 100, supported by resource conversion drilling of Zone 110 – 120, have been very successful. During 2015, these activities added 1.6 million ounces (Moz) to the Mineral Resource base and 0.4Moz to the Mineral Reserve base (post depletion of 0.3 Moz). Initial exploration drilling down to Zone 150 indicated consistency in the nature of the mineralised zones, which supports the positive outlook for the deposit at depth.

At St Ives, the first production from Invincible open pit was achieved in Q1 2015. Depth and lateral extensions at Invincible were identified and will be actively explored as part of the 2016 exploration programme, along with the newly discovered Invincible South underground deposit. The Neptune open pit resource base has also been expanded to support a multi-year palaeochannel mining programme on Lake Lefroy.

At Agnew, access has now been established to the Fitzroy and Bengal lodes ("FBH"), with production ramping up in 2016. During this time, exploration is being focused on the Kath and Waroonga North targets. Establishing access to the newly discovered Cinderella lodes at New Holland was accelerated in 2015, which will serve as a new underground mine and ore source in 2016 to replace diminishing reserves in other areas of New Holland.

Darlot continues to explore and convert resources at Oval for near-term mining and establish additional mining fronts in Lords South Lower ("LSL") by targeting incremental LSL extensions. Exploration activities for assessing the potential from the Centenary Depth Analogue ("CDA") area continue, which is viewed as a potential replication of the ore body currently being mined in the Centenary Deposit.

Cerro Corona undertook a pre-feasibility study to assess the potential for adding Mineral Reserves in 2015 based on innovative solutions to existing waste storage and tailing facility constraints. Pleasingly, it was concluded that this was technically possible. The study built on previous work by incorporating all the latest design updates for the Tailings Storage Facility ("TSF"), including optimisation of the mine in the potentially expanded tonnage case. Additional work on this study is

scheduled in 2016 to complete assessment of all new opportunities and to ensure identification of the most suitable long-term plan. On the operational side, business improvement projects are showing positive results in processing plant throughput and metal recoveries. During the second half of 2015, the plant operated at an average of 830 tonnes per hour ("tph"), with a 72% gold recovery in the same period. Copper also showed better recovery performance despite a reduction in the head grade.

At Salares Norte in Chile, the Scoping Study was updated in 2015 after additional drilling, metallurgical testing and cost modelling was completed. Further drilling is in progress at the Brecha Principal and Agua Amarga zones. Approximately 30% of the Inferred Mineral Resource has now been advanced into the Indicated category with a commensurate improvement in ore body confidence.

Tarkwa mine continues to deliver excellent mining and processing costs. Restructuring the mine to operate at lower total mining volumes of 90 – 100 million tonnes per annum ("Mtpa") that will ensure operational flexibility and underpin delivery on targeted head grades to deliver 520 – 560koz of gold per annum through the recently upgraded 13.5Mtpa carbon in leach ("CIL") plant has been completed.

During 2015, Damang reviewed the option of owner versus contractor mining. Under the current economic conditions, it proved feasible to return to a contractor mining operation, which will be implemented in 2016. Also, a re-assessment of all strategic options across the entire Damang mining lease will continue to determine the best business case to improve cash flow.

South Deep made progress on its re-basing programme, especially with regards to the transition to the new regional pillar layout. Other critical success factors include:

- Ensuring a successful mine wide transition to high profile ("HP") de-stress mining
- Leveraging productivity improvements from the mining fleet
- Successfully implementing business improvement ("BI") strategies and a quality mining focus

The new senior management team tasked with the objective of making the operation cash generative is now well entrenched. The re-basing programme will be advanced in 2016 and will inform the revised long-term plan and outlook for South Deep to be communicated in Q1 2017.

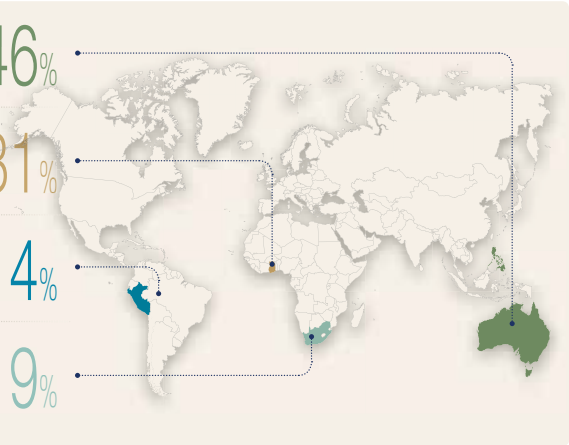
The South Deep re-basing programme will be advanced in 2016 and will inform the revised long-term plan and outlook.

The Group's portfolio management includes the application of a strict screening process and stringent hurdle rates for all new growth opportunities to ensure new acquisitions actively upgrade the profile of Gold Fields' portfolio. The sale of non-core projects is progressing so as to improve overall portfolio quality and the divestment of the Woodjam project was expedited in 2015.

The regional operating model for the Group is now entrenched. Regions are fully staffed with the requisite skills and ability to strategically guide operations and growth opportunities to deliver according to the regional and corporate strategy.

**Gold Fields Limited** (attributable holding in the respective Regions – equivalent koz)

| Region | Attributable % | Mineral Resources | Mineral Reserves | 2015 Production (Au equivalent) | 2015 Production (% of total) |
|---|---|---|---|---|---|
| Australia Region | 100% | 11,336 | 3,555 | 988 | 46% |
| Ghana Region | 90% | 13,554 | 6,947 | 678 | 31% |
| Americas Region | 99.53% | 4,886 | 2,763 | 292 | 14% |
| South Africa Region | 91.3% | 62,503 | 34,027 | 198 | 9% |



*Note: Operations only, excluding projects.*

# Global presence

**Key**

- Mines
- Corporate Office
- Regional Offices


## 1 **Project:** Salares Norte, Chile

Gold and silver deposits

Mineral Resources ›

3.3Moz gold
& 42.1Moz silver

## 2 **Project:** Far Southeast, Philippines

Gold and copper deposits

Mineral Resources ›

19.8Moz gold
& 9,921Mlb copper

## 3 **Project:** Arctic Platinum, Finland

Platinum, palladium, gold, copper and nickel deposits

Mineral Resources ›

0.8Moz gold
2.4Moz platinum
9.8Moz palladium
1,034Mlb copper
438Mlb nickel

## Americas region

**Mine:** Cerro Corona in Peru – Copper, Gold, Porphyry

Mineral Resources ›

2.8Moz gold
& 914Mlb copper

Mineral Reserves ›

1.5Moz gold
& 534Mlb copper

All figures are 100% as managed by Gold Fields.


## West Africa region

**Mines:** Tarkwa, Damang in Ghana – open pit gold mines

Mineral Resources ›

15.1Moz gold

Mineral Reserves ›

7.7Moz gold

## South Africa region

**Mine:** South Deep – underground gold mine

Mineral Resources ›

68.4Moz gold

Mineral Reserves ›

37.3Moz gold

## Australia region

**Mines:** St Ives, Granny Smith, Darlot and Agnew in Western Australia – open pit and underground mines

Mineral Resources ›

11.3Moz gold

Mineral Reserves ›

3.6Moz gold

# Headline numbers

| | | Managed | Attributable |
|---|---|---|---|
| **December 2014** | Gold Mineral Resources | 128.2Moz | 108.3Moz |
| | Copper Mineral Resources | 13,666Mlb | 6,873Mlb |
| | Gold Mineral Reserves | 52.1Moz | 48.1Moz |
| | Copper Mineral Reserves | 623Mlb | 620Mlb |
| **12 months Depletion** | Gold production depletion from Mineral Resources | 2.4Moz | 2.3Moz |
| | Copper production depletion from Mineral Resources | 86Mlb | 86Mlb |
| | Gold production depletion from Mineral Reserves | 2.3Moz | 2.2Moz |
| | Copper production depletion from Mineral Reserves | 79Mlb | 79Mlb |
| **December 2015** | Gold Mineral Resources | 121.5Moz | 102.2Moz |
| | Copper Mineral Resources | 11,869Mlb | 5,912Mlb |
| | Gold Mineral Reserves | 50.1Moz | 46.1Moz |
| | Copper Mineral Reserves | 534Mlb | 532Mlb |

*– Group total figures are inclusive of projects and the 2015 figures are net of production depletion*
*– The gold and copper prices used for the December 2015 Mineral Resources were US$1,500/oz and US$3.0/lb. For the Mineral Reserves, US$1,200/oz and US$2.7/lb were used for 2016 – 2017 and US$1,300/oz and US$3.0/lb thereafter*

# Group Mineral Resource and Mineral Reserve overview

All numbers are net of 12 months' depletion since the December 2014 statement, with the previously declared numbers shown in brackets.

- The total attributable gold Mineral Resources, excluding growth projects, are 90.2 (96.2) Moz and the Mineral Reserves are 46.1 (48.1) Moz, net of 2.1Moz depletion. Total attributable copper Mineral Resources, excluding growth projects, are 910 (1,001) Mlb and Mineral Reserves are 532 (620) Mlb
- Attributable gold Mineral Resources, including growth projects, are 102.2 (108.3) Moz, while attributable copper Mineral Resources, including growth projects, are 5,912 (6,873) Mlb
- A re-basing project has been initiated at South Deep, principally to model the production capability of the operation given a set of operating constraints, as well as the potential when these constraints are lifted. The re-basing project consists of a number of prioritised sub-projects, one being a review of the geotechnical environment at South Deep, and the Geotechnical Review Board ("GRB"), consisting of an international panel of subject experts, was established. The GRB have already supported re-configuration of the pillar layout from 240 metre mining spans with 60 metre pillars to 180 metre mining spans with 60 metre pillars. This configuration will be monitored and reviewed annually, based on results of empirical data collection and underground observations. The change in pillar design has been adopted and resulted in a broad re-design and revised schedule for the LoM
- The South Deep plan, which forms the basis for the 2016 Mineral Reserve, will continue to be refined and enhanced as other re-basing project outcomes are delivered and as the mine evolves to steady state production. The December 2015 Mineral Resource and Mineral Reserve declaration of 68.4Moz and 37.3Moz respectively is inclusive of the 3.8Moz impact of the reduced mining spans, as well as the remodelling of the Mineral Resource and Mineral Reserve with all of the latest drill hole information
- The Ghanaian operation's Mineral Resources showed a marginal increase to 15.1Moz, while the Mineral Reserves decreased from 8.7Moz to 7.7Moz, mostly attributable to mining depletion of 0.8Moz and some resource model updates based on new drill information
- The Australia region Mineral Resource increased by 1.3Moz to 11.3Moz and the Mineral Reserves remained constant at 3.6Moz, however, this is net of 1.0Moz from mining depletion. Granny Smith continues to provide outstanding performances in Mineral Resource and Mineral Reserve replenishment
- The Americas region Mineral Reserve decreased from 1.8Moz to 1.5Moz and the copper Mineral Reserve from 623Mlb to 534Mlb due primarily to depletion
- The Mineral Resources for Salares Norte have seen a material upgrade in resource classification and the models have been updated based on additional drilling while the Mineral Resources for the Arctic Platinum and Far Southeast projects have remained unchanged year-on-year
- The Woodjam project in Canada was divested in 2015

# Strategic pillars

In 2015, Gold Fields developed a new Group Performance Scorecard to reflect the reality of operating a mining company in tough economic conditions and instil the right culture and behaviours among our workforce, driven by the strategic business imperative of cash generation.

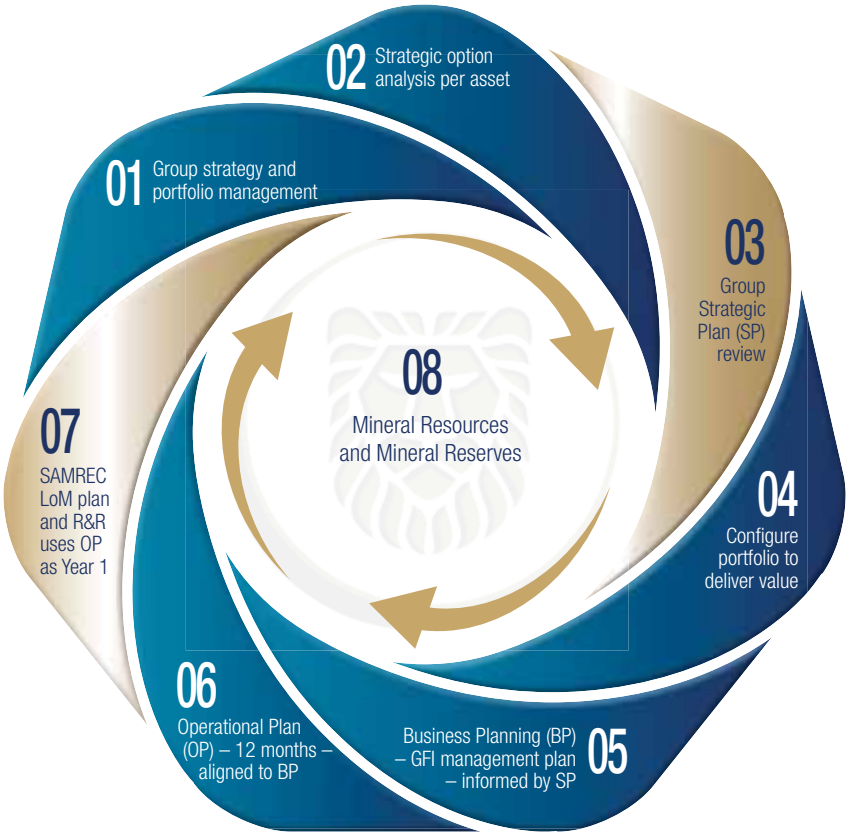
The quality of the group's Mineral Resources and Reserves is fundamental to delivering mines and projects as core franchise assets.

The scorecard consists of four key performance areas and elements against which we measure our performance. The four key performance areas are:

- Financial performance
- Business optimisation
- People
- Social licence to operate

Each of these four areas has underlying elements and, for the Group and Mineral Resource Management during 2015, these were identified as:

**Planning cycle**




***Wiring Strategy to long-term Planning***

**Financial performance**
- Free cash flow/margin for producing assets
- Activities that will impact or reduce costs
- Delivery of plan to guidance
- Enhancement of the Group's debt position

**Social licence to operate**
- Shared Value activities
- Energy and carbon projects
- Community relations
- Water management
- Social and labour plan projects or initiatives, as well as any other community or regulatory related projects


**Business optimisation**
- Safety improvements
- Portfolio management and growth
- Growth through exploration discovery
- Resource conversion and Reserve enlargement and flexibility
- Business process re-engineering or optimisation projects to improve efficiencies

**People**
- Management and tracking of performance
- Employee communication and engagement
- Talent management
- Training initiatives

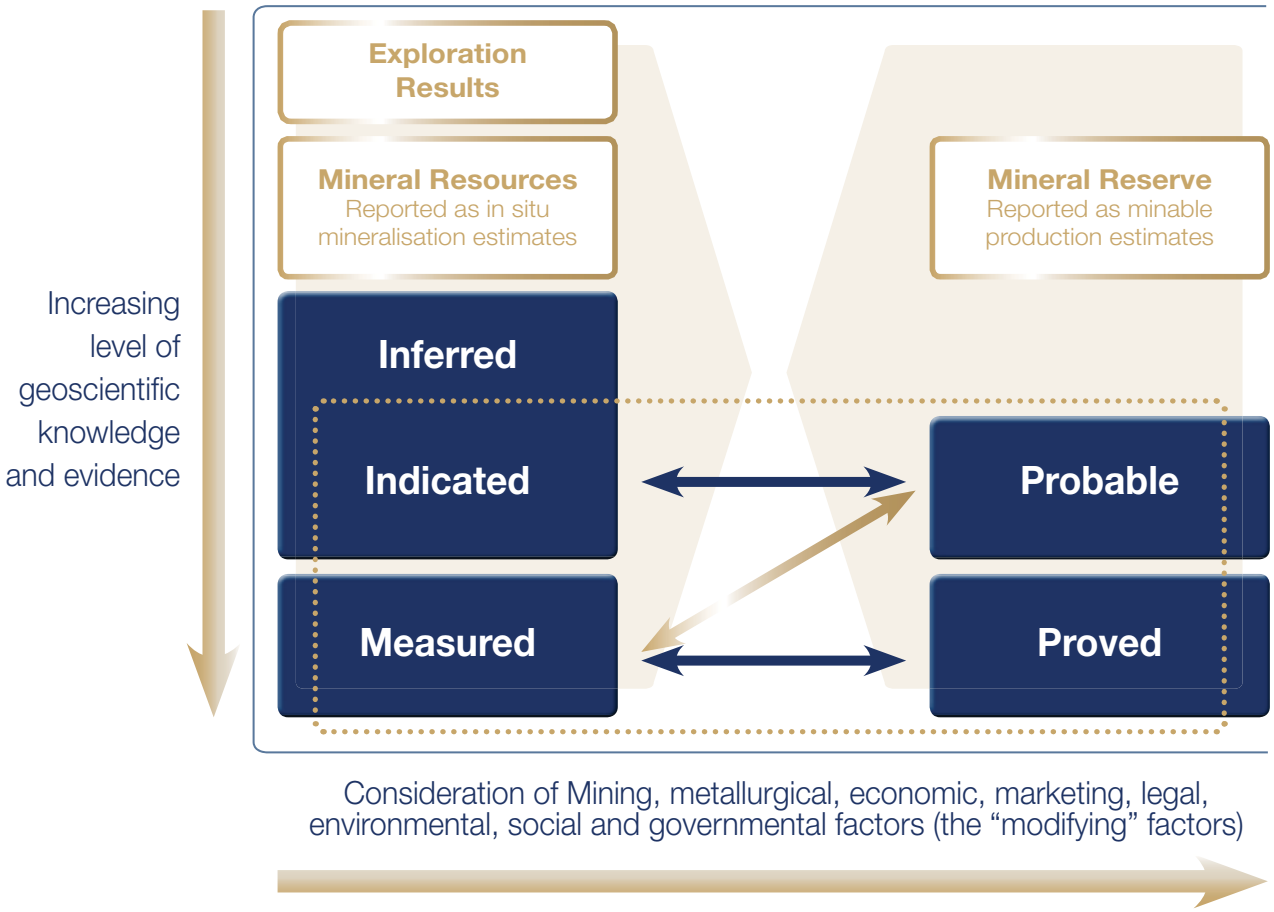
**Strategic pillars**

# Assessment and reporting criteria

The assessment and reporting criteria as outlined in the 2007 SAMREC Code (as amended July 2009) has been used in the preparation of an internal Competent Persons Report ("CPR") for each operating asset, from which the numbers stated in this report were drawn. The CPR principally comprises a technical review of the Mineral Resources and Mineral Reserves, together with a techno-economic appraisal of the relevant mining and processing assets.

Reporting is also in accordance with section 12 of the JSE Listings Requirements and takes cognisance of other relevant international codes where geographically applicable. The Competent Persons designated in terms of SAMREC, who assume responsibility for the reporting of Mineral Resources and Mineral Reserves are the respective operation-based Mineral Resource Managers, Technical Managers and relevant Project Managers. The Competent Persons have sufficient experience regarding the type and style of mineral deposit under consideration and, unless otherwise stated, are full-time employees of GFI.

The definitions contained in the SAMREC Code are either identical to, or not materially different from, international definitions. The relationships between Mineral Resources and Mineral Reserves are depicted below in the SAMREC classification diagram.




Reporting is in accordance with SAMREC and Section 12 of the JSE Listings Requirements and takes cognisance of other relevant international codes where geographically applicable.

The Mineral Resources and Mineral Reserves are underpinned by appropriate Mineral Resource management processes and protocols that ensure adequate corporate governance. External and independent third party reviews and audits are undertaken as and when required – targeting expert review, technical assurance and reporting compliance of the key components of a mine's Mineral Resource and Mineral Reserve, LoM plan, key projects and any significant maiden Mineral Resource or Mineral Reserve declarations.

Technical and operating procedures are designed to be compliant with the Sarbanes-Oxley Act framework as adopted by GFI for Mineral Resource and Mineral Reserve estimation, auditing and reporting.

The commodity prices, which are reviewed annually and used for the Mineral Reserve declaration are in accordance with the SEC guidelines as the short-term (2016/2017) gold price (US$1,200/oz) is lower than the three-year trailing average (~US$1,280oz). Although the longer-term gold price used is higher than the current spot, the strategic positioning of the operations to be cash generative at gold prices periodically trading lower is central to the phasing of the LoM plans. The December Mineral Resource prices have a premium of ~15% over the Mineral Reserve prices.

The following gold prices were used as a basis for estimation in the December 2015 Mineral Reserve declaration:

| | Gold price + exchange rates | | | | |
|---|---|---|---|---|---|
| **Period** | **Gold price (US$/oz)** | **ZAR/US$** | **US$/A$** | **ZAR/kg** | **A$/oz** |
| **January 2016 – December 2017** | **1,200** | **12.96** | **0.80** | **500,000** | **1,500** |
| **January 2018 – Life-of-Mine** | **1,300** | **11.96** | **0.84** | **500,000** | **1,550** |

The following copper prices were used as a basis for estimation in the December 2015 Mineral Reserve declaration:

| **Period** | **Copper price (US$/lb)** | **Copper price (US$/tonne)** |
|---|---|---|
| **January 2016 – December 2017** | **2.7** | **5,950** |
| **January 2018 – Life-of-Mine** | **3.0** | **6,610** |

The following metal prices were used as a basis for estimation in the December 2015 Mineral Resource declaration:

| Gold price | | | Copper price | |
|---|---|---|---|---|
| **US$/oz** | **AS$/oz** | **ZAR/kg** | **US$/lb** | **US$/tonne** |
| **1,500** | **1,750** | **550,000** | **3.5** | **7,720** |

*Note: See individual growth projects for respective metal prices used.*

Mineral Resource tonnages and grades are estimated in situ over a minimum mining width, and may include mineralisation below the selected cut-off grade to ensure that the Mineral Resources comprise practical mining blocks of adequate size and continuity. Measured and Indicated Mineral Resources are reported inclusive of those Mineral Resources modified to produce Mineral Reserves.

# Assessment and reporting criteria (continued)

Mineral Reserves are that portion of the Mineral Resource, which technical and economic studies have demonstrated, can justify extraction at the time of disclosure (to a minimum of a pre-feasibility study level). Estimates of tonnages and grades quoted as Mineral Reserves include allowances for all mining dilution, all other mining factors (modifying factors) and are consequently reported as net tonnes and grades delivered to the mill.

- The Group's underground Mineral Reserves are classified as being above existing infrastructure. This is in line with international practice, where reserves are continually accessed via ramps for which the planned expenditure has been provided for in the LoM
- The LoM is produced following an annual Group planning process that is initiated by reviewing a range of strategic options and scenarios, which are subject to trade-off studies to identify the best value option per asset in line with Group strategy. This option then informs and guides the generation of the detailed operational plan, which is the first year of the LoM plan and is prepared on a monthly basis and zero-based costing is used to formulate the cash flow model. The LoM plan is underpinned by a full mine design and production schedule. Of critical importance is the utilisation of historically achieved data for productivity and processing rates, modifying factors and operating costs
- Although all permitting may not be finalised, there is no reason to expect that these will not be granted based on existing processes and protocols. However, the duration taken for final approval may impact the production schedules
- All financial models are based on existing tax laws as at 31 December 2015
- Open pit Mineral Resources are typically confined to pit shells that are defined by the price, costs and relevant modifying factors used for their estimates. These pit shells are used to constrain the mineralisation to that which is economically and practically extractable under assumed economic conditions
- All regions and operations have documented the assumptions and modifying factors that underpin the LoM plans, which are supported by mine designs and schedules
- The conversion ratio from Mineral Resources to Mineral Reserves at South Deep is further affected by the following key factors:
  - Mining constraints applied to the extraction, based on the geometry of the geological structures as presently interpreted
  - Mining quality factors (e.g. mine call factor and dilution)
  - Gold price variance and cut-off grades applied
- Mineral Reserve parameters for the Australia region vary on a mining project-by-project basis and reflect particular cost structures and technical assumptions derived from actual production history or pre-feasibility/feasibility work
- Due to the limited extent of the Cerro Corona mining right area, Mineral Resources are limited by the current capacity of the waste storage facility ("WSF"), while the Mineral Reserves are constrained by the present capacity of the TSF. In a multiple commodity deposit such as Cerro Corona, the net smelter return ("NSR") cut-off calculation takes account of all cost and technical parameters
- Mineral Reserves for West Africa are estimated using mine designs generated according to industry-standard mine optimisation methods, current cost structures and technical assumptions derived from actual production history and pre-feasibility/feasibility studies
- Caution should be exercised when interpreting the grade-tonnage curves provided within this report. The ability to high-grade (selectively mine) the deposits may be precluded by the deposit geometry, mining method and the need for practical development of the ore body
- Operations are entitled to mine all declared material located within their respective mineral rights and/or mining rights, and all necessary statutory mining authorisations and permits are in place or have reasonable expectation of being granted
- Power and utility cost escalation and fuel prices have been factored into all financial models

- Appropriate closure plan and rehabilitation costs have been included in all financial models
- This supplement ('this report') contains information as at 31 December 2015 ('the effective date of this report'). The statements and information set out in this report pertain only to the effective date of this report. Shareholders and other interested and affected parties are therefore urged to review all public disclosures made by Gold Fields after the effective date of this report, as some of the information contained in the report may have changed or been updated. Gold Fields does not undertake any obligation to update publicly or release any revisions to statements and information set out in this report. Neither is it obligated to reflect events or circumstances after the effective date of this report or to reflect the occurrence of unanticipated events, unless obliged to do so pursuant to law or regulation. In such event, Gold Fields does not undertake to refer back to any information contained in this report

The Group has proven expertise in exploration, resource modelling, mine planning and reconciliation methodologies for surface, shallow and deep to ultra-deep mining operations. It constantly reviews and considers the application of international leading practices in Mineral Resource Management at all its operations and projects.

## Summary of Gold Fields Limited Mineral Resource and Mineral Reserve Statement

### Mineral Resource headline numbers[1]

| | Managed Mineral Resources | | | | | | Attributable ounces | |
|---|---|---|---|---|---|---|---|---|
| | **31 Dec 2015** | | | 31 Dec 2014 | | | **31 Dec 2015** | 31 Dec 2014 |
| **Gold only** | **Tonnes (Mt)** | **Grade (g/t)** | **Au (Moz)** | Tonnes (Mt) | Grade (g/t) | Au (Moz) | Gold (Moz) | |
| **Total operating mines** | **856.6** | **3.54** | **97.609** | 903.9 | 3.58 | 103.925 | **90.157** | 96.187 |
| **Total projects** | **1,127.0** | **0.66** | **23.933** | 1,164.6 | 0.65 | 24.271 | **12.053** | 12.104 |
| **Total operating mines and projects** | **1,983.5** | **1.91** | **121.542** | 2,068.6 | 1.93 | 128.196 | **102.210** | 108.291 |

### Operational summary[1]

| | Managed Mineral Resources | | | | | | Attributable ounces | |
|---|---|---|---|---|---|---|---|---|
| | **31 Dec 2015** | | | 31 Dec 2014 | | | **31 Dec 2015** | 31 Dec 2014 |
| **Gold** | **Tonnes (Mt)** | **Grade (g/t)** | **Gold (koz)** | Tonnes (Mt) | Grade (g/t) | Gold (koz) | Mineral Resource (koz) | |
| **Australia operations** | | | | | | | | |
| Agnew | **16.3** | **5.05** | **2,656** | 13.8 | 5.79 | 2,570 | **2,656** | 2,570 |
| Darlot | **1.2** | **6.51** | **260** | 1.1 | 7.18 | 263 | **260** | 263 |
| Granny Smith | **30.4** | **5.40** | **5,279** | 17.4 | 6.61 | 3,696 | **5,279** | 3,696 |
| St Ives | **29.1** | **3.35** | **3,141** | 30.1 | 3.63 | 3,508 | **3,141** | 3,508 |
| **Total Australia region** | **77.1** | **4.57** | **11,336** | 62.4 | 5.00 | 10,037 | **11,336** | 10,037 |
| **South Africa operation** | | | | | | | | |
| South Deep | **331.8** | **6.41** | **68,436** | 382.4 | 6.19 | 76,046 | **62,503** | 69,804 |
| **Total South Africa region** | **331.8** | **6.41** | **68,436** | 382.4 | 6.19 | 76,046 | **62,503** | 69,804 |
| **Peru operation** | | | | | | | | |
| Cerro Corona | **109.2** | **0.79** | **2,777** | 115.2 | 0.81 | 3,015 | **2,764** | 3,001 |
| **Total Americas region** | **109.2** | **0.79** | **2,777** | 115.2 | 0.81 | 3,015 | **2,764** | 3,001 |
| **Ghanaian operations** | | | | | | | | |
| Damang | **79.6** | **2.20** | **5,625** | 85.3 | 1.92 | 5,260 | **5,063** | 4,734 |
| Tarkwa[2,3] | **258.8** | **1.13** | **9,435** | 258.7 | 1.15 | 9,568 | **8,491** | 8,611 |
| **Total West Africa region** | **338.4** | **1.38** | **15,060** | 344.0 | 1.34 | 14,827 | **13,554** | 13,345 |
| **Gold only** | | | | | | | | |
| **GFI operations – Total Gold** | **856.6** | **3.54** | **97,609** | 903.9 | 3.58 | 103,925 | **90,157** | 96,187 |

*[1] Managed unless otherwise stated*
*[2] Includes 66.6Mt of surface stockpiles at an ore grade of 0.43g/t*
*[3] Open pit Mineral Reserve only 144.8Mt at an ore grade of 1.25g/t*

# Assessment and reporting criteria (continued)

| | Managed Mineral Resources | | | | | | Attributable ounces | |
|---|---|---|---|---|---|---|---|---|
| | **31 Dec 2015** | | | 31 Dec 2014 | | | **31 Dec 2015** | 31 Dec 2014 |
| **(PERU) – Cerro Corona COPPER** | **Tonnes (Mt)** | **Grade (% Cu)** | **Copper (Mlbs)** | Tonnes (Mt) | Grade (% Cu) | Copper (Mlbs) | Attributable Copper (Mlbs) | |
| Copper (Cu) only | **102.0** | **0.41** | **914** | 108.0 | 0.42 | 1,006 | **910** | 1,001 |

## Mineral Reserve headline numbers [1]

| | Managed Mineral Reserves | | | | | | Attributable ounces | |
|---|---|---|---|---|---|---|---|---|
| | **31 Dec 2015** | | | 31 Dec 2014 | | | **31 Dec 2015** | 31 Dec 2014 |
| **Gold only** | **Tonnes (Mt)** | **Grade (g/t)** | **Au (Moz)** | Tonnes (Mt) | Grade (g/t) | Au (Moz) | Gold (Moz) | |
| **Total operating mines** | **532.6** | **2.92** | **50.073** | 558.1 | 2.90 | 52.123 | **46.064** | 48.122 |
| **Total operating mines and projects** | **532.6** | **2.92** | **50.073** | 558.1 | 2.90 | 52.123 | **46.064** | 48.122 |

## Operational summary[1]

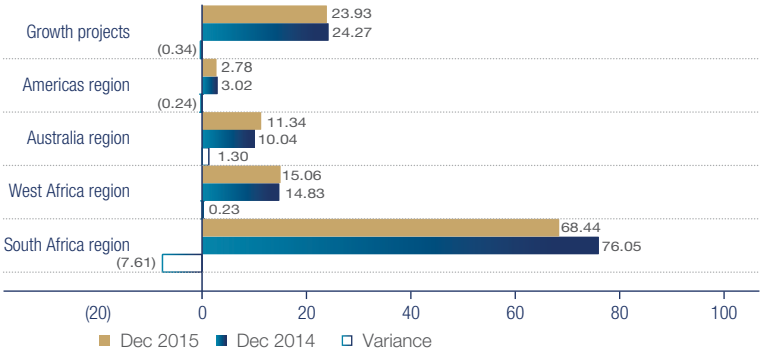
| | Managed Mineral Reserves | | | | | | Attributable ounces | |
|---|---|---|---|---|---|---|---|---|
| | **31 Dec 2015** | | | 31 Dec 2014 | | | **31 Dec 2015** | 31 Dec 2014 |
| **Gold** | **Tonnes (Mt)** | **Grade (g/t)** | **Gold (koz)** | Tonnes (Mt) | Grade (g/t) | Gold (koz) | Mineral Reserve (koz) | |
| **Australian operations** | | | | | | | | |
| Agnew | **3.4** | **6.16** | **670** | 3.6 | 7.44 | 865 | **670** | 865 |
| Darlot | **0.2** | **5.63** | **34** | 0.4 | 7.36 | 85 | **34** | 85 |
| Granny Smith | **7.0** | **5.86** | **1,310** | 4.5 | 6.02 | 872 | **1,310** | 872 |
| St Ives | **17.6** | **2.72** | **1,542** | 17.8 | 3.14 | 1,803 | **1,542** | 1,803 |
| **Total Australia region** | **28.1** | **3.93** | **3,555** | 26.3 | 4.28 | 3,625 | **3,555** | 3,625 |
| **South Africa operation** | | | | | | | | |
| South Deep | **218.8** | **5.30** | **37,257** | 223.2 | 5.30 | 38,016 | **34,027** | 34,896 |
| **Total South Africa region** | **218.8** | **5.30** | **37,257** | 223.2 | 5.30 | 38,016 | **34,027** | 34,896 |
| **Peru operation** | | | | | | | | |
| Cerro Corona | **53.1** | **0.90** | **1,543** | 60.5 | 0.90 | 1,757 | **1,535** | 1,749 |
| **Total Americas region** | **53.1** | **0.90** | **1,543** | 60.5 | 0.90 | 1,757 | **1,535** | 1,749 |
| **Ghanaian operations** | | | | | | | | |
| Damang | **21.2** | **1.43** | **973** | 25.7 | 1.49 | 1,235 | **876** | 1,111 |
| Tarkwa[2,3] | **211.3** | **0.99** | **6,746** | 222.4 | 1.05 | 7,491 | **6,071** | 6,742 |
| **Total West Africa region** | **232.6** | **1.03** | **7,719** | 248.1 | 1.09 | 8,725 | **6,947** | 7,853 |
| Gold only | | | | | | | **—** | — |
| **GFI operations - Total gold** | **532.6** | **2.92** | **50,073** | 558.1 | 2.90 | 52,123 | **46,064** | 48,122 |

| | Managed Mineral Reserves | | | | | | Attributable ounces | |
|---|---|---|---|---|---|---|---|---|
| | **31 Dec 2015** | | | 31 Dec 2014 | | | **31 Dec 2015** | 31 Dec 2014 |
| **(PERU) – Cerro Corona Copper** | **Tonnes (Mt)** | **Grade (% Cu)** | **Copper (Mlbs)** | Tonnes (Mt) | Grade (% Cu) | Copper (Mlbs) | Attributable Copper (Mlbs) | |
| Copper (Cu) only | **53.1** | **0.46** | **534** | 60.5 | 0.47 | 623 | **532** | 620 |

[1] *Managed unless otherwise stated*
[2] *Includes 144.8Mt at 1.25g/t for 5.8Moz in-pit material and 66.6Mt of surface stockpiles at an ore grade of 0.43g/t*
[3] *Open pit Mineral Reserve only 144.8Mt at an ore grade of 1.25g/t*

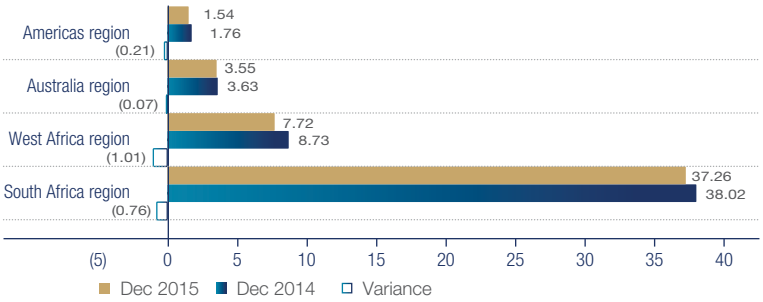
### Mineral Resources per region

(Moz)




### Mineral Reserves per region

(Moz)




The charts above depict the Group's comparative (2015 vs. 2014) managed gold Mineral Resource and Mineral Reserve ounces split by region and growth projects.

- The projects account for 19% of the total 2015 gold Mineral Resource base
- The production profile in 2015 was derived from Ghana (~34%), Australia (~44%), South America (~13% including copper as Au-equivalents) and South Africa (~9%)
- The 2015 figures are net of 2.1Moz gold production depletion

# Assessment and reporting criteria (continued)

## Annual change in gold Mineral Resources and Mineral Reserves

The tables below depict the annual movements in the Mineral Resources and Mineral Reserves.

*Ranked gold Managed Resources (Moz)*

| Operations | Darlot | Agnew | Cerro Corona | St Ives | Granny Smith | Damang | Tarkwa | South Deep |
|---|---|---|---|---|---|---|---|---|
| **Dec-15** | **0.26** | **2.66** | **2.78** | **3.14** | **5.28** | **5.63** | **9.43** | **68.44** |
| Dec-14 | 0.26 | 2.57 | 3.02 | 3.51 | 3.70 | 5.26 | 9.57 | 76.05 |
| Variance | — | 0.09 | (0.24) | (0.37) | 1.58 | 0.37 | (0.13) | (7.61) |

| Projects | Woodjam | APP | Salares Norte | FSE |
|---|---|---|---|---|
| **Dec-15** | **0** | **0.79** | **3.35** | **19.80** |
| Dec-14 | 0.58 | 0.79 | 3.10 | 19.80 |
| Variance | (0.58) | 0 | 0.25 | 0 |

*Copper- Operations only (Mlb)*

| Cerro Corona | Resource | Reserve |
|---|---|---|
| **Dec-15** | **914** | **534** |
| Dec-14 | 1,006 | 623 |
| Variance | (92) | (89) |

Key year-on-year changes in Mineral Resources were mainly driven by mining depletion. Other notable changes include:

- Cerro Corona – Geological, geometallurgical and geotechnical model updates
- Agnew – Addition of Cinderella, Kath, Himitsu, 600 series and Hidden Secret ore zones
- Darlot – Discovery and extensions at Lords South Lower and CDA oval areas
- Granny Smith – exploration success and conversion
- St Ives – Discovery at Invincible South, Invincible underground (UG), Incredible and Neptune
- South Deep – Geological modelling updates and the introduction of a new regional pillar design
- Damang – Lower cut-off grade, steeper geotechnical angles and resource model updates
- Tarkwa – A decrease in mining cost, changes in resource models

*Ranked gold Managed Reserves (Moz)*

| Operations | Darlot | Agnew | Damang | Granny Smith | St Ives | Cerro Corona | Tarkwa | South Deep |
|---|---|---|---|---|---|---|---|---|
| **Dec-15** | **0.03** | **0.67** | **0.97** | **1.31** | **1.54** | **1.54** | **6.75** | **37.26** |
| Dec-14 | 0.09 | 0.87 | 1.23 | 0.87 | 1.80 | 1.76 | 7.49 | 38.02 |
| Variance | (0.05) | (0.20) | (0.26) | 0.44 | (0.26) | (0.21) | (0.74) | (0.76) |

Key year-on-year changes in Mineral Reserves were driven by mining depletion. Other notable changes include:

- Cerro Corona – Geological, geometallurgical and geotechnical model updates
- Agnew – Discovery and resource modelling
- Darlot – Extensions at Lords South Lower
- Granny Smith – exploration success and conversion
- St Ives – Discovery at Neptune, NW Palaeochannel and Invincible pit
- South Deep – Geological modelling updates, the introduction of a new regional pillar design and positive change in Mine Call Factor (MCF)
- Damang – lower cut-off grade, increased MCF, steeper geotechnical angles and resource model updates
- Tarkwa – Lower MCF, decrease in mining cost, changes in resource models

# On-lease exploration, quality assurance and quality control (QA/QC)

The bulk of the Group's brownfield exploration activity took place in the Australia and West Africa regions, where the emphasis has been on realising strong reserve replacement potential. Focus at all mine sites is to ensure that the Mineral Reserve replacement and expansion pipeline is maintained, and that the conversion of Mineral Resources to Mineral Reserves is timely and is leveraged to maintain production profiles and cash flow projections.

Gold Fields believes that near-mine exploration offers the best route to low-cost, low-risk growth in well-understood jurisdictions that can generate cash in the medium term. The on-lease exploration for the twelve months to December 2015 centred heavily on the Australia region. In 2015, Gold Fields raised its on-lease exploration expenditure at the Australian operations from US$54.4 million to US$68.1 million (A$90.8 million) in pursuit of this strategy and the metres drilled virtually doubled from 317,489 million to 617,141 million.

Expenditure in the Ghana region declined marginally from US$4.0 million to US$3.7 million, with Damang focusing on infill drilling and extensions to known targets to improve confidence and offset mining depletion. Tarkwa continued to explore parts of the concession that previously had limited exploration.

In accordance with the SAMREC 2007 Code, a comprehensive quality assurance and quality control (QA/QC) protocol is in place at all the Gold Fields operations and projects.

It draws on industry leading practice for data acquisition and utilises accredited laboratories which are regularly reviewed both internally and externally. Analytical QA/QC is maintained and monitored through the submission of blanks, certified reference material and duplicates, plus umpire laboratory checks.

On-lease exploration metres drilled and expenditure for the 12-month period ending 31 December 2015 is summarised below with the December 2014 expenditure included for comparison.

## Exploration drilling and expenditure

| | December 2015 | | | | December 2014 | |
|---|---|---|---|---|---|---|
| **Region** | **Metres drilled** | **ZAR (millions)** | **A$ (millions)** | **US$ (millions)** | Metres drilled | US$ (millions) |
| Australia | **617,141** | | **90.789** | **68.092** | 317,489 | 54.446 |
| South Africa | **1,800** | **4.771** | | **0.376** | 3,295 | 0.569 |
| Americas | **–** | | | **–** | 2,572 | 1.042 |
| West Africa | **19,825** | | | **3.731** | 26,155 | 3.999 |
| **Total** | **638,766** | **4.771** | **90.789** | **72.200** | 349,511 | 60.056 |

*Figures are exclusive of grade control drilling*

# 2

# Regions, operations and projects


| | | |
|---|---|---|
| 2.1 | Americas region (Cerro Corona and Salares Norte Project) | 18 |
| 2.2 | Australia region (Agnew, Darlot, Granny Smith, St Ives and FSE Project) | 34 |
| 2.3 | South Africa region (South Deep) | 88 |
| 2.4 | West Africa region (Damang and Tarkwa) | 104 |
| 2.5 | Corporate Development project (Arctic Platinum (APP)) | 130 |

# 2.1 Americas region

The Americas region currently accounts for 3% of the gold Mineral Resource and Mineral Reserve base, excluding growth projects.

Cerro Corona continues as a strong anchor point for cementing cash flow and growth in the region.

## Operation
## Cerro Corona – Peru

Mineral Resources
### 2.8Moz gold and 914Mlb copper

Mineral Reserves
### 1.5Moz gold and 534Mlb copper

- A well understood copper-gold porphyry ore body underpinning a robust LoM plan with optionality for expansion
- Plant productivity increased to 830 tonnes per hour (tph) throughput in the second half of 2015 (813tph in 2014)
- A feasibility study to assess the potential of increasing the Mineral Reserves will continue, and options to process the oxide stockpiles are being investigated
- An exhaustive re-logging campaign has been conducted on almost 100% of the drill holes inside the Mineral Reserve pit to enhance resolution of the geological model
- LoM extends to 2023 (eight years)
- 99.53% attributable to Gold Fields

## Project
## Salares Norte – Chile

Mineral Resources
### 3.3Moz gold and 42.1Moz silver 100% attributable to Gold Fields

*For more information on the Americas region please see our website www.goldfields.com/operationsandprojects*

| Operational profile (Cerro Corona) | |
|---|---|
| **Mining method** | Open pit |
| **Infrastructure** | One open pit. One standard sulphide flotation plant with a capacity of 6.7Mtpa |
| **Mineralisation style** | Porphyry (Cu-Au) |
| **Mineralisation characteristics** | i. Mineralisation hosted by a sub-vertical cylindrical shaped diorite porphyry<br>ii. Confined to well-defined intrusive body<br>iii. Mineralisation zones discontinuous with mid-range predictability |

### Regional overview

The Cerro Corona mine is located in northern Peru on the eastern slope of the western mountain range of the Andes. The copper-gold deposit exhibits a typical porphyry style of mineralisation and is situated within the Hualgayoc mining district in the northern part of the Cajamarca province. This metallogenic province hosts prolific epithermal-, porphyry- and polymetallic-style mineralisation. The mining area is characterised by moderate to reasonably steep mountainous terrain with elevations ranging from approximately 3,600 to 4,000 metres above mean sea level.

#### 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, which is one of the oldest mining districts in Peru and is 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.

#### Exploration drilling and expenditure

The Cerro Corona Mineral Resource is defined by approximately 92km of exploration drilling. In the latest drilling programme completed towards the end of 2014, Gold Fields La Cima (GFLC) had drilled an additional 2,572 metres of diamond drill core in order to increase the confidence in the definition of the lithological contacts and reduce local variability related to grade distribution within the five-year mine plan.

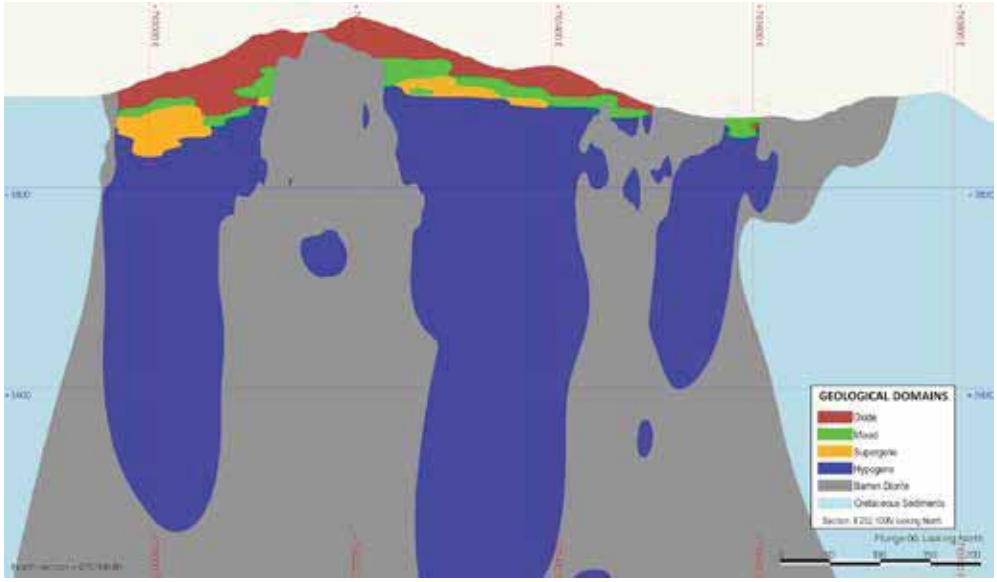
During 2015, the geological model was updated in terms of lithology, mineralisation, alteration and structure, using all of the information from exploratory and infill drill holes, blast holes and in-pit mapping. In addition, a comprehensive re-logging campaign was conducted on almost 100% of the drill holes inside the Mineral Reserve pit. The programme has delivered real benefits to the LoM planning through improved resolution on both geological and geometallurgical domaining. No additional exploration boreholes were drilled during 2015.

The Americas region maintains rigorous QA/QC protocols on all its resource definition and exploration programmes. It draws on industry leading practice for data acquisition and utilises accredited laboratories, which are regularly reviewed both internally and externally. Analytical QA/QC is maintained and monitored through the submission of blanks, certified reference material and duplicates, plus umpire laboratory checks.

# 2.1 Americas region (continued)

| | C2015 | | C2014 | |
|---|---|---|---|---|
| **Exploration drilling** | **Metres drilled** | **Metres drilled** | Metres drilled | US$ (millions) |
| Cerro Corona | – | – | 2,572 | 1,042 |

## West-east section through the Cerro Corona intrusion showing interpreted geological domains




### Social licence to operate

Since 2011, GFLC has been certified in accordance with the ISO 14001 and OHSAS 18001 standards. In this respect GFLC established an integrated Safety, Occupational Health and Environmental Management System at Cerro Corona, which subscribes to international best practices and Peruvian legal requirements.

In October 2015, the Integrated Safety, Occupational Health and Environment Management System completed the 3-year auditing process. Cerro Corona subsequently retained the ISO14001:2004 and OHSAS18001 certifications.

Occupational health and safety at Cerro Corona, which is mainly focused on, but not limited to, Visible Leadership, Behaviour-based Safety Programmes, Risk Management and Contractor Management systems, is managed by the functional line supervisors, with the support of the safety, health and environmental teams including GFLC's management.

In 2015, GFLC applied the organisational climate survey for the Great Place to Work (GPTW) programme and the resultant score places GFLC at the top of the Mining Industry in Peru.

In September 2014, Cerro Corona started a Local Suppliers Competitiveness Development Project. By December 2015, there were 60 local suppliers with a business diagnosis and completed improvement plans. Of these suppliers, 45 went on to implement their specific improvement plans.

Gold Fields supports the Hualgayoc Dialogue Round Table, which is formed from 40 communities and hamlets of Hualgayoc District. In 2015, Cerro Corona invested US$1.2 million in development projects selected by the Round Table, including various educational, agricultural and infrastructural development projects. It is expected that a similar contribution will be made by the end of 2016.

| Sustainability factors | | Fatal Injury frequency rate | Total recordable Injury frequency rate | Energy consumption (TJ) | $CO_2$ emissions (000 tonnes) (scope 1 & 2) | Water withdrawal (million litres) |
|---|---|---|---|---|---|---|
| **Cerro Corona** | **C2015** | – | **1.09** | **1,012** | **79** | **4,677** |
| | C2014 | – | 0.38 | 877 | 61 | 3,561 |

# Cerro Corona Mine

Cerro Corona consistently produces high-margin gold and copper from a single large open pit.

It is located in the highest part of the western cordillera of the Andes Mountains in northern Peru.

| Asset fundamentals | |
|---|---|
| **General location** | The Cerro Corona deposit, centered at longitude 78° 37' W and latitude 6° 45' S, is at elevations ranging from approximately 3,600 to 4,000 metres above mean sea level. It is located 1.5km west-northwest of the village of Hualgayoc, some 80km by road north of the departmental capital of Cajamarca, and approximately 600km north-northwest of the capital city of Lima. |
| **Licence status and holdings** | The mining concessions owned by Cerro Corona cover an area of 4,365 hectares while the surface rights cover 1,291 hectares. Cerro Corona is owned by GFLC, which holds 99.53% of the economic interest. |
| **Operational infrastructure and mineral processing** | Cerro Corona Mine operates one open pit and one copper-gold plant.<br><br>The processing plant at Cerro Corona includes the typical equipment for a copper flotation plant, with a design capacity of 6.7Mtpa. The crushing plant comprises two jaw crushers in parallel. Crushed product is conveyed to a two-stage grinding circuit consisting of a semi-autogenous grinding (SAG) mill and a ball mill, in closed circuit with cyclones for classification. Cyclone overflow represents the final milled product and feeds the flotation plant. The rougher flotation produces a bulk concentrate, which is then reground and sent to cleaner flotation. The tails go to scavenger flotation, while the concentrate, with a grade of over 20% copper, goes to the next process.<br><br>The final concentrate is thickened and filtered before being stockpiled for road transport (380km) to the Salaverry port, for shipment to copper smelters in Korea, Japan and Germany. The thickened rougher flotation tails and the tails from the cleaner scavenger flotation are sent by gravity to the tailings storage facility. |
| **Climate** | There are no extreme climate conditions that may affect mining operations. |
| **Deposit type** | The Cerro Corona copper-gold deposit is typical of porphyry-style mineralisation comprising stock work quartz-pyrite-marcasite-chalcopyrite ± bornite ± hematite ± magnetite veining, hosted by intensely altered intrusive lithologies of diorite to dacitic composition. |
| **LoM** | It is estimated that the current Mineral Reserve will be depleted in 2023 (eight years). |
| **Environmental, health and safety** | Cerro Corona maintained its ISO14001 and OHSAS18001 certifications.<br><br>Cerro Corona was included in the Environmental Good Practice Registry of the National Environmental Agency as a consequence of good environmental performance in 2015. In Peru only three mining companies are part of this Registry. |

# 2.1 Americas region (continued)

## Cerro Corona Mine (continued)

### Brief history of Cerro Corona

In 1979, exploration identified porphyry-style mineralisation in the Cerro Corona area. During the period from 1992 to 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 audit into the mineralised zone.

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

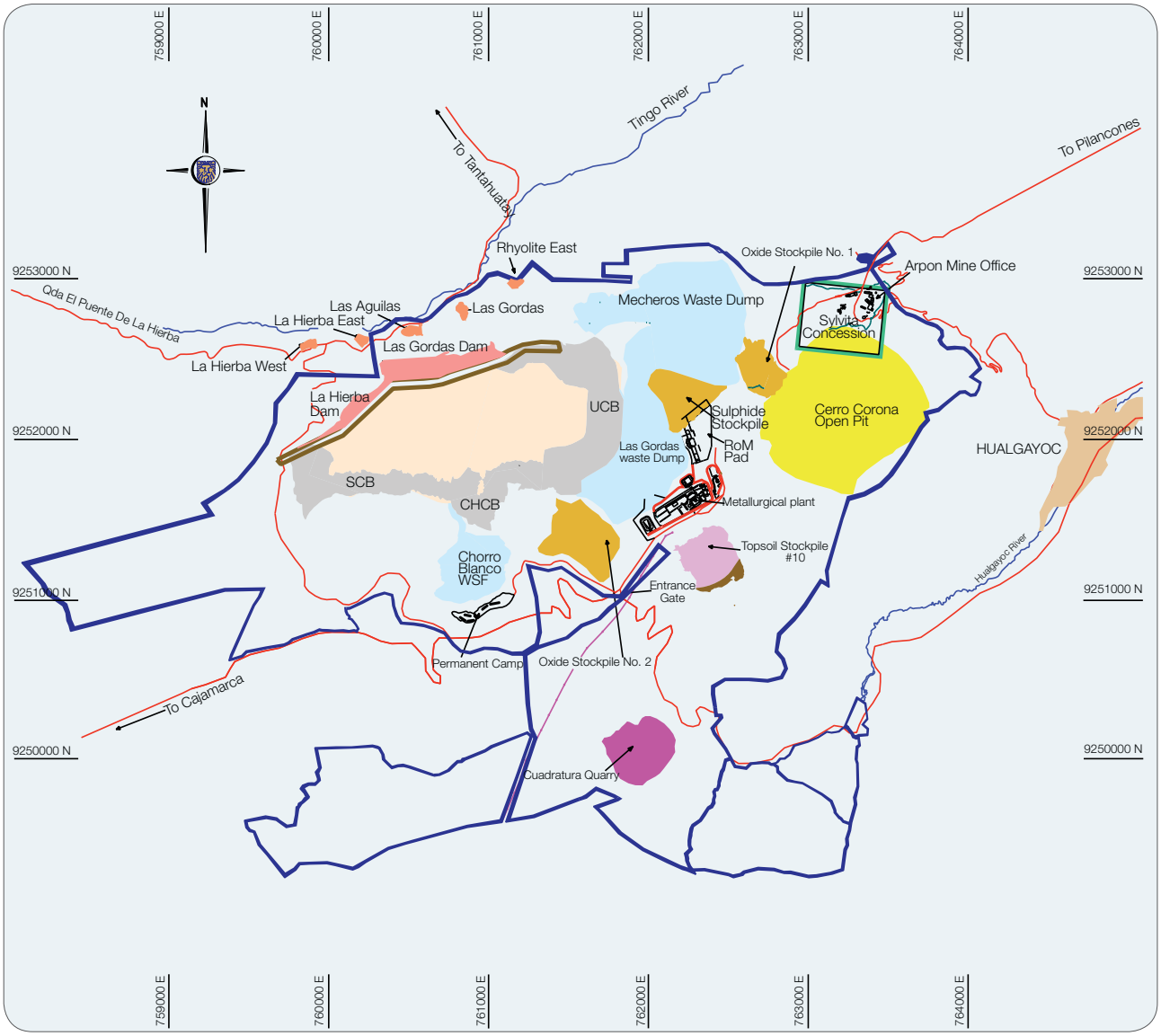
In 2001, Minproc completed a number of feasibility studies, which ultimately indicated a Mineral Reserve of ~95Mt. In 2003, Gold Fields, through a subsidiary, signed a definitive agreement with Sociedad Minera Corona S.A. for the purchase of the Cerro Corona deposit and adjoining mining concessions.

The environmental impact assessment was approved on 2 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 started production in September 2008, when the process plant started to operate.

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

### Key developments at Cerro Corona

- Cerro Corona remained the lowest All-in Cost per ounce (AIC/oz) producer in Gold Fields, producing high-margin gold and copper.
- During 2015, the geological model was updated in terms of lithology, mineralisation, alteration and structure, using information from exploratory and infill drill holes, blast holes, in-pit mapping and an exhaustive re-logging campaign. Results have been incorporated into the enhanced resource model with improved density and hardness information, waste-ore contact definition and improved alteration-clay models.
- A pre-feasibility study to assess the potential of expanding the LoM tonnage profile by configuring solutions to the current WSF and TSF constraints was undertaken in 2015. The study concluded that this was technically possible. Additional work on this study is scheduled in 2016.
- The option to process the oxide stockpiles through the current sulphide plant is under review, both separately and in conjunction with sulphides. During 2014 and 2015, a number of laboratory and plant tests were performed with a mixture of material from the upper part of Number 1 and 2 oxide stockpiles and hypogene mineralisation from the pit. However, additional test work is required to confirm the best processing option and alternative treatment programmes are scheduled for 2016.
- New geometallurgy models are now informing the short- to medium-term mining mix in the pit and the process blending to optimise concentrate delivery to the Salaverry Port.
- The implementation of process improvement projects in the plant during 2015, is showing positive results in throughput and recoveries. During the second half of 2015, the plant operated at an average of 830tph, with a 72% gold recovery in the same period. Copper recovery also showed better performance despite an 11% reduction in the head grade.




## Reference

| | | | |
|---|---|---|---|
| Office | | Tailings Dam | |
| River | | Waste Dump | |
| Roads | | Quarry | |
| Powerline | | Top Soil Dump | |
| Project Boundary | | Blankets | |
| Open Pit | | Stockpile | |

**Gold Fields Limited**
**Cerro Corona Gold Mine**

PLAN SHOWING MINE INFRASTRUCTURE AS AT 31 DECEMBER 2015

0 — 1
Kilometres
Provisional American datum 56

# 2.1 Americas region (continued)

## Cerro Corona Mine (continued)

### Operating statistics

| | | Historic performance | | | |
|---|---|---|---|---|---|
| | Units | **C2015** | C2014 | C2013[1] | C2012 |
| **Open pit mining** | | | | | |
| Total mined | kt | **12,962** | 13,603 | 14,793 | 14,006 |
| – Waste mined | kt | **6,120** | 6,571 | 6,435 | 6,296 |
| – Sulphide tonnes mined | kt | **6,842** | 7,032 | 8,359 | 7,710 |
| Strip ratio (waste: ore tonnes) | ratio | **0.9** | 0.9 | 0.8 | 0.8 |
| Gold mined grade | g/t | **1.05** | 1.08 | 1.02 | 1.12 |
| Copper mined grade | % | **0.50** | 0.56 | 0.48 | 0.60 |
| **Processing** | | | | | |
| Sulphide tonnes milled | kt | **6,710** | 6,797 | 6,571 | 6,513 |
| Gold head grade | g/t | **1.07** | 1.06 | 1.13 | 1.24 |
| Copper head grade | % | **0.52** | 0.58 | 0.55 | 0.68 |
| Produced | | | | | |
| Concentrate produced | kt | **145** | 164 | 151 | 181 |
| Gold produced | koz | **159** | 151 | 159 | 170 |
| Copper produced | kt | **29** | 32 | 30 | 36 |
| Plant recovery (Au) | % | **71.9** | 68.0 | 69.4 | 68.3 |
| Plant recovery (Cu) | % | **86.1** | 85.5 | 86.3 | 85.5 |
| **Financials** | | | | | |
| Operating cost | US$ m | **144** | 158 | 161 | 171 |
| | US$/oz | **484** | 484 | 509 | 501 |
| Capital expenditure | US$ m | **65** | 51 | 56 | 94 |
| | US$/oz | **219** | 156 | 178 | 272 |
| All-in Cost (AIC) | US$/oz | **718** | 316 | 206 | |
| All-in Sustaining Cost (AISC)[1, 2] | US$/oz | **718** | 316 | 206 | 775 |
| **General** | | | | | |
| Mineral Reserves | Mt | **53.1** | 60.5 | 67.1 | 103.6 |
| Mineral Reserves Au Head Grade | g/t | **0.90** | 0.90 | 0.94 | 0.83 |
| Mineral Reserves Cu Head Grade | % | **0.46** | 0.47 | 0.48 | 0.45 |
| Mineral Reserves – Au | Moz | **1.5** | 1.8 | 2.0 | 2.8 |
| Mineral Reserves – Cu | Mlb | **534** | 623 | 712 | 1,039 |

*[1] Pre-December 2013 figures represent notional cash expenditure (NCE) US$/oz*
*[2] AISC and AIC calculated according to World Gold Council (WGC) standard, with copper revenue treated as a by-product. Rounding off of figures presented in this report may result in minor computational discrepancies. Where this occurs, it is not deemed significant*

### Local geology

The Cerro Corona copper-gold deposit is hosted by a 600 to 700 metre diameter sub-vertical, cylindrical-shaped diorite porphyry situated in mid-Cretaceous limestone, marls and siliciclastic rocks. Within the porphyry, the copper-gold mineralisation is primarily associated with zones of stock work quartz veining conforming to classic porphyry-type vein definition. The Cerro Corona porphyry is unusual in that it carries a very high gold content compared to other copper-gold deposits.

There are at least two phases of diorite placement, only one of which is mineralised. The non-mineralised diorite is generally regarded as the last event, and is referred to as 'barren core'. Most recent geological modelling strongly suggests that the Cerro Corona porphyry probably comprises four or five satellite stocks, the last two of which are barren. Early mineralisation was accompanied by moderate to strong potassic alteration, which has been commonly overprinted by late, semi-pervasive argillic alteration and locally, by structurally controlled phyllic alteration assemblages (quartz-sericite-pyrite).

The intrusion has been emplaced at the intersection of Andean parallel and Andean-normal (trans-andean)

structures, which is a typical feature of the Cajamarca metallogenic province. A dominant northeast-southwest trending fault system, running through the intrusion, is referred to as the Mariela Fault trend, which has an important relationship in the distribution of the mineralisation. There are three distinct mineralised zones within the deposit. These are identified as the annulus zone, the northern zone and the southern zone. Each of these is treated separately in geological and resource modelling.

In addition to the mineralised zones, the deposit is characterised by several domains conforming to the degree of oxidation and weathering. Supergene oxidation and leaching processes at Cerro Corona have led to the development of a weak to moderate copper enrichment blanket. This allows for the subdivision of the deposit from the surface downward, into an oxide zone, a mixed oxide-sulphide zone, a secondary enriched (supergene) sulphide zone and a primary (hypogene) sulphide zone.

## Mining

The Cerro Corona deposit is mined by conventional surface open pit mining methods. The final surface mine area is expected to cover some 900 by 1,000 metres. The mining operation will extend from the crest of the original Cerro Corona hill, which peaked at 3,964mRL, to a final depth at around 3,570mRL.

### Mining methods

The Cerro Corona pit is mined via open-cut methods by conventional drill and blast with a truck and excavator fleet. Load and haul is carried out by 36 tonne dump trucks and excavators with a nine tonne bucket capacity. Mining benches are all 10 metres high and haul roads have a maximum gradient of 10%.

### Mine planning and scheduling

Cerro Corona's LoM plan is based on detailed and well-informed geological and resource models. The LoM plan is established from detailed short and long-term mine design and schedules based on high confidence production rates and resilient modifying factors. Planning utilises specialised mine planning software and a customised resource estimation model known as the localised multi-variate uniform conditioning model (LMUC), which uses specialised geostatistical software.

## Mineral Resources and Mineral Reserves

Geological and evaluation models have been updated as at December 2015 to reflect the latest available data sets. An integrated mine design and schedule, based on current performance levels, takes cognisance of and mitigates the inherent risks associated with mining operations at Cerro Corona.

The Mineral Resources are reported at an NSR cut-off of US$17.34/t and the Mineral Reserves at NSR cut-off's ranging from US$23.50 to US$25.50/t, from the LMUC model and constrained within an optimised MineSight® Economic Planner pit shell, based on the relevant economic parameters. The Mineral Reserves are constrained by the total capacity of the upgraded TSF of 100 million tonnes (54 million tonnes post December 2015).

The LoM capital costs are made up predominantly of the TSF wall raising and seepage control measures (containment blankets), WSF expansion and water treatment plants.

### Mineral Resources

Mineral Resources are reported as in situ within pit shells and are inclusive of those Mineral Resources, which have been modified to produce Mineral Reserves. The Measured, Indicated and Inferred oxide and sulphide Mineral Resource estimate has been calculated within the diorite intrusion above 3,300mRL.

# 2.1 Americas region (continued)

## Cerro Corona Mine (continued)

*Mineral Resource classification*

| Gold | Tonnes (kt) | | | Grade (g/t) | | | Gold (koz) | | |
|---|---|---|---|---|---|---|---|---|---|
| **Classification** | **Dec 15** | Dec 14 | Dec 13 | **Dec 15** | Dec 14 | Dec 13 | **Dec 15** | Dec 14 | Dec 13 |
| **Open pit** | | | | | | | | | |
| Measured | **71,592** | 76,120 | 85,920 | **0.82** | 0.82 | 0.83 | **1,879** | 2,011 | 2,296 |
| Indicated | **23,317** | 26,600 | 28,680 | **0.58** | 0.68 | 0.68 | **434** | 578 | 625 |
| Inferred | **3,335** | 1,440 | 3 | **0.56** | 0.47 | 0.61 | **60** | 22 | 0 |
| **Total open pit** | **98,245** | 104,160 | 114,603 | **0.75** | 0.78 | 0.79 | **2,373** | 2,611 | 2,921 |
| **Surface** | | | | | | | | | |
| Oxides measured | **7,149** | 7,170 | 6,820 | **1.32** | 1.32 | 1.34 | **303** | 303 | 295 |
| Sulphide measured | **3,823** | 3,830 | 3,860 | **0.82** | 0.82 | 0.83 | **101** | 101 | 102 |
| **Total surface** | **10,972** | 11,000 | 10,680 | **1.14** | 1.14 | 1.16 | **404** | 405 | 398 |
| **Grand total** | **109,217** | 115,160 | 125,283 | **0.79** | 0.81 | 0.82 | **2,777** | 3,015 | 3,318 |

| Copper | Tonnes (kt) | | | Grade (%) | | | Copper (Mlb) | | |
|---|---|---|---|---|---|---|---|---|---|
| **Classification** | **Dec 15** | Dec 14 | Dec 13 | **Dec 15** | Dec 14 | Dec 13 | **Dec 15** | Dec 14 | Dec 13 |
| **Open pit** | | | | | | | | | |
| Measured | **71,570** | 76,120 | 85,846 | **0.42** | 0.43 | 0.44 | **663** | 725 | 836 |
| Indicated | **23,317** | 26,600 | 28,640 | **0.39** | 0.41 | 0.41 | **201** | 242 | 260 |
| Inferred | **3,335** | 1,440 | 0 | **0.34** | 0.34 | | **25** | 11 | 0 |
| **Total open pit** | **98,222** | 104,160 | 114,486 | **0.41** | 0.43 | 0.43 | **889** | 978 | 1,096 |
| **Surface** | | | | | | | | | |
| Measured | **3,823** | 3,839 | 3,860 | **0.30** | 0.33 | 0.33 | **25** | 28 | 28 |
| **Total surface** | **3,823** | 3,839 | 3,860 | **0.30** | 0.33 | 0.33 | **25** | 28 | 28 |
| **Grand total** | **102,045** | 107,999 | 118,346 | **0.41** | 0.42 | 0.43 | **914** | 1,006 | 1,124 |

*Modifying factors*

- Mineral Resources and Mineral Reserves are quoted at an appropriate economic NSR* cut-off, with tonnages and grades based on the resource block model. They also include estimates of any material below the NSR cut-off that needs to be mined in order to extract the complete pay portion of the Mineral Resource
- Mineral Resources and Mineral Reserves are quoted as at 31 December 2015
- Unless otherwise stated, all Mineral Resources and Mineral Reserves are quoted as 100% and are not attributable with respect to ownership
- All Mineral Reserves are quoted in terms of run-of-mine (RoM) grades and tonnages, as delivered to the metallurgical processing facility
- Mineral Reserve statements include only Measured and Indicated Mineral Resources, modified to produce Mineral Reserves as contained in the LoM plan
- Mineral Resources and Mineral Reserves undergo internal audits during the year and any issues identified are rectified at the earliest opportunity – usually during the current reporting cycle.

| | | December | | |
|---|---|---|---|---|
| | Units | **2015** | 2014 | 2013 |
| **Mineral Resource parameters** | | | | |
| Mineral Resource gold price | US$/oz | **1,500** | 1,500 | 1,500 |
| Mineral Resource copper price | US$/lb | **3.5** | 3.5 | 3.5 |
| Net smelter return (NSR) for mill feed* | US$/t | **17.34** | 18.47 | 19.04 |
| Au Cut-off for oxide ore | g/t | **0.4** | 0.4 | 0.4 |
| **Mineral Reserve parameters** | | | | |
| Mineral Reserve gold price | US$/oz | **1,300** | 1,300 | 1,300 |
| Mineral Reserve copper price | US$/lb | **3.0** | 3.0 | 3.0 |
| NSR for mill feed*+ | US$/t | **23.5 – 25.5** | 18.5 – 25.0 | 21.4 |
| Strip ratio (waste:ore) | ratio | **0.99** | 0.89 | 0.73 |
| Dilution open pit | % | **0** | 0 | 0 |
| MCF | % | **100** | 100 | 100 |
| Mining recovery factor (open pit) | % | **98** | 100 | 100 |
| Plant recovery factor (Au) – Hypogene# | % | **70** | 70 | 68 |
| Plant recovery factor (Cu) – Hypogene# | % | **88** | 89 | 87 |
| Processing capacity | Mtpa | **6.7** | 6.7 | 6.7 |

*# Approximately 99% of the remaining in pit ore consists of hypogene material.*

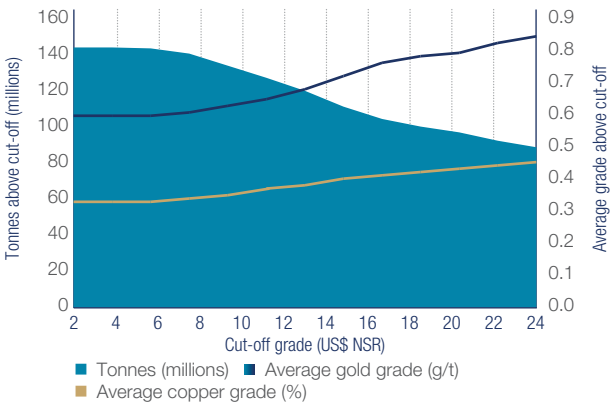
** NSR is defined as the return from sales of concentrates, expressed in US$/t, i.e.: NSR = (Au price – Au selling cost) x Au grade x Au recovery + (Cu price – Cu selling cost) x Cu grade x Cu recovery. Since 2014 a variable NSR was applied to the LoM plan to optimise the NPV and FCF.*

*+ The broader NSR cut-off range reported for 2015 is the result of using a lower short-term reserve gold price of US$1,200/oz and US$2.7/lb for copper for the period 2016 to 2017. From 2018 onward the reserve gold price used is US$1,300/oz and US$3.0/lb for copper. This results in an increased minimum NSR cut-off for the short term only.*

### *Grade tonnage curve*

Grade tonnage curves for sulphide Mineral Resources (open pit) are presented below.

**Grade tonnage curve (sulphides) – Surface**



# 2.1 Americas region (continued)

## Cerro Corona Mine (continued)

### Mineral Reserves

The Mineral Reserve estimate for Cerro Corona is based on a suitably detailed and engineered LoM plan. All design and scheduling work is undertaken to an appropriate level of detail by experienced engineers using specialised mine planning software. The planning process incorporates relevant modifying factors and realistic production and processing rates supported by an NSR cut-off and other techno-economic investigations, including optimised pit staging, geotechnical domain modelling and hydrogeological studies. Appropriate LoM sustaining capital is incorporated in the cash flow model to underpin the reserve. Low grade stockpile material is scheduled for treatment at the end of the LoM.

The 2015 operating results show the gold and copper head grade tracking marginally above the reported LoM reserve grade, which is a result of the dynamic NSR cut-off grade applied which schedules specific grade material through the plant to leverage NPV and detailed pit sequencing manages the arsenic content to within final concentrate threshold levels.

The table in this section summarises the Cerro Corona statement of Mineral Reserves. The terms and definitions are those given in the 2007 SAMREC Code.

The planning process incorporates realistic modifying factors and the use of appropriate cut-off grades, geotechnical criteria, mining fleet productivities and other techno-economic investigations.

*Mineral Reserve classification*

| Gold | Tonnes (kt) | | | Grade (g/t) | | | Gold ('000 oz) | | |
|---|---|---|---|---|---|---|---|---|---|
| **Classification** | **Dec 15** | Dec 14 | Dec 13 | **Dec 15** | Dec 14 | Dec 13 | **Dec 15** | Dec 14 | Dec 13 |
| **Open pit** | | | | | | | | | |
| Proved | **41,599** | 46,760 | 55,281 | **0.96** | 0.95 | 0.97 | **1,283** | 1,426 | 1,722 |
| Probable | **7,632** | 9,873 | 7,981 | **0.65** | 0.72 | 0.78 | **159** | 230 | 200 |
| **Total open pit** | **49,231** | 56,634 | 63,262 | **0.91** | 0.91 | 0.95 | **1,442** | 1,656 | 1,923 |
| **Surface** | | | | | | | | | |
| Sulphide Measured | **3,823** | 3,839 | 3,855 | **0.82** | 0.82 | 0.83 | **101** | 101 | 102 |
| **Total surface** | **3,823** | 3,839 | 3,855 | **0.82** | 0.82 | 0.83 | **101** | 101 | 102 |
| **Grand total** | **53,054** | 60,473 | 67,117 | **0.90** | 0.90 | 0.94 | **1,543** | 1,757 | 2,025 |

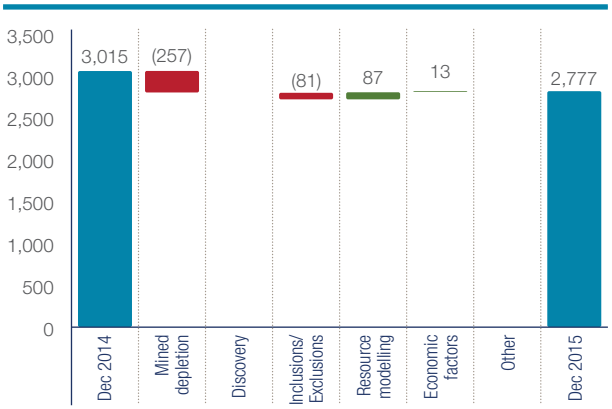
| Copper | Tonnes (kt) | | | Grade (%) | | | Copper (Mlb) | | |
|---|---|---|---|---|---|---|---|---|---|
| **Classification** | **Dec 15** | Dec 14 | Dec 13 | **Dec 15** | Dec 14 | Dec 13 | **Dec 15** | Dec 14 | Dec 13 |
| **Open pit** | | | | | | | | | |
| Proved | **41,599** | 46,760 | 55,281 | **0.48** | 0.48 | 0.49 | **436** | 499 | 603 |
| Probable | **7,632** | 9,873 | 7,981 | **0.44** | 0.44 | 0.46 | **73** | 96 | 80 |
| **Total open pit** | **49,231** | 56,634 | 63,262 | **0.47** | 0.48 | 0.49 | **509** | 595 | 683 |
| **Surface** | | | | | | | | | |
| Measured | **3,823** | 3,839 | 3,855 | **0.30** | 0.33 | 0.33 | **25** | 28 | 28 |
| **Total surface** | **3,823** | 3,839 | 3,855 | **0.30** | 0.33 | 0.33 | **25** | 28 | 28 |
| **Grand total** | **53,054** | 60,473 | 67,117 | **0.46** | 0.47 | 0.48 | **534** | 623 | 712 |

*Mineral Resource and Mineral Reserve reconciliation year-on-year*

| Factors that affected Mineral Resource reconciliation year-on-year | Factors that affected Mineral Reserve reconciliation year-on-year |
|---|---|
| Mining depletion | Mining depletion |
| Geological, geometallurgical and geotechnical model updates | Geological, geometallurgical and geotechnical model updates |
| NSR cut-off strategy | NSR cut-off strategy |

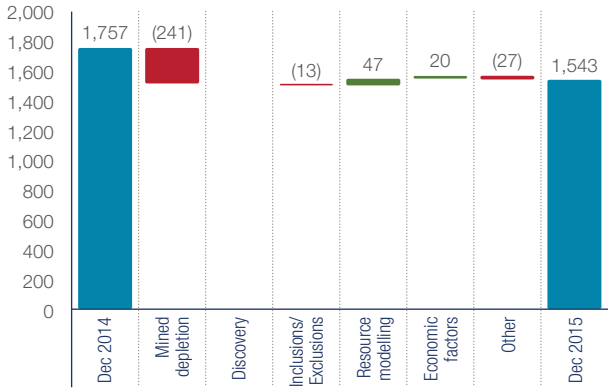
*Change in gold Mineral Resources*

**Mineral Resource Reconciliation**
(Gold – koz)



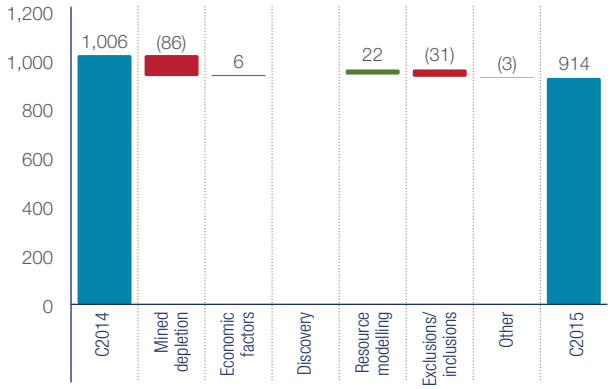

*Change in gold Mineral Reserves*

**Mineral Reserve Reconciliation**
(Gold – koz)



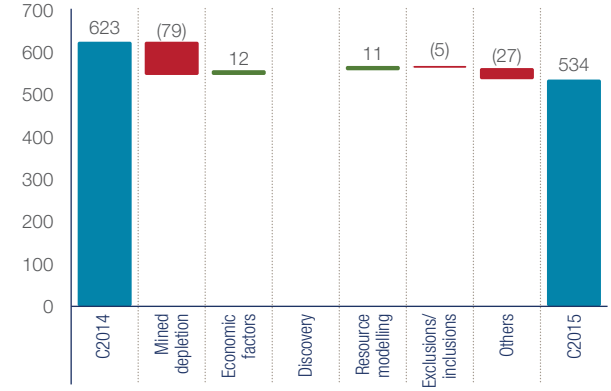

*Change in copper Mineral Resources*

**Mineral Resource Reconciliation**
(Copper – Mlb)




*Change in copper Mineral Reserves*

**Mineral Reserve Reconciliation**
(Copper – Mlb)



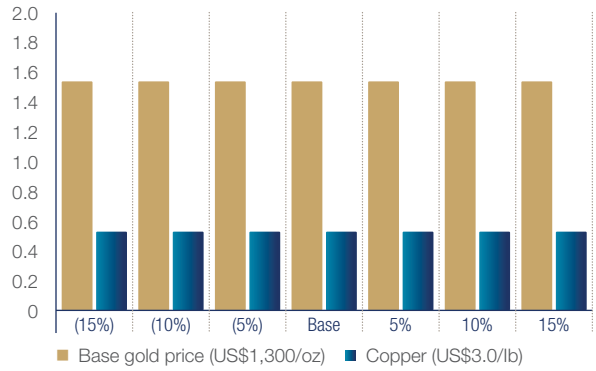
# 2.1 Americas region (continued)

## Cerro Corona Mine (continued)

### Mineral Reserve sensitivity

The Mineral Reserves are constrained by the TSF and are therefore reasonably insensitive to changes in the metal price. Sensitivities are not based on detailed rerun depletion schedules and should be considered on a relative and indicative basis only.

**Mineral Reserve sensitivity**
(Gold – Moz) (Copper – Blb)




### Competent Persons

Internal technical reviews have been conducted by the Competent Persons as listed, who are full-time employees of Gold Fields Limited.

***E Garcia***

*Mineral Resources Manager*

Mining Engineering, MBA, SAIMM (704963), SME (4028357), CIM (163652), CIP (109603), Pontificia Universidad Católica del Perú.

Industry experience: He has 21 years' experience in the mining industry (eight years at Cerro Corona).

Commodities: Gold, Copper and Silver. He is responsible for the overall accuracy, standard, and compliance of this declaration.

***P Gómez***

*Geology and Exploration Manager*

Geological Engineering, MBA, Universidad Nacional San Antonio Abad del Cusco CIP (130253), Diplomate in Geometallurgy Pontificia Universidad Católica del Perú. Certified in applied geostatistics by the University of Alberta.

Industry experience: He has over 17 years' experience in consulting, exploration, mining and resource modelling on world-class operations.

Commodities: Gold, Copper, Silver, Zinc and Molybdenum. He is responsible for the Geology Department and Exploration at Cerro Corona Mine.

***H Solis***

*Chief Engineer*

Mining Engineering, MBA, CIP (77973), Universidad Nacional Mayor de San Marcos.

Industry experience: He has 20 years' experience (ten years at Cerro Corona) in surface and underground mining operations.

Commodities: Gold, Copper, Lead, Silver, Zinc. He is responsible for the compliance of the LoM planning, scheduling and Mineral Reserve statement for Cerro Corona.

***H Rios***

*Senior Resource Modeller*

Geological Engineering, Universidad Nacional de Ingeniería, MBA Centrum Católica, MAusIMM (311727), CIP (92165), SEG (672559). Certified in applied geostatistics by the University of Alberta.

Industry experience: He has over 15 years' experience in exploration, mining and resource modelling.

Commodities: Gold, Copper, Silver. He is responsible for the Resource Department at Cerro Corona Mine.

***A Uzategui***

*Senior Mine Geologist*

Geological Engineering, CIP (12337), Universidad Nacional San Agustín.

Industry experience: He has 22 years' experience (ten years at Cerro Corona) in surface and underground mining operations and exploration.

Commodities: Gold, Copper, Silver, Lead, Silver, Zinc, Molybdenum and Wolframium. He is responsible for the structural and geological interpretation at Cerro Corona Mine.

# Salares Norte Project – 100% Attributable to GFI

A high-grade gold-silver oxide deposit discovered by Gold Fields in March 2011

## Location

The Salares Norte Project is located in the Atacama Region of Northern Chile. The nearest town is Diego de Almagro, about 190 kilometres by road to the west of the project. The target is centred on latitude of 26°0'42"S and longitude of 68°53'35"W, with elevations between 4,200 and 4,900 metres AMSL.

## Project history and ownership

Gold Fields discovered the mineralisation at Salares Norte in March 2011 with reverse circulation drilling. To date, a total of 71,374 metres has been drilled in 231 holes on the project (60 reverse circulation holes and 171 diamond drill holes).

The Salares Norte Project is owned by Minera Gold Fields Salares Norte Ltda (MGFSNL), which holds 900 ha of exploitation concessions (mining rights), with definitive title granted. Gold Fields also has an option to purchase agreements for two blocks of exploitation concessions attached to the project, totalling 2,100ha. Gold Fields Limited indirectly holds a 100% interest in MGFSNL. Negotiations for the right of way are in progress with the government. Applications for water rights have been submitted to the government and are in process.

## Geology and mineralisation

The Salares Norte Project is located in the northern part of the Maricunga Belt, an area with a predominance of Cenozoic volcanic rocks, comprising eroded strato-volcanos, volcanic domes and pyroclastic rocks. Mineralisation at Salares Norte is contained in a high-sulphidation epithermal system, hosted mainly by a breccia complex along the contact of two volcanic domes of andesitic and dacitic composition. Mineral Resources have been delineated by drilling in two separate deposits, Brecha Principal and Agua Amarga, which are located about 500 metres apart. Most of the mineralisation known to date is oxidised. The sulphide mineralisation contains mainly pyrite. Preliminary metallurgical test results indicate extraction in the order of 90% using a conventional CIL process on samples of oxidised material.

## Level of study, processing methodology, sustainability and permits

An interim scoping study was completed on the project in 2014, which showed positive results. The Scoping Study was updated in 2015 after additional drilling, metallurgical testing and cost analysis. Further exploration and resource definition drilling is in progress. The environmental impact declaration that was approved in January 2014 has been amended to permit continued exploration drilling.

A comprehensive QA/QC protocol is in place at all the Gold Fields operations and projects, using leading industry practice in data acquisition, reputable certified laboratories and analytical controls.

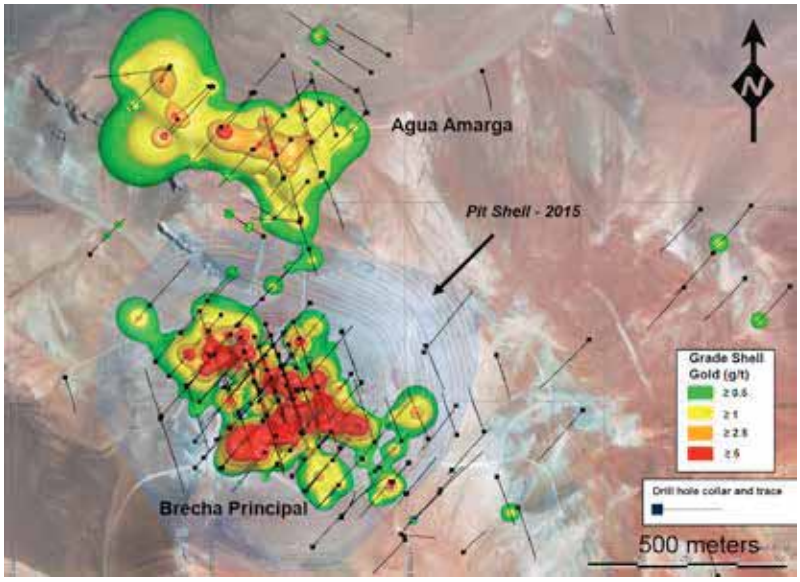
## Key developments at Salares Norte include:

- The Mineral Resource reflects a significant improvement in confidence level comprising 30% Indicated and 70% Inferred with the average grade for Brecha Principal at 4.7g/t Au and for Agua Amarga 2.8g/t Au
- Resource comprises 96% oxide material
- All geological domains have been reinterpreted with a better understanding of mineralisation controls
- Ongoing infill drilling at Brecha Principal and Agua Amarga
- Environmental baseline study commenced in October 2015

# 2.1 Americas region (continued)

## Salares Norte Project (continued)

### Plan View, Salares Norte Project – Mineral Resource Areas and Drill Holes




### Mineral Resources

*Salares Norte Classified Mineral Resource*

| Deposit | Class | Tonnes (Mt) | Gold (g/t) | Silver (g/t) | Gold (koz) | Silver (koz) |
|---|---|---|---|---|---|---|
| **Brecha Principal** | Indicated | 6.8 | 4.5 | 82.9 | 977 | 18,133 |
| | Inferred | 8.4 | 5.0 | 50.1 | 1,336 | 13,534 |
| | **Sub-total** | **15.2** | **4.7** | **64.8** | **2,313** | **31,666** |
| **Agua Amarga (Inferred only)** | **Sub-total** | **11.6** | **2.8** | **28.1** | **1,034** | **10,467** |
| **Total** | Indicated | 6.8 | 4.5 | 82.9 | 977 | 18,133 |
| | Inferred | 20.0 | 3.7 | 37.3 | 2,370 | 24,001 |
| | **Total** | **26.8** | **3.9** | **48.9** | **3,347** | **42,133** |

| Total Mineral Resource | Tonnes (Mt) | | | Grade Au & Ag = g/t | | | Content Au & Ag = koz | | |
|---|---|---|---|---|---|---|---|---|---|
| **Classification** | **Dec'15** | Dec'14 | Dec'13 | **Dec'15** | Dec'14 | Dec'13 | **Dec'15** | Dec'14 | Dec'13 |
| Indicated – Gold | **6.8** | – | – | **4.5** | – | – | **977** | 0 | 0 |
| Inferred – Gold | **20.0** | 23.3 | 23.3 | **3.7** | 4.1 | 4.1 | **2,370** | 3,100 | 3,109 |
| **Total – Gold** | **26.8** | 23.3 | 23.3 | **3.9** | 4.1 | 4.1 | **3,347** | 3,100 | 3,109 |
| Indicated – Silver | **6.8** | – | – | **82.7** | – | – | **18,133** | 0 | 0 |
| Inferred – Silver | **20.0** | 23.3 | 23.3 | **37.4** | 44.8 | 44.8 | **24,001** | 33,600 | 33,600 |
| **Total – Silver** | **26.8** | 23.3 | 23.3 | **48.9** | 44.8 | 44.8 | **42,133** | 33,600 | 33,600 |

1. Mineral Resources are reported in accordance with the South African Code for the Reporting of Exploration Results, Mineral Resources, and Mineral Reserves, 2007 Edition.
2. Confidence classification assumes annual production-scale, bulk open pit mining scenario evaluation.
3. Figures are rounded to reflect confidence. Some figures may not sum or average exactly due to rounding. The Competent Person deems these small errors to be immaterial.
4. Mineral Resources are reported without mining dilution and loss. Mining dilution and loss were included as a constraint for pit shell generation.
5. Mineral Resources are constrained within an optimised open pit shell using scoping-level parameters for Brecha Principal and concept level parameters at Agua Amarga including mining, processing, and administration cost estimates.
6. Commodity prices used in this study are US$1,500/oz (1,500) gold and US$20.00/oz (28.20) silver, 2014 prices in brackets.
7. Mineral Resources are reported for material within an open pit shell having positive value after process recovery and costs for processing, refining, royalty (1%) and overhead costs have been applied. A variable cut-off is actually applied since the process cost is dependent on the head grade. An average revenue cut-off of US$42.08/tonne-processed was applied.
8. Average cut-off grade was 0.99 g/t Au.
9. Attributable metal to Gold Fields is 100%.

## Competent Persons

Internal technical reviews have been conducted by the Competent Persons as listed, who are full-time employees of Gold Fields Limited, except for S Poos who is an external consultant.

### *N Brewer*

*Vice President Exploration – Americas Region*

BA Geology. American Institute of Professional Geologists (AIPG CPG-7042).

Industry experience: 40 years in greenfields and brownfields exploration worldwide (25 countries).

Commodities: Gold, silver and copper – 30 years; Base metals – 8 years; uranium – 2 years. He is the lead Competent Person and is responsible for the overall accuracy, standard and compliance of the declaration.

### *A Trueman*

*Chief Resource Geologist – Americas Region*

BSc Geology (Hons). PGeo, APEGBC 149753 and MAusIMM CP 110730.

Industry experience: 24 years in mining, exploration and resource evaluation on projects in Africa, Asia, Australia, Europe, South America and North America.

Commodities: Gold, copper, silver, coal, bauxite, PGE's and uranium. He is responsible for Mineral Resource estimation and reporting.

### *S Poos*

*Principal Consultant – BWF Mining Consultants, P. C.*

BSc Mining Engineering, MSc Industrial Engineering. State of Colorado Professional Engineers (PE 0030975); Society for Mining, Metallurgy and Exploration (SME 2571200).

Industry experience: 25 years in mine design, planning and operations worldwide in over 10 countries.

Commodities: Gold, silver, copper, base metals and coal. As a consultant to Gold Fields, she is responsible for the mining section and constraining the Mineral Resource within a relevant pit shell.

# 2.2 Australia region

Consolidated portfolio of orogenic greenstone style ore bodies, with highly prospective areas for resource growth. A strong emphasis on brownfields exploration on site is targeting the next generation of mines to ensure life-of-mine extension.

## The Australia region currently accounts for 12% of the gold Mineral Resource and 7% of the gold Mineral Reserve base, excluding growth projects.

Mineral Resources (excluding Growth Projects)
11.3Moz

Mineral Reserves
3.6Moz

- Continued emphasis on early-stage brownfield exploration to replenish the Mineral Resource and Mineral Reserve pipeline and discover the next generation of mines within the prospective Yilgarn greenstone belt
- Emerging early-stage targets yielding encouraging results across all sites during 2015
- Mineral Resource growth of 13% while the Mineral Reserve base was stable year-on-year, including mining depletion of 1.0Moz
- Orogenic style ore bodies characteristically support medium-term LoM profiles but with appropriate funding they exhibit an inherent capacity to maintain life extension with ongoing discovery and new mine development
- Cyclical discovery trends from brownfield and extensional exploration activities, supported by elevated levels of investment, should deliver a sustainable Mineral Reserve and prolonged LoM
- The region's proven management capability is ideally tailored to assess and grow opportunities to further strengthen the quality of the portfolio
- The current LoM's are based on the Proved and Probable Mineral Reserves as at 31 December 2015

*For more information on the Australia region please see our website www.goldfields.com/operationsandprojects*

## Operations

### Agnew Gold Mine

Mineral Resources
2.7Moz

Mineral Reserves
0.7Moz

- The FBH ore body is the primary mining front at Waroonga, as the Kim lode advances to maturity
- Cinderella area has progressed from an exploration project to an active mining area
- Highly prospective areas are targeted for resource growth contiguous to the present mining at Waroonga and New Holland, as well as across the vast tenement package
- Accelerated exploration based on continued positive exploration results at Waroonga North
- Strong focus on exploration in prospective Cinderella Trend east of New Holland
- LoM, based on current Mineral Reserves extends to 2019 (four years)

### Darlot Gold Mine

Mineral Resources
0.3Moz

Mineral Reserves
0.03Moz

- Successful initiation of stoping in Lords South Lower area with positive grade reconciliations and incremental expansion options identified with drilling underway
- Further upside potential exists from ongoing exploration drilling in the Centenary Depth Oval area and resource conversion drilling is ongoing
- Initiation of systematic integrated exploration in 2016 targeting deeper, hidden Centenary depth ore body analogues
- Ramp up of early stage surface exploration commenced in 2015 to evaluate extensive portfolio of exploration targets across lease and select underground mine extensions
- LoM based on current Mineral Reserves extends to mid-year 2016

### Granny Smith Gold Mine

Mineral Resources
5.3Moz

Mineral Reserves
1.3Moz

- Substantial 0.44 million ounce increase (+50%) in the Wallaby underground Mineral Reserve, post depletion
- Significant 1.6 million ounce increase (+43%) in Mineral Resource, post depletion
- Exploration demonstrates quality ore body with high grades and good continuity at depth
- Exploration drilling on Zones 125 – 150 has continued to return significant intercepts that project a positive outlook for the Wallaby deposit at depth
- Regional exploration, outside of Wallaby, delivering encouraging early stage results
- The Mineral Resource for the satellite Granny Smith ore body (open pit and underground) increased from 245koz to 675koz
- LoM based on current Mineral Reserves extends to 2024 (nine years)

# 2.2 Australia region (continued)

## St Ives Gold Mine

Mineral Resources
3.1Moz

Mineral Reserves
1.5Moz

- Intensified exploration continues to discover the next generation of mines with exploration focused at Invincible Underground, Invincible South, Speedway Trend, Eastern Causeway and the Kambalda West tenements
- Several new areas with multiple highly prospective targets are emerging from generative work and exploration conducted in 2015
- Invincible open pit mining commenced during H1 2015 and is now the mainstay open pit production centre
- Invincible underground exploration and down dip growth continued in 2015
- Development of Stage 2 Neptune commenced in 2015 with production scheduled for 2016
- Definition and drill testing of the extensive palaeochannel network across tenements initiated for shallow, high-grade placer deposits
- LoM based on current Mineral Reserves extends to 2020 (five years)

## Far Southeast project

Mineral Resources
Au 19.8Moz and Cu 9,921Mlb

- Large copper-gold porphyry deposit in the Philippines
- Various mining concept studies undertaken regarding mining method, higher-grade extraction options and production rates. Further assessment and refining of these studies is continuing
- 40% attributable to Gold Fields

| Operational Profiles | St Ives | Agnew | Darlot | Granny Smith |
|---|---|---|---|---|
| **Mining method** | Open pit, long-hole sub-level stoping and others. | **Waroonga:** Long-hole sub-level stoping and others. **New Holland:** Retreat up-hole long-hole stoping. | Combination of retreat long-hole open stoping, minor room and pillar. | Combination of inclined room and pillar, transverse long-hole open stope and bulk long-hole open stoping. |
| **Infrastructure and Mineral Processing** | Three open pits, one main underground mine and one gold processing plant with a capacity of 4.7Mtpa consisting of a SAG mill, gravity circuit and a five-stage carbon in pulp (CIP) circuit. Gold is recovered by electro winning. | Two underground complexes and one active processing plant, with a capacity of 1.3Mtpa consisting of a three-stage crushing circuit, two-stage milling circuit, gravity circuit and CIP circuit. | One active underground mine. A processing plant with a capacity of 0.8Mtpa consisting of a three-stage crushing circuit, two-stage milling circuit, gravity circuit and CIL gold plant. | One active underground mine. A processing plant with a capacity of 3.5Mtpa consisting of two crushing circuits, SAG and ball mills, leach and CIP circuits and a tailings re-treatment circuit. However, it is mine constrained and currently operates at 1.5Mtpa on a campaign milling basis. |
| **Tailings storage facility (TSF)** | Tailings are currently stored in two paddock-type facilities until a newly approved in-pit tailings storage facility commences operations at Leviathan, which will meet current LoM requirements. | The TSF is projected to last until 2018, with planning in progress for a new tailings facility. | Tailings capacity exists beyond the current mine life within the existing TSF 2 and 3 facilities. | The TSF capacity is projected to last beyond the current LoM. |
| **Mineralisation style** | Orogenic Greenstone hosted (Hydrothermal-style). | | | |
| **Mineralisation characteristics** | Mineralisation typically structurally controlled and hosted by shear and fault zones and confined to well-defined prospective structural belts. | | | |
| | Mineralisation zones discontinuous with short-range predictability | | Mineralisation zones with moderate- to long-range geological continuity and short-range grade continuity. | |
| | Exploration programmes required to drive discovery, define the mineralisation controls, establish continuity and convert Mineral Resources to Mineral Reserves. | | | |

## Regional overview

Gold Fields' mining assets in the Australia Region include a 100% interest in the St Ives, Agnew, Darlot and Granny Smith mines in the Yilgarn area of Western Australia.

### Regional geology

All four operations fall within the geological region known as the Archaean Norseman-Wiluna Greenstone Belt. This is part of the Yilgarn Craton, a 2.6 Giga annum (Ga) granite-greenstone terrain, which is well endowed in gold and nickel mineralisation.

Much of the Yilgarn Craton is deeply weathered and partially covered by Tertiary and Quaternary regolith. Pre-Tertiary lateritic horizons are variably exposed, stripped or buried by later deposits that have in turn been lateritised. The depth of weathering is strongly controlled by original rock types, with mafic rocks generally being more susceptible to weathering than felsic rocks.

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 quartz-carbonate 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.

### Exploration drilling and expenditure

Exploration activities in the region over the period were dominated by early stage exploration and generative studies coupled with ongoing resource conversion projects through infill drilling and extensions to existing mines. These activities on early stage targets have yielded promising results identifying new areas and potential targets for infill drilling in 2016. Extensional exploration activities continued in 2015, with several high-quality targets to be drill tested in 2016, notably at Granny Smith where down dip extensions and further lodes were identified.

On-lease exploration metres drilled and expenditure for the 12-month periods ending 31 December 2015 and 2014 are summarised below (exclusive of grade control drilling). The region's drilling and traction on early stage exploration reflects a significant year-on-year ramp up in exploration activity to drive discovery and build a solid project pipeline.

The region maintains rigorous QA/QC protocols on all its exploration programmes. It draws on industry leading practice for data acquisition and utilises accredited laboratories, which are regularly reviewed both internally and externally. Analytical QA/QC is maintained and monitored through the submission of blanks, certified reference material and duplicates, plus umpire laboratory checks.

| | **C2015** | | | C2014 | | |
|---|---|---|---|---|---|---|
| **Exploration drilling** | **Metres drilled** | **A$ (millions)** | **US$ (millions)** | Metres drilled | A$ (millions) | US$ (millions) |
| Agnew | **82,701** | **20.805** | **15.604** | 56,137 | 15.109 | 13.60 |
| Darlot | **50,534** | **9.556** | **7.167** | 50,154 | 7.502 | 6.75 |
| Granny Smith | **159,404** | **18.050** | **13.537** | 77,433 | 13.043 | 11.74 |
| St Ives | **324,502** | **42.379** | **31.784** | 133,765 | 24.841 | 22.36 |
| **Total GFA** | **617,141** | **90.789** | **68.092** | 317,489 | 60.495 | 54.45 |

*Average 2015 exchange rate: US$=A$1.33*
*Drilling unit costs are affected by the length, type (diamond drill (DD), reverse circulation (RC), air core or sonic), ground conditions, rig and site availability, as well as whether drilling is from surface or underground*

# 2.2 Australia region (continued)

## Mineral Resources and Mineral Reserves

### Mineral Resources

The Mineral Resources declared within the Australia region are classified as Measured, Indicated or Inferred, as described in the SAMREC Code. Mineral Resource categories are assigned with consideration given to geological complexity, grade variance, drill hole intersection spacing, and mining development. The following factors apply to the Mineral Resources reported:

- All Mineral Resources are declared using a cut-off grade calculated for the individual deposit
- Mineral Resources are further tested through the application of realistic modifying factors to ensure that there is a reasonable prospect of eventual economic extraction
- Mineral Resources are quoted at an appropriate in situ economic cut-off grade with tonnages and grades based on the relevant resource block models. They also include estimates of any material below the cut-off grade required to be mined to extract the complete pay portion of the Mineral Resource
- Open pit Mineral Resources comprise the material above the nominated cut-off within a diluted optimised pit shell and constrained to an optimised minimum mining width shape
- Underground Mineral Resources comprise the material above the nominated cut-off and constrained to a practical mining shape and a minimum mining width

### Mineral Reserves

The Mineral Reserve estimates are based on appropriately detailed and engineered LoM plans. All design and scheduling work is undertaken to a suitable level of detail by experienced engineers using appropriate mine planning software. The planning process incorporates relevant modifying factors and the use of cut-off grades and results from other techno-economic investigations. All prevailing geotechnical protocols and constraints are taken account of in the mine design and scheduling.

*Australia Region: Summary Mineral Resource and Mineral Reserve Statement for operational mines[1]*

| | Mineral Resources | | | | | Mineral Reserves | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 31 December 2015 | | | Dec 2014 | | 31 December 2015 | | | Dec 2014 |
| Measured, Indicated and Inferred | **Tonnes (Mt)** | **Grade (g/t)** | **Gold (Moz)** | Gold (Moz) | Proved and Probable | **Tonnes (Mt)** | **Grade (g/t)** | **Gold (Moz)** | Gold (Moz) |
| Agnew | **16.3** | **5.05** | **2.656** | 2.570 | Agnew | **3.4** | **6.16** | **0.670** | 0.865 |
| Darlot | **1.2** | **6.51** | **0.260** | 0.263 | Darlot | **0.2** | **5.63** | **0.034** | 0.085 |
| Granny Smith | **30.4** | **5.40** | **5.279** | 3.696 | Granny Smith | **7.0** | **5.86** | **1.310** | 0.872 |
| St Ives | **29.1** | **3.35** | **3.141** | 3.508 | St Ives | **17.6** | **2.72** | **1.542** | 1.803 |
| **Total Australia operations** | **77.1** | **4.57** | **11.336** | 10.037 | **Total Australia operations** | **28.1** | **3.93** | **3.555** | 3.625 |

*[1]Managed, unless otherwise stated*
*– Mineral Resources are inclusive of Mineral Reserves*
*– All tonnes (t) relate to metric units and rounding-off of figures may result in minor computational discrepancies, where this happens, it is not deemed significant*

## Social licence to operate

All operations in Gold Fields Australia have suitably resourced departments responsible for Health, Safety, Environment, Risk, Emergency and Security Management. The region subscribes to a range of internationally recognised standards including ISO 14001 for Environmental Management and OHSAS 18001 for Health and Safety.

Since the acquisition, Granny Smith has achieved ISO 14001 and OHSAS 18001 Certification. The Lawlers operations have been amalgamated under the Agnew certifications through an expansion of the audit scope by the certifying body. Darlot has also achieved certification to the OHSAS 18001 and ISO 14001 standards. St Ives has maintained certification to ISO 14001 and OHSAS 18001. The Gold Fields Australia operations comply with the requirements of the International Cyanide Management Code (ICMC).

In terms of energy management, Gold Fields Australia undertook a baseline review of the St Ives and Agnew assets in 2012, in which numerous action items were identified to improve the energy efficiency of the operations. An ongoing review of energy efficiency was conducted in 2014 geared towards seeking further opportunities for improvement and to include the newly acquired Yilgarn assets into the energy management plan. Since then energy and carbon reduction targets have been updated in the case of St Ives due to changes in the mine plan. Agnew's targets were also updated since its consolidation with Lawlers and targets have been set for the Granny Smith and Darlot Mines. All targets have been set until 2016.

Gold Fields has a well-established Enterprise-wide Risk Management (ERM) system in place. This system requires the formulation of risk registers for each operation, detailing the most material business risks and the management actions to mitigate these. These risk registers have been integrated into CURA, the centralised Gold Fields web-based risk management system. The risk registers for all assets in Gold Fields Australia are reviewed quarterly on-site, as well as at regional level.

| Sustainability factors | | Fatal injury frequency rate | Total recordable injury frequency rate | Energy consumption (TJ) | $CO_2$ emissions (000 tonnes) (scope 1 and 2) | Water withdrawal (million litres) |
|---|---|---|---|---|---|---|
| **Agnew** | **C2015** | **0** | **14.21** | **706** | **80** | **2,349** |
| | C2014 | 0 | 18.13 | 655 | 76 | 1,572 |
| **Darlot** | **C2015** | **0** | **10.12** | **260** | **34** | **504** |
| | C2014 | 0 | 13.17 | 262 | 33 | 542 |
| **Granny Smith** | **C2015** | **0** | **15.42** | **753** | **97** | **8,770** |
| | C2014 | 0 | 9.30 | 630 | 86 | 7,843 |
| **St Ives** | **C2015** | **0** | **20.52** | **1,523** | **170** | **10,584** |
| | C2014 | 0 | 22.39 | 1,738 | 187 | 9,571 |

# 2.2 Australia region (continued)

## Agnew Gold Mine

Agnew has an intensified focus on defining new ore sources at New Holland and Waroonga, in conjunction with targeted exploration programmes testing an expanded area beyond current mining fronts. These include Waroonga North and the under-explored Cinderella Trend. The objective is to increase the Mineral Resource and Mineral Reserve base to generate a new high grade backbone to sustain a robust five-year plan supported by an improved understanding of the broader regional targets to discover the next generation of mines. Development of the FBH area at Waroonga has continued, with the objective of replacing production from the Kim ore body in the future.

| Asset fundamentals | |
|---|---|
| **General location** | Agnew is situated at latitude 27° 55' S and longitude 120° 42' E in the Norseman-Wiluna Greenstone Belt. It is located 23 kilometres west of the town of Leinster in Western Australia, which is 375 kilometres north of Kalgoorlie and approximately 870 kilometres north-east of Perth. Well-established power, access roads and supporting infrastructure are in place. |
| **Licence status and holdings** | The Agnew Gold Mining Company Proprietary Limited (AGMC), ACN 098-385-883, was incorporated in Australia in 2001 as the legal entity holding and conducting mining activity on the Agnew mineral leases. The Gold Fields Limited Group holds 100% of the issued shares of AGMC through its 100% holding in the issued shares of Orogen Holding (BVI) Limited. Agnew controls exploration and mineral rights over a total area of 74,409 hectares (total of granted tenements) and has security of tenure for all current exploration and mining leases that contribute to future Mineral Reserves. |
| **Operational infrastructure** | Agnew currently operates two underground mines, Waroonga and New Holland. At Waroonga, ore is sourced from the Kim, FBH and Main North lodes that are accessed via declines. New Holland mining occurs in three primary areas: Genesis 500, Cinderella and Sheba. These are accessed via declines. There are also centralised administrative offices, as well as engineering workshops at both Waroonga and New Holland and one active CIP processing plant (1.3Mtpa. capacity). |
| **Climate** | No extreme climate conditions are experienced that may affect mining operations. |
| **Deposit type** | Orogenic greenstone gold deposits hosted in a number of different styles of lodes. Although all of the Agnew deposits broadly occur at the intersections between structures and stratigraphy, there are subtle differences in alteration and mineralisation, which are controlled in part by the local host rock chemistry. |
| **LoM** | Extensional and brownfields exploration continue, which could increase the LoM. It is estimated that the current Mineral Reserves will be depleted in 2019 (4 years). |
| **Environmental, health and safety** | Agnew continues to be certified to OHSAS18001 and ISO 14001 Environmental Management System. During 2014, the New Holland operations were amalgamated under these certifications.<br>Agnew was certified as compliant with the ICMC on 3 June 2009 |

## Brief history of Agnew

Paddy Lawlers' prospecting party were 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 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.

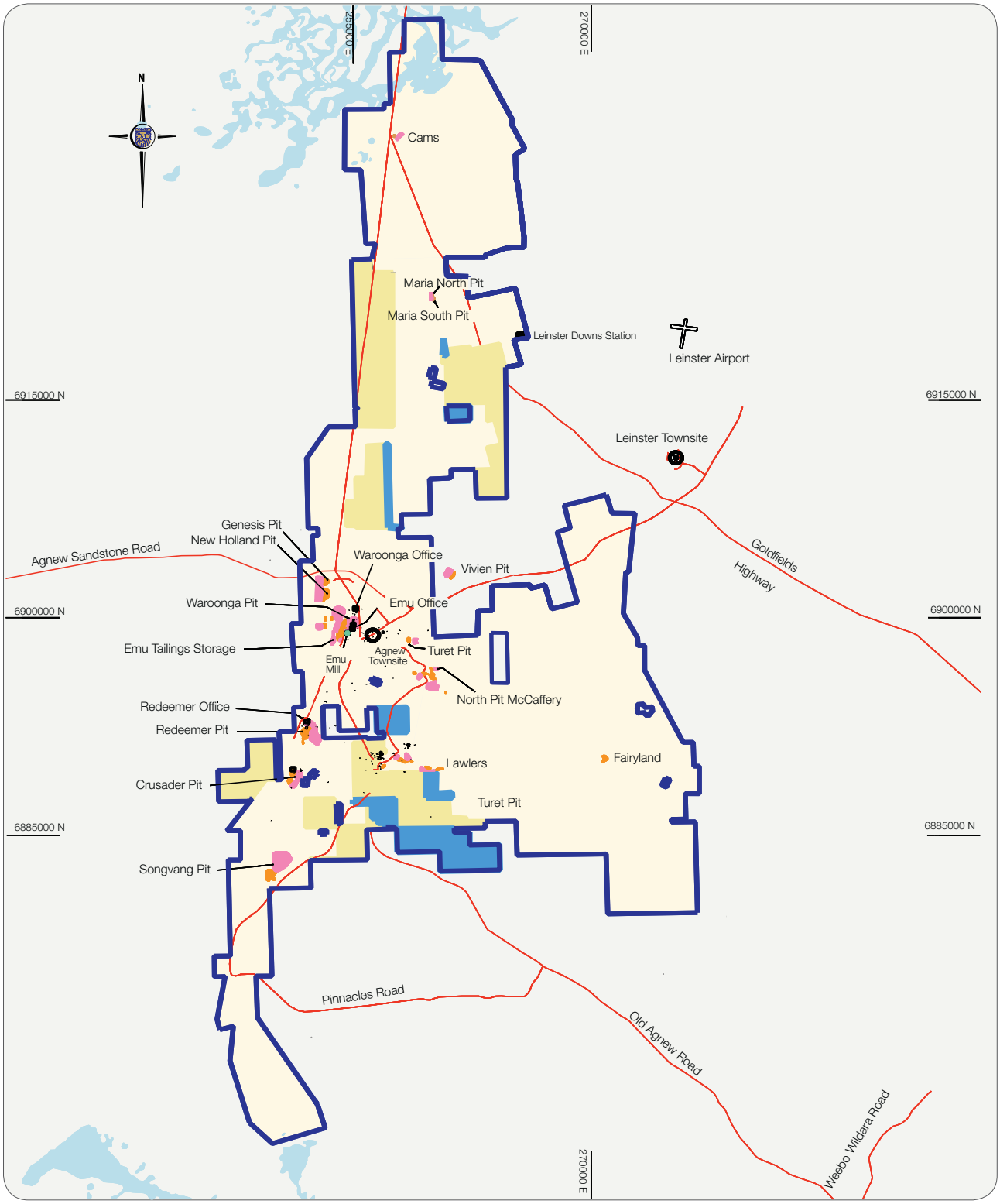
The Lawlers operation was purchased by Plutonic Resources from Forsayth in 1992 and was subsequently acquired by Homestake in 1998. During 2001, Barrick merged with Homestake and Gold Fields acquired Agnew from WMC. The Kim South lode at Waroonga was discovered in 2002, as was Songvang OP, with production commencing in 2002 and 2004 respectively. Further discoveries were made at Fairyland UG (2009) and FBH in 2012. Gold Fields concluded the acquisition of the neighbouring Lawlers Mine from Barrick in October 2013.

## Key developments

- Drilling at Cinderella has successfully increased the Mineral Resource and defined a maiden Mineral Reserve in 2015
- The Cinderella pre-feasibility study was completed and approval given to initiate capital development in late 2015, with underground production commencing in H2 2016
- Exploration drilling to the north of Kim lode has continued to return highly encouraging results from the Waroonga North project. Acceleration of the resource definition drilling is planned for 2016
- Extensional and infill drilling at FBH has increased confidence and definition in the geology model. This enables detailed planning for on-lode access development and initial stoping, which commenced in 2015
- Regional consolidation and ranking of exploration targets across Agnew was completed during the year with a significant ramp up on early stage exploration and near mine brownfields exploration planned in 2016
- 2016 will include assessment of the potential of Hidden Secret, Cinderella North, Leviathan and Zone 2 South open pit

# 2.2 Australia region (continued)

## Agnew Gold Mine (continued)




**Reference**

- Roads
- Agnew/Lawlers Mining Lease
- Agnew Prospecting Licence
- Agnew Exploration Licence
- Open Pit
- Waste Dump

**Gold Fields Limited**
**Agnew Gold Mine**

PLAN SHOWING MINE INFRASTRUCTURE AS AT DECEMBER 2015

0 1 3 5
Kilometres
Map Grid of Australia Co-ordinate System

## Operating statistics

| | | Historic performance | | | |
|---|---|---|---|---|---|
| | Units | **C2015** | C2014 | C2013[1] | C2012 |
| **Open pit mining** | | | | | |
| Total mined | kt | **—** | — | — | 262 |
| – Waste mined | kt | **—** | — | — | 83 |
| – Ore mined | kt | **—** | — | — | 179 |
| Mined grade | g/t | **—** | — | — | 1.4 |
| Strip ratio (tonnes) | waste:ore | **—** | — | — | 0.5 |
| **Underground mining** | | | | | |
| Total mined | kt | **1,939** | 1,767 | 1,236 | 845 |
| – Waste mined | kt | **740** | 573 | 506 | 222 |
| – Ore mined | kt | **1,199** | 1,194 | 730 | 623 |
| Mined grade | g/t | **6.4** | 7.2 | 9.1 | 8.5 |
| Processing | | | | | |
| Tonnes treated | kt | **1,218** | 1,246 | 974 | 943 |
| Head grade | g/t | **6.4** | 7.1 | 7.5 | 6.1 |
| Yield | g/t | **6.1** | 6.8 | 6.9 | 5.8 |
| Plant recovery factor | % | **94.8** | 94.4 | 92.9 | 93.2 |
| Total gold production | koz | **237** | 271 | 216 | 177 |
| | kg | **7,360** | 8,420 | 6,706 | 5,494 |
| **Financials** | | | | | |
| Average Au price received | US$/oz | **1,158** | 1,266 | 1,413 | 1,668 |
| | A$/oz | **1,544** | 1,407 | 1,372 | 1,720 |
| Exchange rate (annual average) | US$/A$ | **0.75** | 0.90 | 1.03 | 0.97 |
| Operating cost | A$/oz | **801** | 708 | 647 | 808 |
| Capital expenditure | A$/oz | **410** | 341 | 250 | 342 |
| All in sustaining cost (AISC) | A$/oz | **1,276** | 1,097 | 949 | 1,253 |
| | US$/oz | **959** | 990 | 919 | — |
| **Life-of-Mine** | | | | | |
| Mineral Reserves | Mt | **3.4** | 3.6 | 4.2 | 6.0 |
| Mineral Reserves head grade | g/t | **6.16** | 7.44 | 7.05 | 5.96 |
| Mineral Reserves | Moz | **0.67** | 0.87 | 0.95 | 1.15 |

[1] *From Dec 2013, results and Mineral Reserves are inclusive of the New Holland (Lawlers) Operation.*
*Rounding off of figures presented in this report may result in minor computational discrepancies. Where this occurs it is not deemed significant.*

# 2.2 Australia region (continued)

## Agnew Gold Mine (continued)

### Local geology

Agnew Gold Mine is situated in the northern portion of the Norseman-Wiluna Greenstone Belt of the Yilgarn Craton, Western Australia. Locally, the Belt comprises a sequence of mafic to ultramafic volcanics and associated interflow sediments, which have been folded to form the Lawlers Anticline. The Lawlers Anticline plunges in a northerly direction at approximately 30°. The core of the anticline has been intruded by granodiorite, which in turn has been intruded by late stage leucogranite.

The mafic and ultramafic volcanics of the Lawlers Anticline are unconformably overlain by a sequence of clastic sediments comprising the Scotty Creek Formation. The sedimentary rocks have been metamorphosed to lower greenschist facies and comprise conglomerates and very fine- to very coarse-grained pebbly sandstones and siltstones. The rocks within the AGMC mining leases are dominantly covered by transported alluvium, and minor residual soils, or by localised thick accumulations of Permian sedimentary rocks blanketed by more recent clay and sediments.

The Agnew deposits are broadly hosted by the intersections between various structures and the relative stratigraphy. Gold mineralisation largely occurs in quartz veins within the sedimentary units of the Scotty Creek Formation.

### Exploration and resource definition drilling

Exploration in 2015 focused on extensional activity at both the Waroonga and New Holland mineralised systems. At Cinderella, which is centrally located between the two existing mines, exploration delivered an increased Mineral Resource and defined a maiden Mineral Reserve, resulting in a new mine in 2016. Drill testing north of Waroonga has continued to return significant gold intersections with frequent visible gold from both the Kath and Waroonga North projects. A preliminary inventory model is expected for Waroonga North in early 2016, while mineralisation remains open at depth and along strike. An initial resource model for the Kath lode was produced in late 2015.

At Cinderella, several drilling campaigns were completed during 2015. Extensional drill programmes were completed, increasing the Mineral Resources with infill drilling delivering increased geological granularity resulting in a maiden Mineral Reserve declaration. Cinderella comprises two main lodes: Lode 83 and Lode 141. Both lodes remain open to the east and to the north and further drilling is planned in 2016 to test the extent of this mineralisation. An extensional exploration drilling programme in 2015 defined a maiden resource for Himitsu, which is located south west of Cinderella. Further drilling is planned at Himitsu in 2016 to increase confidence in the resource and test for potential extensions south and east.

Drilling focused on extending the existing high grade 500 Series lode and also the deeper 600/700 Series at New Holland, which is located beneath the current mine development. Limited extensions were delineated in the 500 Series to the North with indications that the structure, associated with the mineralisation, is discontinuous and therefore generally erratic and of low grade. The deeper 600/700 Series drilled during 2015 intersected the targeted lodes but with sub-economic assay results. Structurally focused, targeted follow-up drilling will continue in 2016.

A consolidation and ranking of exploration targets across all Agnew tenements was completed during the year with a significant ramp up on early stage exploration and near mine brownfields exploration planned in 2016.

### Mining

Current mining consists of the Waroonga and New Holland underground complexes, with the bulk of production presently sourced from the high-grade Kim South lode. Access has now been established to the FBH lodes , with production ramping up in 2016. New Holland is in the process of establishing access to the Cinderella lodes, which has been accelerated in 2015 to deliver a new mine and ore source in 2016 to replace diminishing reserves in other areas of New Holland.

#### Mining methods

Access to the Waroonga underground mine is via a decline with the portal located in the previously mined Waroonga open pit. In 2015, the Waroonga mine produced from the Kim, Main, and FBH lodes. All primary infrastructures, including escape ways and ventilation shafts, are located in the hanging wall sandstone. The primary mining method at Waroonga is long-hole sub-level stoping with paste fill.

Access to the New Holland underground mine is via twin declines with portals located in the Genesis and New Holland open pits. In 2015, the New Holland underground mine produced from the Genesis 500 Series, Sheba and New Holland areas. The selection of the stoping method is dependent upon the geometry of the ore structure. The primary mining method employed at New Holland is retreat up-hole long-hole mining.

#### Mine planning and scheduling

The current mining areas situated at Waroonga include high-grade ore from Kim South and FBH, supplemented with medium-grade ore from Main North and South. At New Holland, mining of the Genesis 500 series nears completion in 2016, with Cinderella ore production coming online mid-year. Additional mining fronts in areas of New Holland and Sheba are contributing medium-grade material assisting in leveraging mill throughput and equipment efficiencies. The stope design takes practical stope layouts and geometry into consideration, as well as planning for mining losses in pillars or other parts of the resource excluded for technical reasons. Dilution material is included in the stope design. Ore losses can occur when material cannot be practically extracted from the stopes, and are accounted for as part of the planning process.

LoM plans have been generated for these areas with the necessary development, advance rates and sustaining capital to support the planned production schedules and profiled grade and tonnage.

### On-mine projects

In 2015, the majority of the initial access development for the FBH ore body was completed. The capital programme included access declines from the existing Kim infrastructure and additional ventilation rises to provide ventilation to the FBH mining areas.

Rapid access was also established for Cinderella via an underground incline, with exceptional development performance in late 2015. A 4 metre diameter ventilation rise and a 1.5 metre diameter escape way is planned for Q1 2016, supporting ongoing mining operations at New Holland.

In addition to these capital infrastructure projects, a number of operational improvement projects were completed at Agnew during 2015, reducing the production risks for the operation. These included improvements to the paste-fill infrastructure, and the relocation of a number of escape ways in Waroonga.

The operation continues to examine and review the possibility of opportunistically exploiting small-scale open pitiable deposits for supplementary mill feed at elevated A$ gold prices. Surface opportunities are being assessed at Hidden Secret, Cinderella, Zone 2 and Leviathan complex.

## Mineral Resources and Mineral Reserves

The Mineral Resources and Mineral Reserves have been updated using the current Gold Fields planning gold price of A$1,750/oz and A$1,550/oz respectively and reported in accordance with SAMREC Code. The December 2015 Mineral Resources have been stated inclusive of Mineral Reserves. Geological and evaluation models have been updated to reflect the latest available data sets. An integrated mine design and schedule, based on current performance levels, takes cognisance of the capacities and interdependencies associated with all aspects of the mining operations at Agnew.

### Mineral Resources

The Mineral Resources are classified as Measured, Indicated or Inferred, as described in the SAMREC Code 2007. Mineral Resource categories are assigned with consideration given to geological complexity, grade variance, drill hole intersection spacing and mining development. The impacts of year-on-year changes are covered in the reconciliation section.

*Mineral Resource classification*

| | Tonnes (kt) | | | Grade (g/t) | | | Gold (koz) | | |
|---|---|---|---|---|---|---|---|---|---|
| **Classification** | **Dec 15** | Dec 14 | Dec 13 | **Dec 15** | Dec 14 | Dec 13 | **Dec 15** | Dec 14 | Dec 13 |
| **Open pit and underground** | | | | | | | | | |
| Measured | **1,108** | 2,246 | 3,193 | **4.22** | 4.17 | 4.57 | **151** | 302 | 469 |
| Indicated | **9,228** | 8,655 | 11,059 | **5.62** | 6.43 | 6.02 | **1,667** | 1,789 | 2,139 |
| Inferred | **5,985** | 2,841 | 4,881 | **4.34** | 5.20 | 6.66 | **835** | 475 | 1,045 |
| Total open pit and underground | **16,321** | 13,742 | 19,133 | **5.05** | 5.81 | 5.94 | **2,652** | 2,565 | 3,653 |
| **Surface** | | | | | | | | | |
| Measured stockpiles | **27** | 56 | 62 | **5.24** | 2.62 | 1.81 | **5** | 5 | 4 |
| **Total surface** | **27** | 56 | 62 | **5.24** | 2.62 | 1.81 | **5** | 5 | 4 |
| **Grand total** | **16,348** | 13,798 | 19,196 | **5.05** | 5.79 | 5.92 | **2,656** | 2,570 | 3,657 |

# 2.2 Australia region (continued)

## Agnew Gold Mine (continued)

*Mineral Resource classification per source area*

| | Measured | | | Indicated | | | Inferred | | | Total Mineral Resource | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Area | Tonnes (kt) | Grade (g/t) | Gold (koz) | Tonnes (kt) | Grade (g/t) | Gold (koz) | Tonnes (kt) | Grade (g/t) | Gold (koz) | Tonnes (kt) | Grade (g/t) | Gold (koz) |
| **Open pit** | | | | | | | | | | | | |
| Various – other | 529 | 2.92 | 50 | 1,297 | 3 | 125 | 89 | 2.89 | 8 | 1,914 | 2.97 | 183 |
| Cinderella Pit | – | – | – | – | – | – | 67 | 4.11 | 9 | 67 | 4.11 | 9 |
| Hidden Secret | – | – | – | – | – | – | 309 | 2.26 | 22 | 309 | 2.26 | 22 |
| **Total open pit** | **529** | **2.92** | **50** | **1,297** | **3** | **125** | **465** | **2.65** | **40** | **2,291** | **2.91** | **214** |
| **Underground** | | | | | | | | | | | | |
| Waroonga - Kim | 577 | 5.41 | 100 | 698 | 6.57 | 147 | 164 | 7.75 | 41 | 1,439 | 6.24 | 289 |
| Rajah | – | – | – | 546 | 4.08 | 72 | 124 | 3.78 | 15 | 669 | 4.02 | 87 |
| Main | – | – | – | 1,342 | 6.52 | 281 | 105 | 8.11 | 27 | 1,446 | 6.63 | 308 |
| FBH | – | – | – | 2,431 | 6.4 | 530 | 389 | 4.02 | 50 | 2,820 | 6.4 | 580 |
| Kath | – | – | – | 266 | 4.46 | 38 | 388 | 4.52 | 56 | 654 | 4.5 | 94 |
| Other | 2 | 4.84 | – | 432 | 6.46 | 90 | 83 | 4.87 | 13 | 517 | 6.2 | 103 |
| GNH – 200 Series | – | – | – | 79 | 4.03 | 10 | 384 | 3.95 | 49 | 463 | 3.96 | 59 |
| Lower Genesis | – | – | – | 398 | 4.32 | 55 | 919 | 4.26 | 126 | 1,317 | 4.28 | 181 |
| Sheba | – | – | – | 436 | 5.67 | 80 | 597 | 3.7 | 71 | 1,034 | 4.53 | 151 |
| Upper New Holland | – | – | – | 518 | 4.91 | 82 | 1,386 | 4.31 | 192 | 1,904 | 4.47 | 274 |
| Upper Genesis | – | – | – | 418 | 5.52 | 74 | 213 | 6.31 | 43 | 631 | 5.79 | 117 |
| Cinderella | – | – | – | 367 | 7.01 | 83 | 404 | 4.83 | 63 | 771 | 5.87 | 145 |
| Himitsu | – | – | – | – | – | – | 365 | 4.15 | 49 | 365 | 4.15 | 49 |
| **Total underground** | **580** | **5.41** | **101** | **7,930** | **6.05** | **1,542** | **5,520** | **4.48** | **795** | **14,030** | **5.4** | **2,438** |
| **Surface** | | | | | | | | | | | | |
| Mill Stocks | 27 | 5.24 | 5 | – | – | – | – | – | – | 27 | 5.24 | 5 |
| **Grand Total** | **1,136** | **4.25** | **155** | **9,228** | **5.62** | **1,667** | **5,985** | **4.34** | **835** | **16,348** | **5.05** | **2,656** |

*Modifying factors*

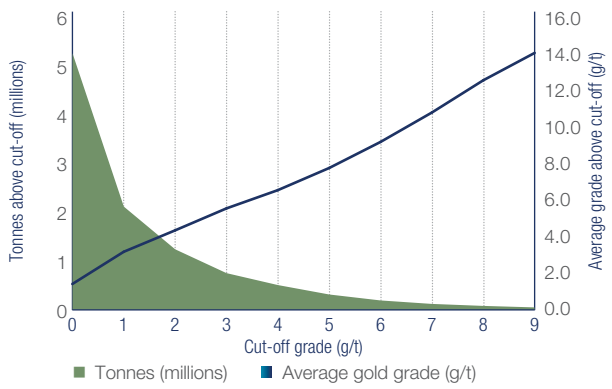
- The Measured and Indicated Mineral Resources are inclusive of Mineral Reserves
- Mineral Reserves are quoted in terms of RoM grades and tonnages as delivered to the metallurgical processing facility and are therefore fully diluted
- Mineral Reserve statement includes only Measured and Indicated Mineral Resources, modified to produce Mineral Reserves contained within the LoM plan
- Mineral Resources and Mineral Reserves undergo regular internal and/or external audits, and any issues identified are rectified at the earliest opportunity – usually during the current reporting cycle

| | | December | | |
|---|---|---|---|---|
| | Units | **2015** | 2014 | 2013 |
| **Mineral Resource parameters** | | | | |
| | US$/oz | **1,500** | 1,500 | 1,500 |
| Mineral Resource gold price | US$/A$ | **0.86** | 0.96 | 0.96 |
| | A$/oz | **1,750** | 1,570 | 1,570 |
| Cut-off for underground | g/t | **2.68 – 3.30** | 2.77 – 4.75 | 3.31 – 4.34 |
| **Mineral Reserve parameters** | | | | |
| | US$/oz | **1,300** | 1,300 | 1,300 |
| Mineral Reserve gold price | US$/A$ | **0.84** | 0.96 | 0.96 |
| | A$/oz | **1,550** | 1,370 | 1,370 |
| Cut-off for fresh ore | g/t | **3.17 – 4.09** | 3.17-5.44 | 4.23 – 4.97 |
| Mining recovery factor (underground) | % | **80-95** | 90-95 | 95 |
| MCF | % | **100** | 100 | 100 |
| Dilution underground | % | **15** | 10 | 10 |
| Plant recovery factor | % | **94.3** | 94.9 | 96.0 |
| Processing capacity | Mtpa | **1.3** | 1.3 | 1.3 |

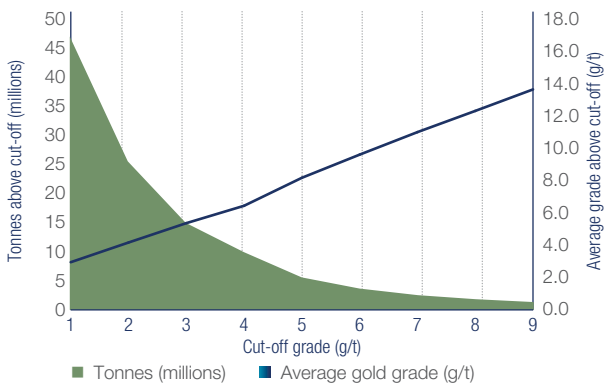
*Grade tonnage curves*

The grade tonnage curves for the surface and underground Mineral Resource is presented below.

**Grade tonnage curve – Surface**




**Grade tonnage curve – Underground**




## Mineral Reserves

The Mineral Reserve estimate for Agnew is based on an appropriately detailed and engineered LoM plan. All design and scheduling work is undertaken to an appropriate level of detail by experienced engineers using appropriate mine planning software. The planning process incorporates realistic modifying factors and the use of appropriate cut-off grades, geotechnical criteria, mining fleet productivities and other techno-economic investigations.

The current operational plan reflects mining at both the Waroonga and New Holland Complex's, with mining sourced from the Kim South, Main North, FBH, 500 Series and Sheba areas.

# 2.2 Australia region (continued)

## Agnew Gold Mine (continued)

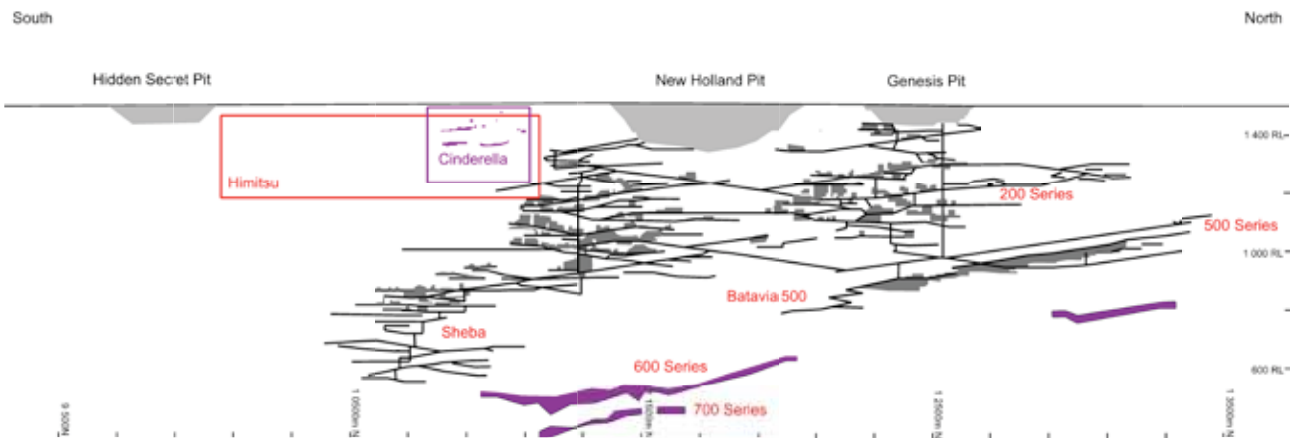
*Mineral Reserve classification*

| | Tonnes (kt) | | | Grade (g/t) | | | Gold (koz) | | |
|---|---|---|---|---|---|---|---|---|---|
| **Classification** | **Dec 15** | Dec 14 | Dec 13 | **Dec 15** | Dec 14 | Dec 13 | **Dec 15** | Dec 14 | Dec 13 |
| **Underground** | | | | | | | | | |
| Proved | **242** | 258 | 327 | **8.84** | 8.92 | 6.81 | **69** | 74 | 72 |
| Probable | **3,110** | 3,299 | 3,815 | **5.96** | 7.41 | 7.15 | **596** | 786 | 878 |
| **Total underground** | **3,352** | 3,556 | 4,142 | **6.17** | 7.52 | 7.13 | **665** | 860 | 949 |
| **Surface** | | | | | | | | | |
| Proved | **27** | 56 | 62 | **5.24** | 2.62 | 1.80 | **5** | 5 | 4 |
| **Total surface** | **27** | 56 | 62 | **5.24** | 2.62 | 1.80 | **5** | 5 | 4 |
| **Grand total** | **3,379** | 3,612 | 4,204 | **6.16** | 7.44 | 7.05 | **670** | 865 | 953 |

*Mineral Reserve classification per mining area*

| | Proved | | | Probable | | | Total Mineral Reserve | | |
|---|---|---|---|---|---|---|---|---|---|
| Mineral Reserves areas | Tonnes (kt) | Grade (g/t) | Gold (koz) | Tonnes (kt) | Grade (g/t) | Gold (koz) | Tonnes (kt) | Grade (g/t) | Gold (koz) |
| **Underground** | | | | | | | | | |
| Waroonga – FBH | | | | 1,255 | 7.08 | 285 | 1,255 | 7.08 | 285 |
| Waroonga – Kim | 234 | 8.95 | 67 | 371 | 5.99 | 71 | 606 | 7.13 | 139 |
| Waroonga – Edmunds | 3 | 5.78 | 1 | 206 | 5.76 | 38 | 209 | 5.76 | 39 |
| Waroonga – Main | | | | 129 | 6.29 | 26 | 129 | 6.29 | 26 |
| Waroonga – Main south | | | | 361 | 5.90 | 68 | 361 | 5.90 | 68 |
| **Waroonga – Total** | **238** | **8.91** | **68** | **2,322** | **6.56** | **489** | **2,559** | **6.78** | **558** |
| NH – Cinderella | | | | 380 | 4.53 | 55 | 380 | 4.53 | 55 |
| NH – Sheba 500 | | | | 128 | 4.42 | 18 | 128 | 4.42 | 18 |
| NH – Other | 5 | 5.15 | 1 | 280 | 3.68 | 33 | 285 | 3.71 | 34 |
| **GNH – Total** | **5** | **5.15** | **1** | **788** | **4.21** | **107** | **793** | **4.22** | **107** |
| **Total underground** | **242** | **8.84** | **69** | **3,110** | **5.96** | **596** | **3,352** | **6.17** | **665** |
| **Surface** | | | | | | | | | |
| Agnew Surface Stockpiles | 27 | 5.24 | 5 | – | 0.00 | – | 27 | 5.24 | 5 |
| **Grand total** | **269** | **8.47** | **73** | **3,110** | **5.96** | **596** | **3,379** | **6.16** | **670** |

**Schematic north-south cross-section through the New Holland/Genesis ore bodies and mine workings**

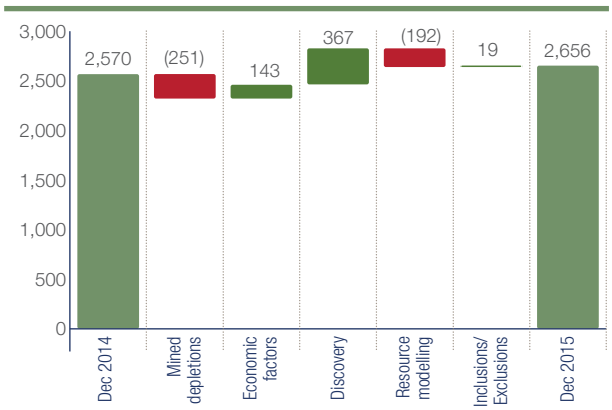


*Mineral Resource and Mineral Reserve reconciliation year-on-year*

| Factors that affected Mineral Resource reconciliation year-on-year | Factors that affected Mineral Reserve reconciliation year-on-year |
|---|---|
| Mining depletion | Mining depletion |
| Addition of Cinderella, Kath, Himitsu and Hidden Secret | Discovery at Cinderella and Sheba 500 at lower grades than the global average |
| Infill drilling and resource modelling – Sheba | Infill drilling and resource modelling – FBH & Edmunds |
| Mineral Resource classification – Yeoman | |

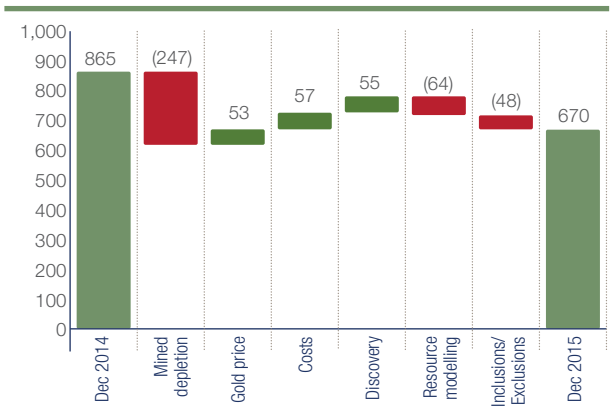
*Mineral Resource Reconciliation (Gold – koz)*

**Mineral Resource Reconciliation**
(Gold – koz)




*Mineral Reserve Reconciliation (Gold – koz)*

**Mineral Reserve Reconciliation**
(Gold – koz)

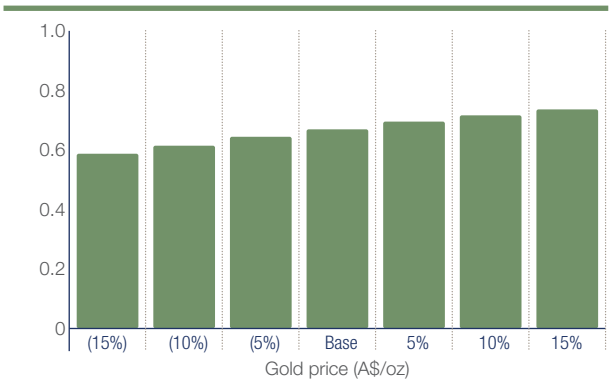



## Mineral Reserve sensitivity

To illustrate the impact of fluctuations in gold price and exchange rates on the current declaration, Agnew, with the incorporation of Lawlers has generated sensitivities with respect to Mineral Reserves. The following graph indicates the Managed Mineral Reserve sensitivity at -15% -10%, -5%, +5%, +10% and +15% to the base (A$1,550/oz) reserve gold price.

These sensitivities (other than for the base case) are not supported by detailed plans and depletion schedules. They should only be considered on an indicative basis, specifically as such sensitivities assume 100% selectivity, without any operating cost increases.

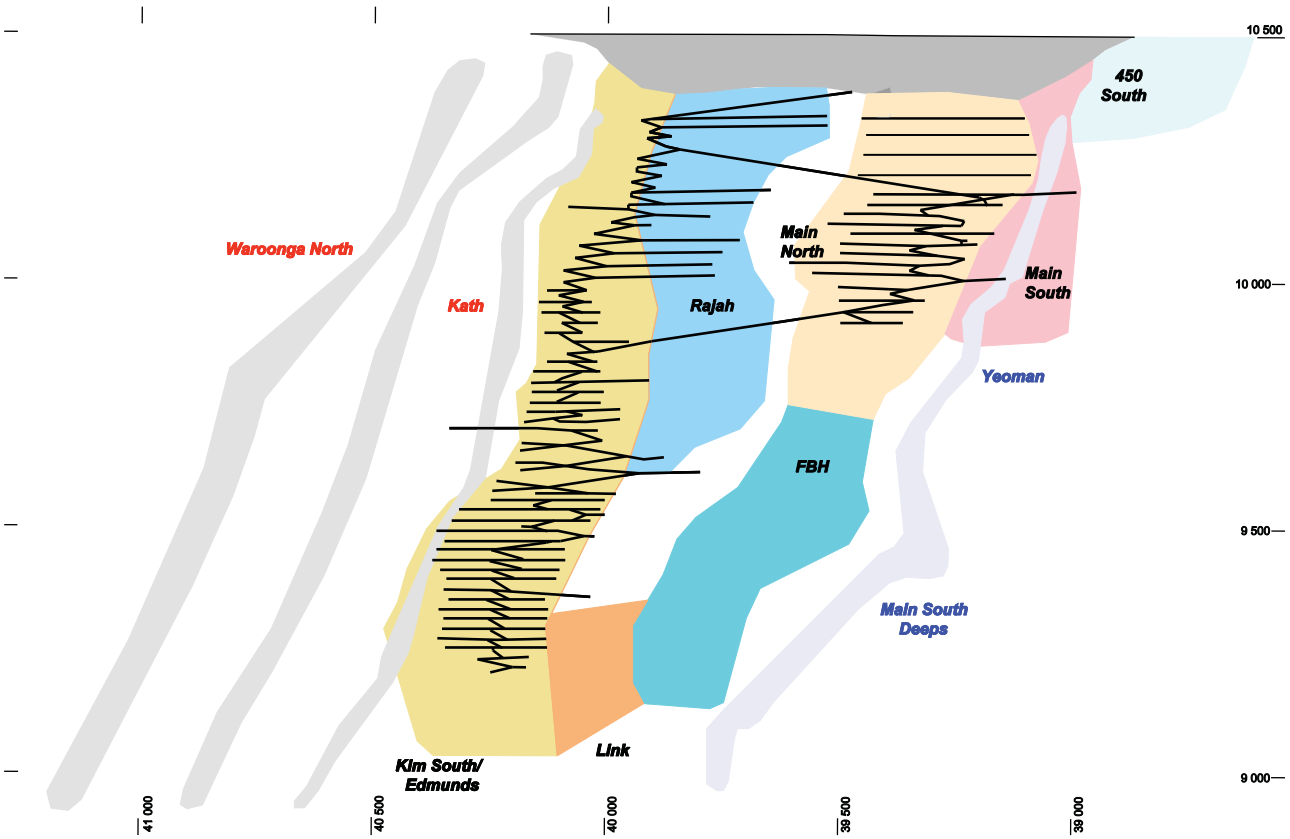
**Mineral Reserve sensitivity**
(Gold – Moz)



# 2.2 Australia region (continued)

## Agnew Gold Mine (continued)

### Schematic north-south long-section through the Waroonga ore bodies




## Competent Persons

Internal technical reviews have been conducted on the Agnew GM assets by the Competent Persons as listed, who are full-time employees of Gold Fields Limited.

### *M Thomas*

*Mineral Resource Manager*

MSc (Economic Geology); MAIG membership number 5041.

**Industry experience:** 28 years' experience in exploration and mining in South Africa and Australia. Commodities: gold. Two years at Lawlers and one year at Agnew. He is responsible for the overall accuracy, standard and compliance of this declaration.

### *N Morriss*

*Senior Planning Engineer*

BEng (Hons) Mining Engineering, B. Com. (Hons) Finance. MAusIMM membership number 208320.

**Industry experience:** 12 years' experience in mining in Australia. Commodities: gold, nickel, diamonds. Two years at Agnew.He is responsible for the overall accuracy, standard and compliance of mine planning, schedules and Mineral Reserve estimation, LoM compilation and financial evaluation.

### *R Urie*

*Regional Mining Engineer*

BEng (Hons) Mining Engineering. MAusIMM membership number 111309.

**Industry experience:** 19 years' experience in mining in Australia. Commodities: gold, base metals, uranium. Four years at Agnew. He is responsible for the overall accuracy, standard and compliance of mine planning, schedules and Mineral Reserve estimation, LoM compilation and financial evaluation.

### *S Gotley*

*Senior Resource Geologist*

BSc (Geology), Grad. Cert. Geostatistics MAusIMM membership number 211515, AIG Membership number 2780.

**Industry experience:** 21 years' experience in mining and consulting in Australia, including 11 years in Archaean gold mining in Australia. Commodities: gold, copper, iron ore, manganese, bauxite. Six months at Agnew. She is responsible for Mineral Resource estimation and reporting.

### *J Logan*

*Resource Geologist*

BSc (Geology). GAIG membership number 5523.

**Industry experience:** 7 years' experience in mining in Australia. Commodities: gold. Seven years at Agnew. He is responsible for Mineral Resource estimation and reporting.

### *S Hackett*

*Principal Resource Geologist*

BSc Geology, MAusIMM membership number 211644.

**Industry experience:** 25 years' experience in exploration and mining in Australia and globally. Commodities: gold, nickel, iron ore. Five years' experience with Agnew . He is responsible for Mineral Resource estimation and reporting from a regional perspective.

# 2.2 Australia region (continued)

## Darlot Gold Mine

In 2015, the focus remained on driving self-funded integrated exploration programmes to replace production depletion and to extend the LoM for Darlot. This was coupled with a ramp up in surface exploration including detailed structural and geophysical targeting aimed at identifying hidden ore bodies at depth analogous to the underground Centenary ore body. The increased exploration budget of A$9.6 million in 2015, focused on both underground and surface prospective areas. Sustained growth and extensions to the underground Lords South Lower (LSL) area were achieved, which will be brought into production in 2016, while ongoing extensional and conversion drilling at the Centenary Oval target has delivered an initial Inferred Mineral Resource. Surface exploration expenditure was also significantly increased in 2015 to test a number of existing and new targets at depth to identify larger, hidden ore bodies analogous to the Centenary deposit. Initial diamond drilling was completed in 2015 on a number of these targets in conjunction with approximately 55 line kilometres of IP geophysics. Continued drilling and follow-up on encouraging targets for 2016 is planned.

Darlot remains mine-constrained and is currently targeting production of approximately 60koz in 2016. Ongoing exploration of this high-grade nuggety ore system, which is open-ended with opportunities for extension, remains an imperative to defining and converting the lease endowment targets into Mineral Reserves for critical life extension.

| Asset fundamentals | |
|---|---|
| **General location** | Darlot is located in the Eastern Goldfields Province of the Yilgarn Craton approximately 55 km east of Leinster or 110 km north of Leonora and approximately 900 km northeast of Perth in Western Australia. It sits at an elevation of 465 metres above mean sea level (amsl) and located at latitude 27°53'32" south and longitude 121°16'16" east. |
| **Licence status and holdings** | Tenure in the Darlot Project consists of 23 mining leases, five miscellaneous licences, and one application for an exploration licence. These tenements cover an area of 11,411ha. Two separate joint venture packages remain in force, consisting of mining leases and prospecting leases totalling 1,720ha. Darlot is located on the Melrose Pastoral Lease in the Mount Malcolm District of the Mount Margaret Mineral Field. The pastoral lease (243,000ha) on which the mine is located, is owned and managed by Gold Fields. |
| **Operational infrastructure and mineral processing** | Darlot is currently mining underground from the Centenary deposit, accessed via declines. In addition, there are centralised administrative offices, engineering workshops and one CIP processing plant (~0.8Mtpa capacity). |
| **Climate** | The climate is semi-arid, however, no extreme climate conditions are experienced that may affect mining operations. |
| **Deposit type** | Orogenic greenstone gold deposits hosted in a number of different styles of lodes. Darlot deposits primarily occur at the intersections between structures and stratigraphy, however, there are subtle differences in alteration and mineralisation that control the local disposition of metal occurrence in thickness, continuity and mineralising texture. |
| **LoM** | Ongoing successful exploration could increase the LoM, which currently extends to mid-2016. |
| **Environmental, health and safety** | In October 2013, the Darlot mine was ISO 14001 accredited. Darlot is certified as fully compliant to the ICMC. In November 2014, Darlot was OHSAS18001 accredited. |

## Brief history

Gold was first discovered in the Lake Darlot region in an alluvial field in late 1894. Initial exploration and production focused on readily extractable gold from the alluvial deposits, however, production from these areas is poorly documented.

The discovery of high-grade quartz vein hosted deposits and the depletion of the alluvial fields changed the exploration focus in the area. Mines at the time included King of the Hills, Saint George, Monte Christo and Zangbar. These were all located within the current Darlot tenement M37/155.

In 1935, a syndicate undertook limited drilling of the Zangbar and Monte Christo quartz lodes. The high-grade lateritic gold section of Monte Christo was mined by open pit in the 1950s.

Modern exploration commenced in the project area in the late 1970s and focused on a re-evaluation of historical mining camps, as well as extensions and repetitions of known mineralised veins. Interest in the area was renewed in the mid-1980s.

From 1986 to 1988, Sundowner Minerals NL undertook an aggressive exploration programme around the Monte Christo area and successfully delineated sufficient resources to commence open-cut mining at Monte Christo and Darlot in 1988. In December 1992, Plutonic Resources Group acquired Sundowner Minerals NL. Open cut mining continued until December 1995 and yielded approximately 400,000oz of gold.

Continued exploration confirmed down-dip extensions to the Darlot lodes. This work culminated with underground development and mining of the Darlot lodes, which began in October 1995.

During August 1996, a drill hole intersected a 33 metre section grading 8.0g/t of gold. This discovery drill hole for the Centenary ore body was approximately 1.2km east of the Darlot open pit. Underground development to the Centenary ore body from the Darlot workings was initiated during December 1996.

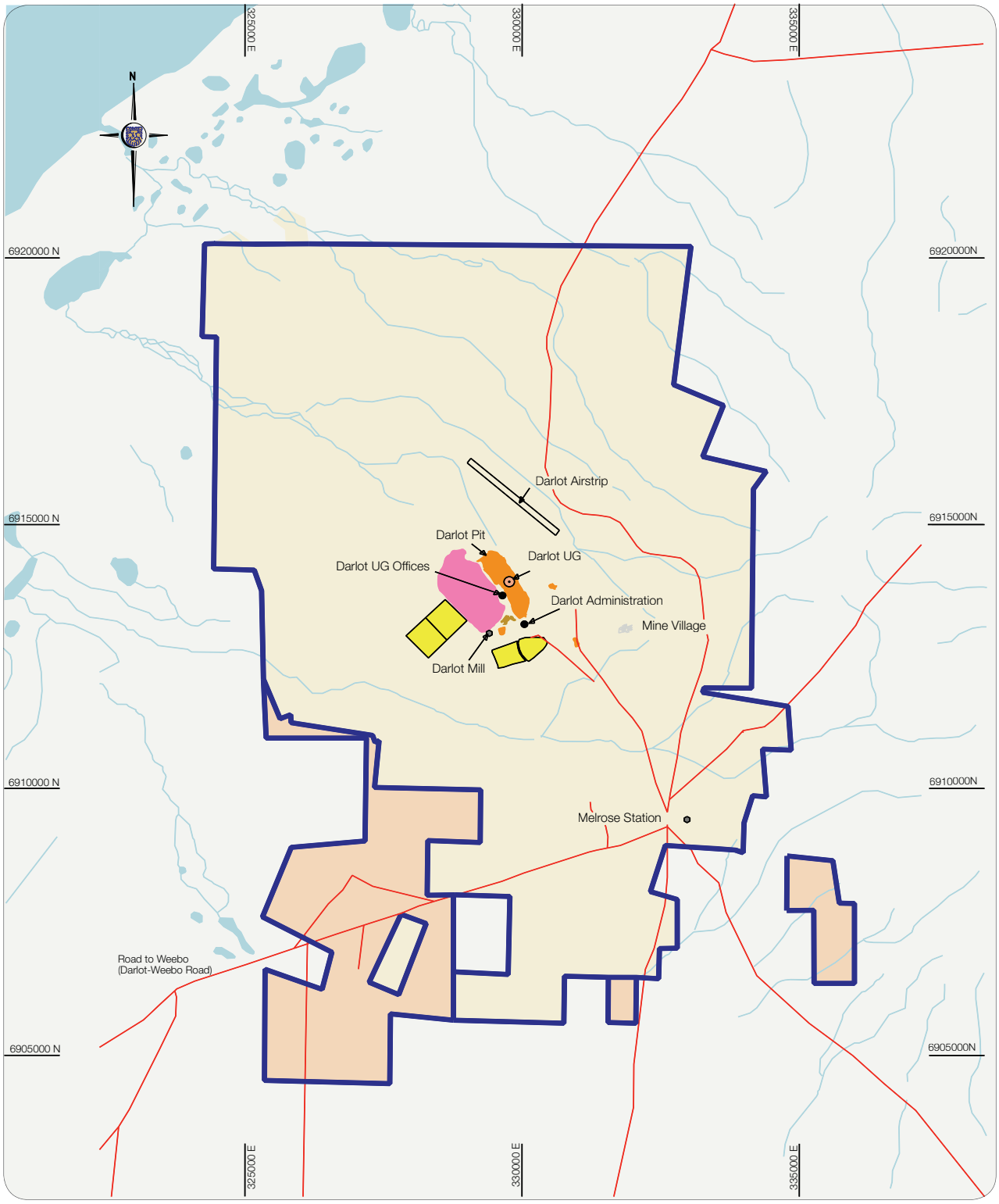
In May 1998, Homestake Mining Company acquired Plutonic Resources Group and in June 2001 Barrick merged with Homestake. In October 2013, Gold Fields acquired the Darlot mine and tenement package from Barrick.

## Key developments

- Continued to be cash generative with gold output maintained in 2015
- Established mining in the Lords South Lower areas with consistent quality grade delivered in H2 2015 after mining was stopped in complex remnant areas
- Identification of incremental LSL extensions – drilling and technical evaluations are in progress
- Continued growth through extension and conversion drilling of the CDA Oval resource
- Exploration in 2015 focused on replacing production depletion and reserve growth to provide critical mass and mining flexibility
- Significant ramp up of drilling and spend in search of blind large ore bodies on integrated structural and geophysical targets
- Near mine and regional tenement package remains prospective and generally under-explored

# 2.2 Australia region (continued)

## Darlot Gold Mine (continued)




### Reference

| | |
|---|---|
| U/G Mines | |
| Towns | |
| Buildings | |
| Offices | |
| Roads | |
| Waste Dump | |
| Open Pits Inactive | |
| Stockpiles | |
| Tailings/Leach Pad | |
| Lease Outline (Managed) | |
| Lease Outline (Non-Managed) | |

**Gold Fields Limited**
**Darlot Gold Mine**

PLAN SHOWING MINE INFRASTRUCTURE AS AT 31 DECEMBER 2015

0 1 2 3
Kilometres

Co-ordinate System: Map Grid of Australia Zone 51
(Geodetic Datum of Australia 1994)

## Operating statistics

| | | Historic performance | | | |
|---|---|---|---|---|---|
| | Units | **C2015** | C2014 | C2013 | C2012 |
| **Underground mining** | | | | | |
| Total mined | kt | **640** | 695 | 876 | 876 |
| – Waste mined | kt | **226** | 165 | 189 | 170 |
| – Ore mined | kt | **414** | 530 | 687 | 706 |
| Mined grade | g/t | **6.08** | 4.96 | 3.80 | 4.35 |
| Processing | | | | | |
| Tonnes treated | kt | **457** | 525 | 746 | 853 |
| Head grade | g/t | **5.7** | 5.12 | 3.54 | 4.09 |
| Yield | g/t | **5.34** | 4.96 | 3.28 | 3.82 |
| Plant recovery factor | % | **95.3** | 95.2 | 92.6 | 93.5 |
| Total gold production | koz | **78.4** | 83.6 | 79.8 | 105.0 |
| | kg | **2,440** | 2,558 | 2,449 | 3,260 |
| **Financials** | | | | | |
| Average Au price received | US$/oz | **1,163** | 1,266 | 1,413 | 1,668 |
| | A$/oz | **1,551** | 1,407 | 1,372 | 1,720 |
| Exchange rate (annual average) | US$/A$ | **0.75** | 0.90 | 1.03 | 0.97 |
| Operating cost | A$/oz | **1,013** | 1,085 | 1,132 | 997 |
| Capital expenditure | A$/oz | **339** | 195 | 81 | 220 |
| All in sustaining cost (AISC) | A$/oz | **1,403** | 1,353 | 1,169 | 1,345 |
| | US$/oz | **1,057** | 1,222 | 1,132 | 1,392 |
| **Life-of-Mine** | | | | | |
| Mineral Reserves | Mt | **0.188** | 0.4 | 1.0 | 2.4 |
| Mineral Reserves head grade | g/t | **5.63** | 7.36 | 5.07 | 4.35 |
| Mineral Reserves | Moz | **0.03** | 0.09 | 0.16 | 0.43 |

*Rounding off of figures presented in this report may result in minor computational discrepancies. Where this occurs it is not deemed significant. December 2013 production figures are inclusive of Gold Fields (Q4) and Barrick (Q1 - Q3), while the unit costs are only Q4.*

## Local geology

Darlot Mine is located within the Eastern Goldfields Province of the Archean-aged Yilgarn Craton in Western Australia. The Darlot-Centenary deposit is located within the Mount Margaret Mineral Field, which lies at the southern end of the Yandal Greenstone Belt.

Gold mineralisation is associated with quartz veins and alteration halos controlled by major structures or secondary splays and cross-linking structures. The Darlot deposit has been differentiated into two separate entities, namely the Darlot lodes and Centenary ore body. The Centenary ore body is located some 1.2km east of the Darlot open pit and down dip from the Darlot lode extensions.

In the Darlot lodes, gold mineralisation occurs within and around quartz laminar and sheeted quartz veins in local dilation zones along the Darlot thrust, in addition to sub-horizontal extensional quartz veins in felsic volcanic and intrusive rocks above the thrust.

The Centenary ore body has been defined from approximately 150 metres to 700 metres below surface. Gold mineralisation occurs within sub-horizontal to 20° westerly dipping stacked quartz veins bounded to the west by the Oval fault and to the east by the Lords fault.

There is considerable endowment potential within the current tenement holdings to add to the Mineral Resources and Mineral Reserves, through a combination of in-mine resource extensions and near-mine exploration. In terms of the extent of its tenement holdings and the exploration undertaken to date, Darlot cannot be considered advanced in exploration terms due to the relatively shallow drilling undertaken beyond the present mine footprint. Recent drilling and geological studies continue to highlight the potential of the Darlot area to deliver new economic ore sources in close proximity to existing mine infrastructure.

Mine exploration for the 12 months to December 2015 focused on in-mine extensional and resource definition programmes. Surface exploration centred on near-mine targeting of geophysical and structural anomalies.

# 2.2 Australia region (continued)

## Darlot Gold Mine (continued)

### Mining

The 2016 mine plan is focused on the underground Centenary ore systems and LSL, as well as setting up access and take off points for the CDA Oval area, should current exploration prove successful.

#### Mining methods

Mining is conducted via a combination of long-hole open stoping, room and pillar and narrow vein long-hole stoping. Ore bodies are accessed via two declines from the base of the Darlot open pit. Paste fill is utilised to backfill open stopes allowing maximum extraction of the lode system.

#### Mine planning and scheduling

The 2016 operational plan is dominated by underground mining from the Centenary lode and the new Lords South Lower mining area established in 2015. The mine schedule is sequenced in detail and typically has only two stoping fronts open at any one time.

The stope design for current operations takes practical stope layouts into consideration, as well as planning for mining losses in pillars or other parts of the resource, excluded for technical reasons. Dilution material is included in the stope design. Ore losses can occur when material cannot be practically extracted from the stopes. In addition, stope shapes were assessed using updated cut-off grades.

A ground management plan is in place together with a monitoring system to manage seismicity and potential improvements to the production sequencing to further mitigate risk.

#### On-mine projects

A number of business improvement projects continue with the primary aim of improving operational results through enhancing efficiencies, reducing costs and increasing mine flexibility.

The operation continues to examine and review the possibility of opportunistic exploitation of small-scale open pittable deposits with low strip ratios for supplementary mill feed. In this regard, smaller open pit opportunities continue to be assessed for shallow oxide and supergene ore that could be brought into production quickly and at minimal operating costs.

Future exploration will focus within and immediately around the Darlot mine area. The objective is to define and bring into production additional high-grade ore sources from the CDA.

### Mineral Resources and Mineral Reserves

The Mineral Resources and Mineral Reserves have been updated using the current Gold Fields planning gold price of A$1,750/oz and A$1,550/oz respectively and reported in accordance with SAMREC Code. The December 2015 Mineral Resources have been stated inclusive of Mineral Reserves. Geological and evaluation models have been updated as at 31 December 2015 to reflect the latest available data sets.

#### Mineral Resources

The Mineral Resources are classified as Measured, Indicated or Inferred. Mineral Resource categories are assigned with consideration given to geological complexity, grade variance, drill hole intersection spacing and mining development. The impacts of year-on-year changes are covered in the reconciliation section.

*Mineral Resource classification*

| | Tonnes (kt) | | | Grade (g/t) | | | Gold (koz) | | |
|---|---|---|---|---|---|---|---|---|---|
| **Classification** | **Dec 15** | Dec 14 | Dec 13 | **Dec 15** | Dec 14 | Dec 13 | **Dec 15** | Dec 14 | Dec 13 |
| **Open pit and underground** | | | | | | | | | |
| Measured | **–** | 18 | 563 | **–** | 9.42 | 5.12 | **–** | 6 | 93 |
| Indicated | **688** | 773 | 863 | **6.67** | 7.37 | 5.38 | **148** | 183 | 149 |
| Inferred | **553** | 348 | 175 | **6.31** | 6.61 | 5.07 | **112** | 74 | 29 |
| **Total open pit and underground** | **1,241** | 1,140 | 1,601 | **6.51** | 7.17 | 5.26 | **260** | 263 | 271 |
| **Surface** | | | | | | | | | |
| Measured stockpiles | **–** | – | – | **–** | – | – | **–** | – | – |
| **Total surface** | **–** | – | – | **–** | – | – | **–** | – | – |
| **Grand total** | **1,241** | 1,140 | 1,601 | **6.51** | 7.17 | 5.26 | **260** | 263 | 271 |

*Mineral Resource classification per mining area*

| | Indicated | | | Inferred | | | Total Mineral Resource | | |
|---|---|---|---|---|---|---|---|---|---|
| Area | Tonnes (kt) | Grade (g/t) | Gold (koz) | Tonnes (kt) | Grade (g/t) | Gold (koz) | Tonnes (kt) | Grade (g/t) | Gold koz |
| Centenary | 432 | 5.56 | 77 | 269 | 6.10 | 53 | 700 | 5.76 | 130 |
| Lords South Lower | 196 | 8.96 | 56 | 137 | 5.03 | 22 | 333 | 7.34 | 79 |
| CDA Oval | — | — | — | 128 | 8.35 | 34 | 128 | 8.35 | 34 |
| Darlot | 61 | 7.24 | 14 | 19 | 4.97 | 3 | 80 | 6.70 | 17 |
| **Total Darlot UG** | 688 | 6.67 | 148 | 553 | 6.31 | 112 | 1,241 | 6.51 | 260 |
| **Surface** | | | | | | | | | |
| Surface stockpiles | — | — | — | — | — | — | — | — | — |
| **Grand total** | 688 | 6.67 | 148 | 553 | 6.31 | 112 | 1,241 | 6.51 | 260 |

*Modifying factors*

- The declared Mineral Resources for December 2015 are inclusive of Mineral Reserves
- Mineral Reserves are quoted in terms of RoM grades and tonnages as delivered to the metallurgical processing facility and are therefore fully diluted
- The Mineral Reserve statement includes only Measured and Indicated Mineral Resources, modified to produce Mineral Reserves that are contained within the LoM plan
- Mineral Resources and Mineral Reserves undergo regular internal and/or external audits, and any issues identified are rectified at the earliest opportunity – usually during the current reporting cycle

| | | December | | |
|---|---|---|---|---|
| | Units | **2015** | 2014 | 2013 |
| **Mineral Resource parameters** | | | | |
| | US$/oz | **1,500** | 1,500 | 1,500 |
| Mineral Resource gold price | US$/A$ | **0.86** | 0.95 | 1.05 |
| | A$/oz | **1,750** | 1,570 | 1,429 |
| Cut-off for mill feed | g/t | **1.06** | 1.00 | 1.00 |
| Cut-off for underground | g/t | **3.16** | 3.70 | 3.56 |
| **Mineral Reserve parameters** | | | | |
| | US$/oz | **1,300** | 1,300 | 1,350 |
| Mineral Reserve gold price | US$/A$ | **0.84** | 0.95 | 1.00 |
| | A$/oz | **1,550** | 1,370 | 1,350 |
| Cut-off for mill feed underground[1] | g/t | **3.57** | 4.31 | 3.76 |
| Mining recovery factor (underground) | % | **90 – 95** | 90 | 95 |
| MCF | % | **100** | 100 | 100 |
| Dilution underground | % | **15 – 20** | 15 | 10 |
| Plant recovery factor | % | **95.3** | 95.5 | 95.5 |
| Processing capacity | Mtpa | **0.85** | 0.8 | 0.8 |

[1] *Cut-offs have reduced year-on-year due to higher gold price and reduced operating cost associated with less development as the mine has a limited LoM.*

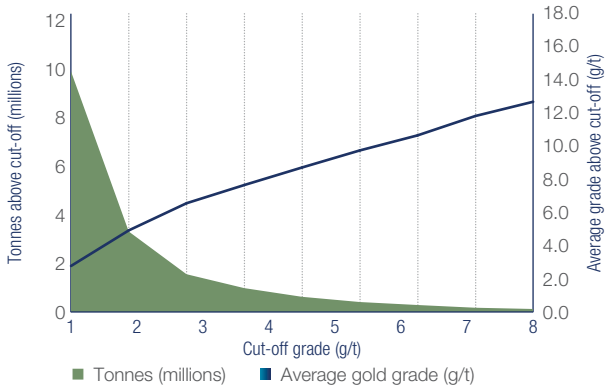
# 2.2 Australia region (continued)

## Darlot Gold Mine (continued)

### *Grade tonnage curves*

The grade tonnage curve for the underground Mineral Resource is presented below.

**Grade tonnage curve – Underground**




### *Mineral Reserves*

The Mineral Reserve estimate for Darlot is based on an appropriately detailed and engineered plan. All design and scheduling work is undertaken to an appropriate level of detail by experienced engineers using appropriate mine planning software. The planning process incorporates realistic modifying factors and the use of appropriate cut-off grades, geotechnical criteria, mining fleet productivities and other techno-economic investigations.

The terms and definitions are those given in the SAMREC Code 2007. The current operational plan has mining occurring in the Lords South Lower areas with minor activities in the other dispersed Darlot mining areas.

### *Mineral Reserve classification*

| | Tonnes (kt) | | | Grade (g/t) | | | Gold (koz) | | |
|---|---|---|---|---|---|---|---|---|---|
| **Classification** | **Dec 15** | Dec 14 | Dec 13 | **Dec 15** | Dec 14 | Dec 13 | **Dec 15** | Dec 14 | Dec 13 |
| **Open pit and underground** | | | | | | | | | |
| Proved | **–** | – | 262 | **–** | – | 5.60 | **–** | – | 47 |
| Probable | **188** | 360 | 679 | **5.63** | 7.36 | 4.89 | **34** | 85 | 107 |
| **Total underground** | **188** | 360 | 941 | **5.63** | 7.36 | 5.09 | **34** | 85 | 154 |
| **Surface** | | | | | | | | | |
| Proved | **–** | – | 10 | **–** | – | 2.80 | **–** | – | 1 |
| **Total surface** | **–** | – | 10 | **–** | – | 2.80 | **–** | – | 1 |
| **Grand total** | **188** | 360 | 951 | **5.63** | 7.36 | 5.07 | **34** | 85 | 155 |

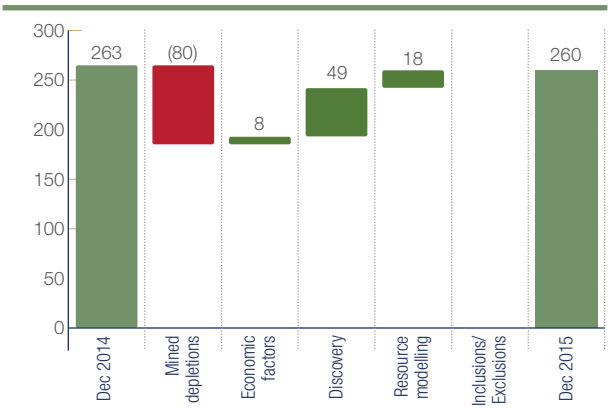
### *Mineral Reserve classification per mining area*

| | Proved | | | Probable | | | Total Mineral Reserve | | |
|---|---|---|---|---|---|---|---|---|---|
| Area | Tonnes (kt) | Grade (g/t) | Gold (koz) | Tonnes (kt) | Grade (g/t) | Gold (koz) | Tonnes (kt) | Grade (g/t) | Gold (koz) |
| **Underground** | | | | | | | | | |
| Lords South Lower | – | – | – | 188 | 5.63 | 34 | 188 | 5.63 | 34 |
| **Total underground** | **–** | **–** | **–** | **188** | **5.63** | **34** | **188** | **5.63** | **34** |
| **Surface** | | | | | | | | | |
| Surface stockpiles | – | – | – | – | – | – | – | – | – |
| **Grand total** | **–** | **–** | **–** | **188** | **5.63** | **34** | **188** | **5.63** | **34** |

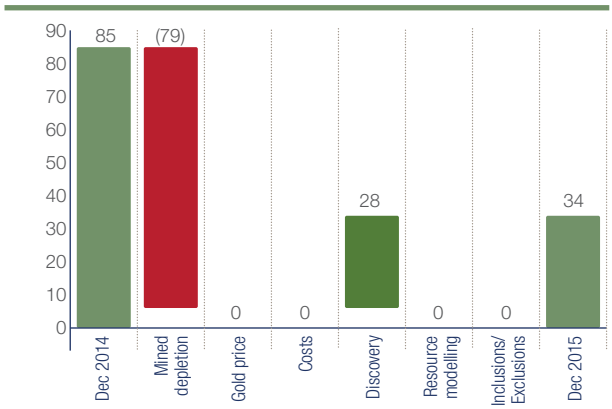
*Mineral Resource and Mineral Reserve reconciliation year-on-year*

| Factors that affected Mineral Resource reconciliation year-on-year | Factors that affected Mineral Reserve reconciliation year-on-year |
|---|---|
| Higher gold price (A$/oz) and reduced operating costs lowered cut-offs, which increased Mineral Resources. | Higher gold price (A$/oz) and reduced operating costs lowered cut-offs, which increased Mineral Reserves. |
| Discovery and extensions at Lords South Lower and CDA oval areas. | Discovery and Mineral Resource upgrade at Lords South Lower. |
| Mining Depletion. | Mining Depletion. |
| Infill drilling impacts on geology and resource models, as well as local area economics. | Impact of updated resource models. |

**Mineral Resource Reconciliation**
(Gold – koz)




**Mineral Reserve Reconciliation**
(Gold – koz)

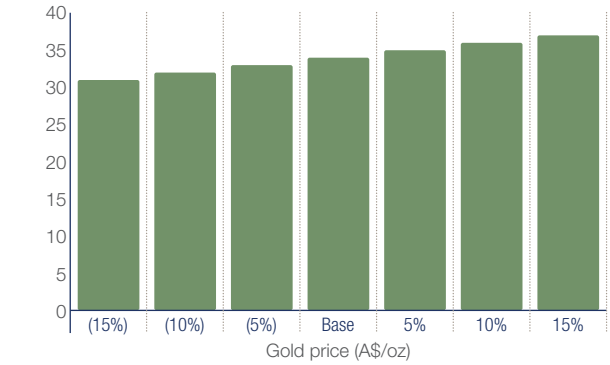



## Mineral Reserve sensitivity

To illustrate the impact of fluctuations in gold price and exchange rates on the current declaration, Darlot has generated sensitivities with respect to Mineral Reserves. The following graph indicates the Managed Mineral Reserve sensitivity at -15%, -10%, -5%, base (A$1,500), +5%, +10% and +15% to the gold price.

These sensitivities (other than for the base case) are not supported by detailed plans and depletion schedules. They should only be considered on an indicative basis, specifically as such sensitivities assume 100% selectivity, without any operating cost increases.

**Mineral Reserve sensitivity**
(Gold – koz)



# 2.2 Australia region (continued)

## Darlot Gold Mine (continued)

### Competent Persons

Internal technical reviews have been conducted on the Darlot GM assets by the Competent Persons as listed, who are full-time employees of Gold Fields Limited.

***M Jolly***

*Regional Mineral Resource Manager*

MSc (Geology), EDP Wits Business School, MAusIMM, membership number 304960.

**Industry experience:** He is the lead Competent Person in terms of SAMREC and has 35 years' experience in the mining and exploration industry (seven years in Australian gold exploration and mining). He is responsible for the overall accuracy, standard and compliance of this declaration

***R Urie***

*Regional Mining Engineer*

BEng (Hons) Mining Engineering. MAusIMM membership number 111309.

**Industry experience:** 19 years' experience in mining in Australia. Commodities: gold, base metals, uranium. Three years in a regional role. He is responsible for the overall accuracy, standard and compliance of mine planning, schedules and Mineral Reserve estimation, LoM compilation and financial evaluation.

***S Law***

*Senior Resource Geologist*

BSc (Hons), MSc, Grad Cert Geostatistics. MAusIMM (CP Geo) membership number - 110467.

**Industry experience:** 23 years' experience in mining in Australia, including 16 years in Archean gold. Commodities: gold, base metals and coal. He is responsible for Mineral Resource estimation and reporting.

***S Hackett***

*Principal Resource Geologist*

BSc Geology, MAusIMM membership number 211644.

**Industry experience:** 25 years' experience in exploration and mining in Australia and globally. Twenty years of experience in Archean gold. Commodities: gold, nickel, iron ore. He is responsible for Mineral Resource estimation and reporting from a regional perspective.

# Granny Smith Gold Mine

The Granny Smith Gold Mine (GSM) has undergone an impressive turnaround since acquisition and is now positioned as a high-grade, high-margin core portfolio asset. Focus is on investment in brownfield exploration, resource conversion, infrastructure, mining and processing efficiency, and cost containment, as well as life extension. These investments are all aimed at underpinning sustainable cash generative ounces.

The Granny Smith Mineral Resource ounces increased by 43% in 2015 as a result of a very successful resource definition and extensional drilling campaign at the flagship Wallaby underground mine and an increase in the Granny Smith underground and open pit mineralisation. The Mineral Reserve also increased by 50% in 2015 following a very effective Mineral Resource to Mineral Reserve conversion programme at Wallaby. This remains a priority in order to deliver the mining mix and production flexibility needed to underpin the planned cash flow margin. Reserves, net of production depletion, have grown incrementally for the last seven years, a trend that is set to continue given the mine's investment in discovering and developing new and extensional Mineral Reserves at Wallaby underground mine and at other prospective and relatively unexplored tenements.

# 2.2 Australia region (continued)

## Granny Smith Gold Mine (continued)

| Asset fundamentals | |
|---|---|
| **General location** | Granny Smith is situated within the Yilgarn Craton at an elevation of 400 metres amsl and located at latitude 28°51'09" South and longitude 122°18'35" East, and is located approximately 400km northeast of the town of Kalgoorlie in the Eastern Goldfields of Western Australia in the Laverton District. |
| **Licence status and holdings** | GSM is owned by GSM Mining Company Pty Ltd, a wholly owned subsidiary of GFI. This entity came into being on 1 October 2013, following Gold Fields' acquisition of the asset from Barrick Corporation. GSM controls exploration and mineral rights over a total area of 78,985 hectares (total of granted tenements) and has security of tenure for all current exploration and mining leases that contribute to future Mineral Reserves. |
| **Operational infrastructure** | Granny Smith is currently mining four lenses from the Wallaby ore body (Z70, Z80, Z90 and Z100), accessed from a single decline. Mining administration and maintenance is located at the Wallaby mine. Ore is processed at the Granny Smith CIP processing plant under campaign milling conditions and is located 15km east of the Wallaby underground mine. |
| **Climate** | The climate is semi-arid and temperatures vary from an average minimum of 4°C in June to an average maximum of 36° C in January. The average annual rainfall total is 220mm. No extreme climate conditions are experienced that materially affect mining operations. |
| **Deposit type** | Orogenic greenstone gold deposits hosted in a number of different styles of lodes. The Granny Smith lodes comprise vein stock works localised by a northerly trending shear at the margin of a granodiorite. The Wallaby lodes are flat lying alteration zones hosted within magnetite amphibole altered conglomerate. |
| **LoM** | Ongoing extensional and brownfields exploration continues, which will sustain an extended LoM beyond current reporting. It is estimated that the current Mineral Reserves will be depleted in 2024 (9 years). |
| **Environmental, health and safety** | Cyanide Code Recertification, ISO14001 recertification and OHSAS18001 recertification. GSM is in compliance with all environmental legislation. |

### Brief history

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

In 1989, mining at GSM commenced in the Granny Smith pit and continued in subsequent years with the development of the Goanna pit, the Windich pit and nearby satellite pits. First gold was poured in 1990.

In 1992, the Keringal and Sunrise deposits were discovered 18km and 34km south of Granny Smith respectively, with ore production from both commencing in 1994. The Wallaby deposit was discovered in 1998, 11km south-west of Granny Smith, with first ore delivered to the mill in November 2001.

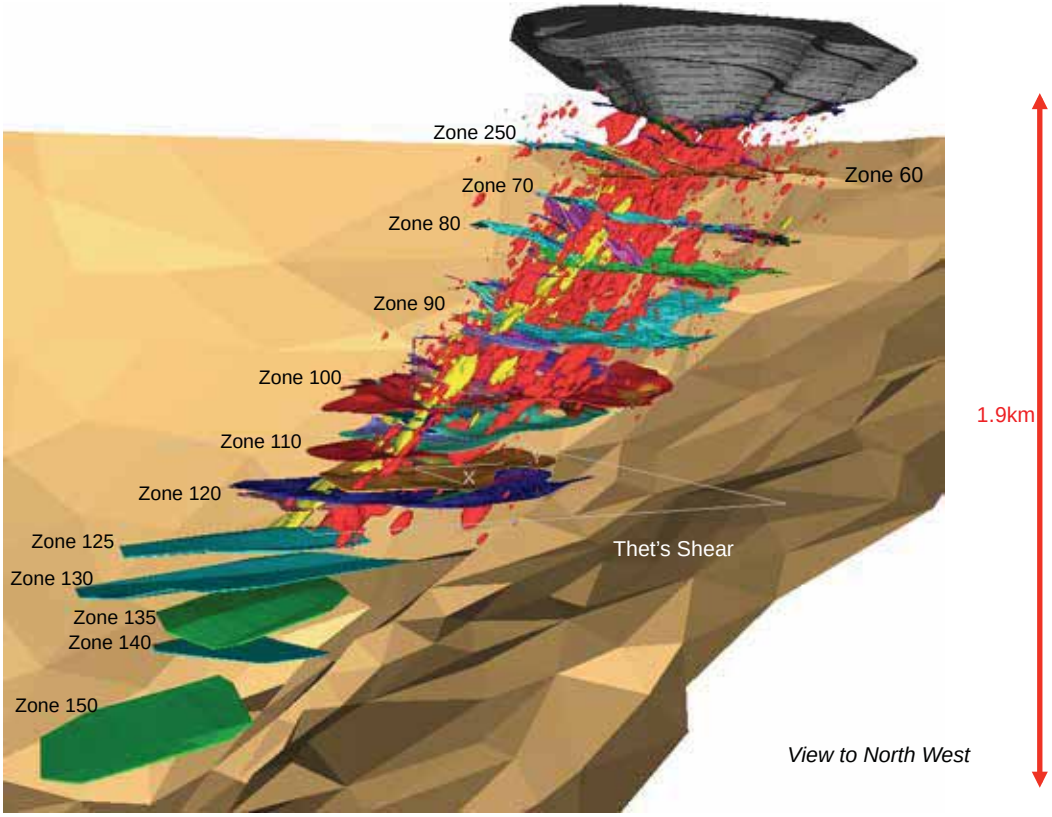
Barrick acquired 100% of Placer Dome shares on 20 January 2006. The Wallaby open pit was mined from October 2001 until December 2006 and produced 13.6Mt at 3.44g/t Au for 1.5 million ounces of gold. Underground mining at Wallaby commenced in December 2005 and is ongoing.

Gold Fields acquired 100% of the Granny Smith Gold Mine on 1 October 2013 as part of the purchase of the Yilgarn South operations.

## Key developments

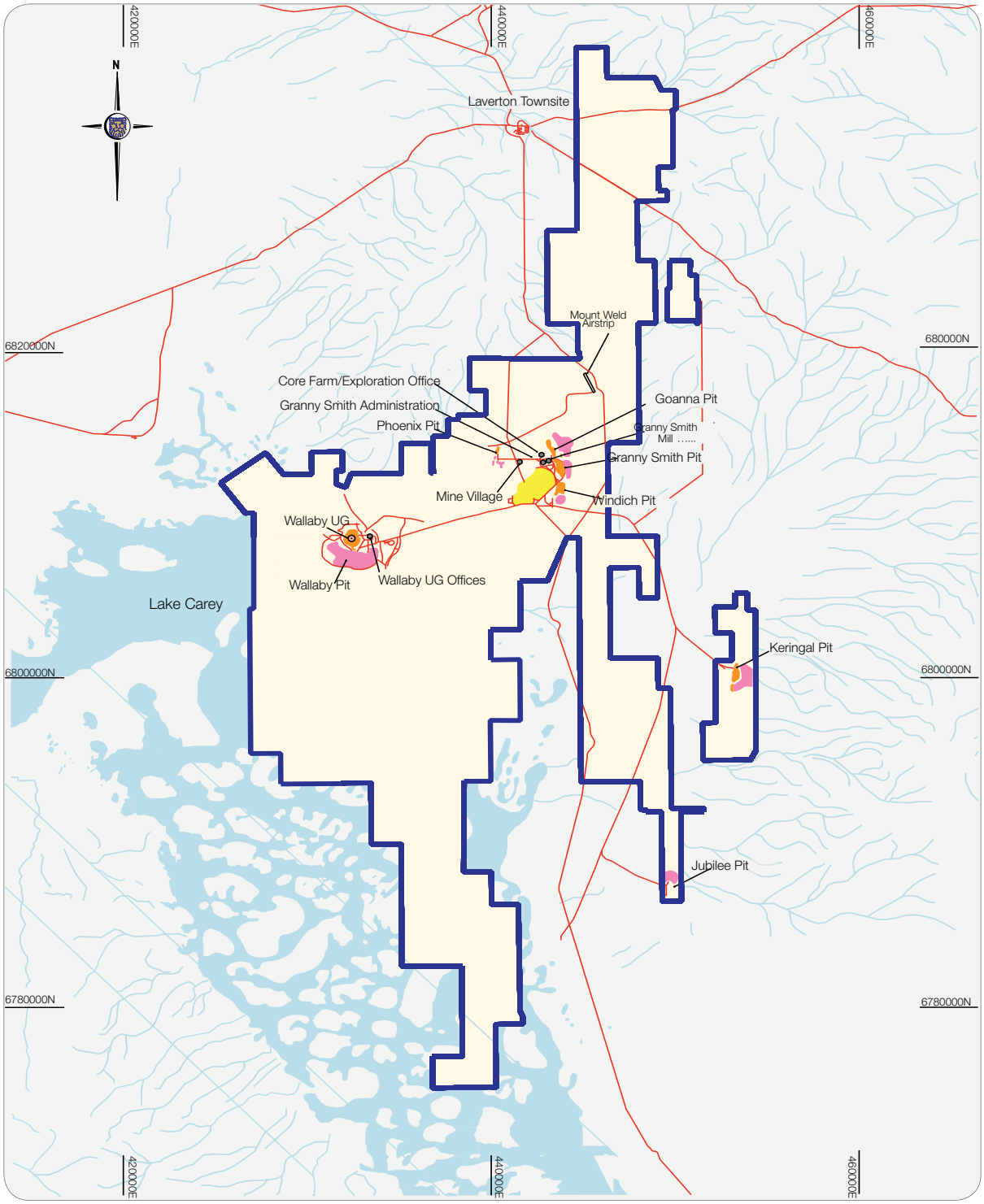
- Exploration and in-fill drilling at the robust Wallaby deposit continues to consistently replace and grow the Mineral Resource and Mineral Reserve base
- Exploration drilling continues to discover, extend and convert, high-margin resource ounces from an ore body open both at depth and laterally
- Positive results for mining extensions to Wallaby on zones Z90, Z100 and Z110/120
- A major +1.1 million ounce increase in Wallaby underground Mineral Resources from extensional drilling and conversion during 2015
- Increases to the Granny Smith underground (0.342Moz) and open pit (0.087Moz) resources in 2015
- Ongoing exploration drilling has expanded the Mineral Resource footprint of the Z100 and Z110/120 lodes, and further improved profiling the mineralised zones down to the Z150 position
- The resource development strategy will continue to focus on identifying the potential of the Wallaby system down to the Z150 level
- Several target areas have been identified over the tenement package for initial drilling and follow-up during 2016
- Early stage surface exploration over the greater tenement package during 2015 has returned a significant number of air core anomalies, particularly over the under-explored Lake Carey area
- Major Plant upgrade and refurbishment which continued in 2015 has improved metal recovery by approximately 4%
- The LoM based on the current Mineral Reserves has been extended to 2024 (nine years), although ongoing exploration and resource conversion is planned with the aim of extending the mine's life further

## Wallaby deposit



# 2.2 Australia region (continued)

## Granny Smith Gold Mine (continued)




**Reference**

| | | | | |
|---|---|---|---|---|
| U/G Mines | | Open Pit | – Inactive | |
| Buildings | | Stockpiles | | |
| Roads | | Tailings Dams | | |
| Granny Smith Leases | | Waste Dump | | |

**Gold Fields Limited**
**Granny Smith Gold Mine**

PLAN SHOWING MINE INFRASTRUCTURE AS AT 31 DECEMBER 2015

0 1 3 5
Kilometres

Map Grid of Australia Co-ordinate System

## Operating statistics

| | | Historic performance | | | |
|---|---|---|---|---|---|
| | Units | **C2015** | C2014 | C2013* | C2012 |
| **Underground mining** | | | | | |
| Total mined | kt | **1,905** | 1,761 | 1,887 | 1,928 |
| – Waste mined | kt | **522** | 253 | 446 | 435 |
| – Ore mined | kt | **1,383** | 1,508 | 1,442 | 1,492 |
| Mined grade | g/t | **6.94** | 7.21 | 5.0 | 5.1 |
| **Processing** | | | | | |
| Tonnes treated | kt | **1,451** | 1,472 | 1,516 | 1,438 |
| Head grade | g/t | **6.97** | 7.17 | 5.29 | 5.16 |
| Yield | g/t | **6.45** | 6.66 | 4.74 | 4.61 |
| Plant recovery factor | % | **92.7** | 92.5 | 89.6 | 89.4 |
| Total gold production | koz | **301** | 315 | 231 | 213 |
| **Financials** | | | | | |
| Average Au price received | US$/oz | **1,157** | 1,266 | 1,413 | 1,668 |
| | A$/oz | **1,543** | 1,407 | 1,372 | 1,720 |
| Exchange rate (annual average) | US$/A$ | **0.75** | 0.9 | 1.03 | 0.97 |
| Operating cost | A$/oz | **600** | 642 | 810 | 908 |
| Capital expenditure | A$/oz | **321** | 207 | 130 | 466 |
| All in sustaining cost (AISC) | A$/oz | **1,017** | 896 | 917 | 1,349 |
| **Life-of-Mine** | | | | | |
| Mineral Reserves | Mt | **7.0** | 4.5 | 4.1 | 31.5 |
| Mineral Reserves head grade | g/t | **5.86** | 6.02 | 6.34 | 1.84 |
| Mineral Reserves | Moz | **1.31** | 0.87 | 0.83 | 1.86 |

** December 2013 production figures are inclusive of Gold Fields (Q4) and Barrick (Q1 - Q3), while the unit costs are only Q4. Rounding off of figures presented in this report may result in minor computational discrepancies. Where this occurs, it is not deemed significant.*

# 2.2 Australia region (continued)

## Granny Smith Gold Mine (continued)

### Local geology

The Granny Smith region is dominated by the Mt Margaret Dome in the northwest and the Kirgella Dome in the southeast. These domes are flanked to the east and west by north-northwest-striking shear zones, with the central zone between the two domes being dominated by north- to north-northeast-striking sigmoidal shear zones. These distinctly different strikes to the shear zones developed early in the tectonic evolution and resulted in a favourable architecture for late-stage orogenic gold mineralisation at Wallaby and Granny Smith.

The majority of gold mineralisation at the Wallaby deposit is contained within an actinolite-magnetite alteration pipe. It cross cuts the host conglomerate and the majority of magmatic intrusions, and overprints the actinolite-magnetite alteration. Gold occurs along micro-fractures within pyrite.

### Exploration and resource definition drilling

Exploration during 2015 focused on resource conversion and extensions to the Wallaby deposit. Regional exploration enjoyed increased traction with the aim of discovering a new significant ore source outside of Wallaby. Five sub audio magnetic (SAM) surveys were completed covering areas on Lake Carey, Boomer and Granny Smith and a 25 metre line spaced airborne magnetic survey was run over tenements covering Lake Carey. Initial drill programmes commenced at the Keringal, Jubilee and Platypus projects with two reverse circulation drill holes and 10 diamond drill holes completed, while diamond drilling was completed at the Boomer and Northern Fleet projects. Further work is planned for Keringal and Jubilee in 2016.

To screen the largely under-explored Granny Smith tenement package, wide-spaced (400m), aircore drilling was completed over approximately 50% of the property. This returned a significant number of anomalous results, the best of which were achieved from areas not previously drilled on Lake Carey.

In-mine exploration extensional drilling at Wallaby in 2015 resulted in extensions to Zone 90 and Zone 100 and also continued to expand the footprint of the Zone 110 and Zone 120 lodes at depth. A further 6 long inclined holes were drilled to target the deeper mineralised zones below Zone 120. This drilling delivered a number of thick, high-grade intervals from the interpreted position of Zone 135 and additional intervals from the Zone 150 target, further improving the geological understanding of the ore body at depth.

The 2016 exploration programme is designed to continue to grow the resource and reserve at Wallaby through extensions both laterally and at depth, while seeking new opportunities through target generation and testing of prospective areas and anomalies within the larger tenement package. Importantly, any new discovery outside of Wallaby, with potential for accretive production volumes, will require minimal plant capital expenditure due to the availability of spare processing capacity.

### Mining

The current operations consist of the Wallaby underground mine with mining occurring in four ore zones (Z70, Z80, Z90 and Z100), which form the basis for the 2016 operational plan.

#### Mining methods

Access to the Wallaby underground mine is via a portal established within the completed Wallaby open pit. The mine operation is trackless, with truck haulage from underground via the pit ramp to the surface. The Wallaby underground mine is currently designed to exploit the stacked mineralised lodes (Z70, Z80, Z90, Z100, Z110 and Z120).

Two primary underground mining methods are used, with minor adjustments to suit localised geometry. Inclined Room and Pillar (IRP) is used in areas with a moderate dip (10° to 35°) and moderate width zones (four to six metres), and Transverse Long-hole Stoping (TLHS) is used in zones, which are thicker (six metres to 15 metres) with variable dips. Two other mining methods are used to a lesser extent: Narrow Vein Long-hole Stoping may be utilised in some areas with the benefit of reduced planned footwall dilution, and Bulk Long-hole Stoping is used in thicker zones (15 metre plus) under varying dip conditions.

#### Mine planning and scheduling

At Wallaby, the mine design takes practical stope layouts into consideration, as well as planning for mining losses in barrier pillars and stope pillars, or other parts of the resource excluded for geotechnical, accessibility or economic reasons. The production scheduling uses rates based on historical mining performance for Z70, Z80 and Z90 and were matched appropriately for Z100. Geotechnical controls, ventilation requirements and production cost management remain focus areas for margin protection as mining progresses to greater depths.

#### On-mine projects

The Granny Smith mill continued to receive significant upgrades during 2015 to ensure structural integrity and improve operating systems and metal recovery. A number of smaller projects are planned during 2016 to maintain the performance of the mill going forward.

In-mine exploration will continue to focus on determining the extent of the Wallaby deposit to Z150, while a pre-feasibility study for the mining of Zone 110/120, including a shaft option, is due for completion in H1 2016.

Business improvement priorities encompass improving stope metal recovery and material movement efficiencies for the loading and trucking fleet.

## Mineral Resources and Mineral Reserves

The Mineral Resources and Mineral Reserves were updated as of December 2015 and used a gold price of A$1,750/oz and A$1,550/oz respectively. The December 2015 Mineral Resources have been stated inclusive of Mineral Reserves. Geological and evaluation models have been updated as at December 2015 to reflect the latest available data sets.

### Mineral Resources

The Mineral Resources are classified as Measured, Indicated or Inferred, as described in the SAMREC Code. Mineral Resource categories are assigned with consideration given to geological complexity, grade variance, drill hole intersection spacing and mining development.

*Mineral Resource classification*

| | Tonnes (kt) | | | Grade (g/t) | | | Gold (koz) | | |
|---|---|---|---|---|---|---|---|---|---|
| **Classification** | **Dec 15** | Dec 14 | Dec 13 | **Dec 15** | Dec 14 | Dec 13 | **Dec 15** | Dec 14 | Dec 13 |
| **Open pit** | | | | | | | | | |
| Measured | **—** | — | — | **—** | — | — | **—** | — | — |
| Indicated | **—** | 92 | 26,743 | **—** | 7.59 | 1.34 | **—** | 22 | 1,153 |
| Inferred | **1,234** | 217 | 914 | **3.53** | 4.32 | 1.04 | **140** | 30 | 31 |
| **Total open pit** | **1,234** | 309 | 27,657 | **3.53** | 5.29 | 1.33 | **140** | 53 | 1,184 |
| **Underground** | | | | | | | | | |
| Measured | **2,524** | 1,484 | 581 | **6.58** | 7.39 | 7.02 | **534** | 353 | 131 |
| Indicated | **16,398** | 8,254 | 5,532 | **5.26** | 6.51 | 7.84 | **2,772** | 1,727 | 1,394 |
| Inferred | **10,212** | 7,255 | 2,380 | **5.57** | 6.62 | 6.98 | **1,829** | 1,544 | 534 |
| **Total underground** | **29,133** | 16,993 | 8,493 | **5.48** | 6.63 | 7.54 | **5,135** | 3,623 | 2,060 |
| **Total stockpiles** | **21** | 96 | 50 | **6.16** | 6.5 | 6.47 | **4** | 20 | 10 |
| **Grand total** | **30,389** | 17,398 | 36,199 | **5.40** | 6.61 | 2.80 | **5,279** | 3,696 | 3,254 |

# 2.2 Australia region (continued)

## Granny Smith Gold Mine (continued)

*Mineral Resource classification per mining area*

| | Measured | | | Indicated | | | Inferred | | | Total Mineral Resource | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Area | Tonnes (kt) | Grade (g/t) | Gold (koz) | Tonnes (kt) | Grade (g/t) | Gold (koz) | Tonnes (kt) | Grade (g/t) | Gold (koz) | Tonnes (kt) | Grade (g/t) | Gold (koz) |
| **Open pit** | | | | | | | | | | | | |
| Granny Smith | – | – | – | – | – | – | 1,234 | 3.53 | 140 | 1,234 | 3.53 | 140 |
| **Total Open Pit** | **–** | **–** | **–** | **–** | **–** | **–** | **1,234** | **3.53** | **140** | **1,234** | **3.53** | **140** |
| **Underground** | | | | | | | | | | | | |
| Granny Smith | – | – | – | 5,590 | 2.57 | 461 | 951 | 2.39 | 73 | 6,541 | 2.54 | 534 |
| Wallaby | | | | | | | | | | | | |
| Zone 70 | 276 | 4.03 | 36 | 328 | 3.52 | 37 | 149 | 3.69 | 18 | 754 | 3.74 | 91 |
| Zone 80 | 718 | 5.45 | 126 | 627 | 4.67 | 94 | 79 | 3.82 | 10 | 1,424 | 5.02 | 230 |
| Zone 90 | 906 | 6.64 | 193 | 2,368 | 6.27 | 477 | 269 | 5.06 | 44 | 3,543 | 6.27 | 715 |
| Zone 100 | 515 | 9.84 | 163 | 5,199 | 6.52 | 1,089 | 2,485 | 5.76 | 460 | 8,199 | 6.5 | 1,712 |
| Zone 110-120 | – | – | – | 2,181 | 8.53 | 598 | 6,207 | 6.08 | 1,214 | 8,389 | 6.72 | 1,812 |
| Other | 109 | 4.49 | 16 | 104 | 4.3 | 14 | 71 | 4.61 | 11 | 284 | 4.45 | 41 |
| **Total Underground** | **2,524** | **6.58** | **534** | **16,398** | **5.26** | **2,772** | **10,212** | **5.57** | **1,829** | **29,133** | **5.48** | **5,135** |
| **Surface** | | | | | | | | | | | | |
| Surface stockpiles | 21 | 6.16 | 4 | – | – | – | – | – | – | 21 | 6.16 | 4 |
| **Grand Total** | **2,545** | **6.57** | **538** | **16,398** | **5.26** | **2,772** | **11,446** | **5.35** | **1,969** | **30,389** | **5.4** | **5,279** |

*Modifying factors*

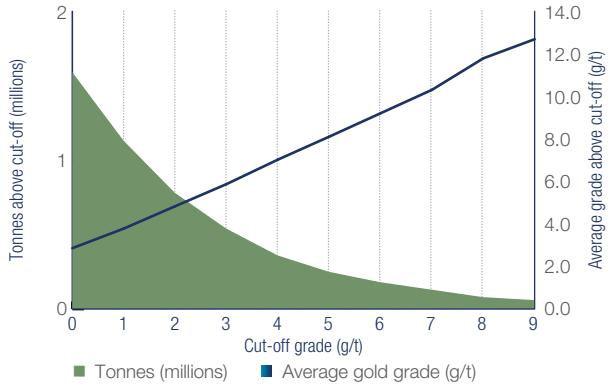
- The Measured and Indicated Mineral Resources are inclusive of Mineral Reserves
- Mineral Reserves are quoted in terms of RoM grades and tonnages as delivered to the metallurgical processing facility and are therefore fully diluted
- Mineral Reserve statement includes only Measured and Indicated Mineral Resources, modified to produce Mineral Reserves and contained within the LoM plan
- Mineral Resources and Mineral Reserves undergo regular internal and/or external audits, and any issues identified are rectified at the earliest opportunity - usually during the current reporting cycle

| | | December | | |
|---|---|---|---|---|
| | Units | **2015** | 2014 | 2013 |
| **Mineral Resource parameters** | | | | |
| Mineral Resource gold price | US$/oz | **1,500** | 1,500 | 1,500 |
| | US$/A$ | **0.86** | 0.95 | 1.05 |
| | A$/oz | **1,750** | 1,570 | 1,429 |
| Cut-off for open pit | g/t | **0.82** | 1.04 | 0.48 – 0.50 |
| Cut-off for underground | g/t | **1.70 – 2.84** | 3.06 – 3.53 | 3.44 – 3.92 |
| **Mineral Reserve parameters** | | | | |
| | US$/oz | **1,300** | 1,300 | 1,350 |
| Mineral Reserve gold price | US$/A$ | **0.84** | 0.95 | 1.00 |
| | A$/oz | **1,550** | 1,370 | 1,350 |
| Cut-off for underground | g/t | **2.55 – 3.21** | 3.50 – 3.81 | 3.63 – 4.11 |
| Mining recovery factor (underground) | % | **91** | 91 | 80 - 95 |
| MCF | % | **100** | 100 | 100 |
| Dilution underground | % | **10** | 10 | 2 – 10 |
| Plant recovery factor | % | **92** | 92 | 88.9 |
| Processing capacity | Mtpa | **3.5** | 3.5 | 3.5 |

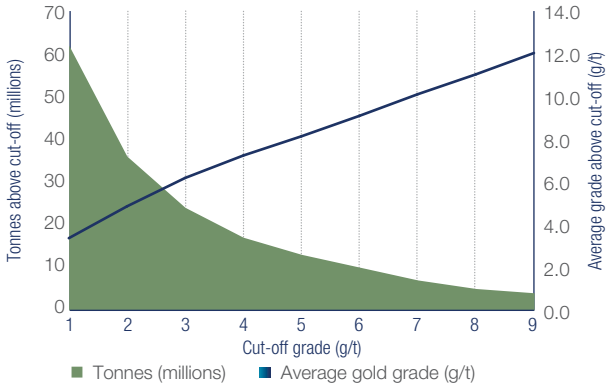
*Grade tonnage curves*

The grade tonnage curves for the underground and open pit Mineral Resource is presented below.

**Grade tonnage curve – Surface**




**Grade tonnage curve – Underground**




## Mineral Reserves

The Mineral Reserve estimate for Granny Smith is based on a detailed and engineered LoM plan. All design and scheduling work is undertaken by experienced engineers using appropriate mine planning software. The planning process incorporates realistic modifying factors and the use of appropriate cut-off grades, geotechnical criteria, mining fleet productivities and other techno-economic investigations.

The current operational plan encompasses mining in four zones (Z70, Z80, Z90 and Z100) at Wallaby underground.

The Mineral Reserves are derived from the LoM plan, which is supported by a detailed design and schedule that takes account of cut-off grades, prevailing geotechnical factors directing optimal sequencing and incorporates appropriate modifying factors. Capital requirements are accommodated in the cash flow model to ensure sustainable operations over the LoM.

*Mineral Reserve classification*

| | Tonnes (kt) | | | Grade (g/t) | | | Gold (koz) | | |
|---|---|---|---|---|---|---|---|---|---|
| **Classification** | **Dec 15** | Dec 14 | Dec 13 | **Dec 15** | Dec 14 | Dec 13 | **Dec 15** | Dec 14 | Dec 13 |
| **Underground** | | | | | | | | | |
| Proved | **758** | 673 | 257 | **6.90** | 7.10 | 5.49 | **168** | 154 | 45 |
| Probable | **6,173** | 3,734 | 3,809 | **5.73** | 5.81 | 6.39 | **1,137** | 698 | 783 |
| **Total underground** | **6,931** | 4,408 | 4,066 | **5.86** | 6.01 | 6.33 | **1,305** | 852 | 828 |
| **Surface** | | | | | | | | | |
| Proved | **21** | 96 | 50 | **6.16** | 6.50 | 6.47 | **4** | 20 | 10 |
| **Total surface** | **21** | 96 | 50 | **6.16** | 6.50 | 6.47 | **4** | 20 | 10 |
| **Grand total** | **6,952** | 4,503 | 4,116 | **5.86** | 6.02 | 6.34 | **1,310** | 872 | 838 |

# 2.2 Australia region (continued)

## Granny Smith Gold Mine (continued)

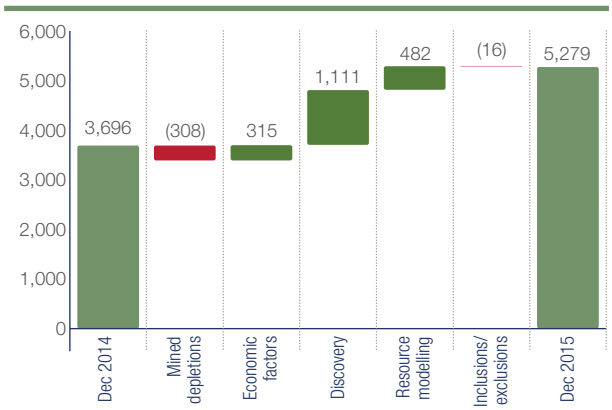
*Mineral Reserves classification per mining area*

| | Proved | | | Probable | | | Total Mineral Reserve | | |
|---|---|---|---|---|---|---|---|---|---|
| Area | Tonnes (kt) | Grade (g/t) | Gold (koz) | Tonnes (kt) | Grade (g/t) | Gold (koz) | Tonnes (kt) | Grade (g/t) | Gold (koz) |
| **Underground** | | | | | | | | | |
| Z80 | 52 | 5.42 | 9 | 180 | 4.63 | 27 | 232 | 4.81 | 36 |
| Z90 | 338 | 7.02 | 76 | 1,190 | 5.79 | 221 | 1,528 | 6.06 | 298 |
| Z100 | 324 | 7.40 | 77 | 2,993 | 5.34 | 513 | 3,318 | 5.54 | 591 |
| Z110 | 0 | 0 | 0 | 576 | 5.68 | 105 | 576 | 5.68 | 105 |
| Z120 | 0 | 0 | 0 | 1,180 | 6.96 | 264 | 1,180 | 6.96 | 264 |
| Other | 44 | 4.08 | 6 | 54 | 3.57 | 6 | 97 | 3.80 | 12 |
| **Total underground** | **758** | **6.91** | **168** | **6,173** | **5.73** | **1,137** | **6,931** | **5.86** | **1,305** |
| **Surface** | | | | | | | | | |
| Surface stockpiles | 21 | 6.16 | 4 | 0 | 0 | 0 | 21 | 6.16 | 4 |
| **Grand total** | **779** | **6.89** | **172** | **6,173** | **5.73** | **1,137** | **6,952** | **5.86** | **1,310** |

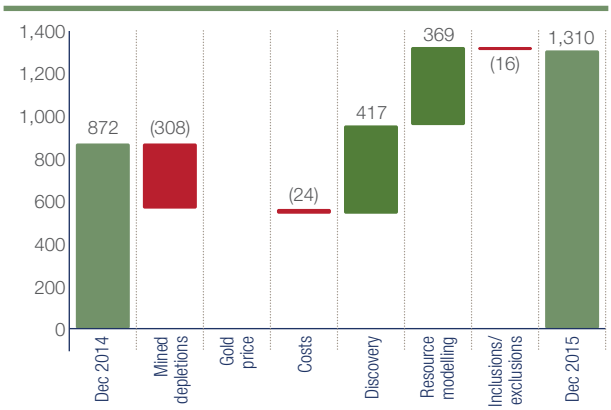
*Mineral Resource and Mineral Reserve reconciliation year-on-year*

| Factors that affected Mineral Resource reconciliation year-on-year | Factors that affected Mineral Reserve reconciliation year-on-year |
|---|---|
| Mining depletion of 308koz from Zones 70, 80, 90 and 100 in the Wallaby underground. | Mining depletion of 308koz from Zones 70, 80, 90 and 100 in the Wallaby underground. |
| Increase of 1,111koz to the Wallaby underground Mineral Resource from resource extension discoveries primarily in Zone 90, Zone 100 and Zone 110-120. | New Mineral Reserve additions at Zone 110/120 (369koz) from conversion of new Indicated Mineral Resources. |
| Increases of 342koz and 87koz to the Granny Smith underground and Goanna open pit projects and 52koz at the Wallaby underground through remodelling. | New Mineral Reserve additions to Zones 90 and 100 (417koz) from conversion of new Indicated Mineral Resources and resource extension discoveries. |
| Upgrade of 315koz of additional material to Mineral Resource due to lower cut-off grades at the Wallaby underground resulting from a higher planning gold price. | |

**Mineral Resource Reconciliation**
(Gold – koz)




**Mineral Reserve Reconciliation**
(Gold – koz)



## Mineral Reserve sensitivity

To illustrate the impact of fluctuations in gold price and exchange rates on the current declaration, Granny Smith has generated sensitivities with respect to Mineral Reserves. The following graph indicates the Managed Mineral Reserve sensitivity at -15% -10%, -5%, +5%, +10% and +15% to the base (A$1,550/oz) reserve gold price.

These sensitivities (other than for the base case) are not supported by detailed plans and depletion schedules. They should only be considered on an indicative basis; specifically as such sensitivities assume 100% selectivity, without any operating cost increases.

**Mineral Reserve sensitivity**
(Gold – Moz)


## Competent Persons

Internal technical reviews have been conducted by the Competent Persons as listed, who are full-time employees of Gold Fields Limited.

### *P Johansen*

*Mineral Resource Manager*

BSc (Hons) Geology AusIMM membership number 108674.

**Industry experience:** 28 years' experience in exploration and mining in Australia and Papua New Guinea (PNG). One year at Granny Smith. Commodities: gold, nickel, iron ore. He is responsible for the overall accuracy, standard and compliance of this declaration.

### *M Velezmoro*

*Senior Engineer: Mining*

BSc Mining. MAusIMM membership number 305685.

**Industry experience:** 18 years' experience in mining in Australia and Peru. Four years at Granny Smith. Commodities: gold, nickel, zinc, iron ore. He is responsible for the overall accuracy, standard and compliance of mine planning, schedules and Mineral Reserve estimation, LoM compilation and financial evaluation.

### *R Urie*

*Regional Mining Engineer*

BEng (Hons) Mining Engineering. MAusIMM membership number 111309.

**Industry experience:** 19 years' experience in mining in Australia. Three years in regional role. Commodities: gold, base metals, uranium. He is responsible for the overall accuracy, standard and compliance of mine planning, schedules and Mineral Reserve estimation, LoM compilation and financial evaluation.

### *R Tully*

*Superintendent: Resources*

BSc (Hons). MAusIMM membership number 992513, AIG membership number 2716.

**Industry experience:** 13 years' experience in mining and exploration in Australia and PNG. Nine years at Granny Smith. Commodities: gold, nickel and PGE. He is responsible for Mineral Resource estimation and reporting.

### *S Hackett*

*Principal Resource Geologist*

BSc Geology, MAusIMM membership number 211644.

**Industry experience:** 25 years' experience in exploration and mining in Australia and globally. Three years' experience with Granny Smith. Commodities: gold, nickel, iron ore. He is responsible for Mineral Resource estimation and reporting from a regional perspective.

# 2.2 Australia region (continued)

## St Ives Gold Mine

St Ives is a well-established operation comprising a mix of 'owner-mined', open pit and underground operations feeding the Lefroy CIL mill with a current capacity of 4.7Mtpa.

The tenement holdings are located in the highly prospective Norseman-Wiluna Greenstone Belt and encompass under-explored ground that has been recently acquired or is defined as new exploration space because of innovative new models for target generation. An intensified exploration programme continues to be a key anchor in replacing Mineral Reserves and growing operational flexibility going forward. The Invincible open pit, now a cornerstone of production at the mine, represented a major discovery in 2012 and in conjunction with the growing potential at Invincible underground, Invincible South and Incredible, has emphasised the high prospectivity of the Speedway corridor, which is prioritised in the 2016 exploration campaign.

## Asset fundamentals

| | |
|---|---|
| **General location** | The St Ives mining operations extend from five to 25 kilometres south-southwest of the town of Kambalda in Western Australia, approximately 630 kilometres east of Perth at latitude 31° 12' S and longitude 121° 40' E. The nearest major settlement is the town of Kalgoorlie situated 80 kilometres to the north. Well-established power grids, access roads and supporting infrastructure exist in the area. |
| **Licence status and holdings** | St Ives controls exploration and mineral rights over a total area of 119,784 hectares (total of granted tenements) and has security of tenure for all current exploration and mining leases that contribute to future Mineral Reserves. |
| **Operational infrastructure and mineral processing** | St Ives currently operates one underground mine, which is accessed via a decline, and three open pits, a centralised administrative office, an engineering workshop and a 4.7Mtpa CIP processing plant. |
| **Climate** | St Ives is situated in an area of arid bush land. While occasional storm activity may cause minor delays to open pit mining operations, the climatic conditions do not materially impact on the normal operations of the site. |
| **Deposit type** | Archaean orogenic greenstone gold hosted in a number of different styles of mineralisation. Lode, supergene and palaeoplacer-style deposits characterise the range of ore body types. |
| **LoM** | Ongoing extensional and brownfields exploration continues and could increase the LoM. It is estimated that the current known Mineral Reserves will be depleted in 2020 (five years). |
| **Environmental, health and safety** | The mine maintained OHSAS 18001 Occupational Health and Safety Management System certification and ISO 14001 Environmental Management System certification. St Ives was certified as fully compliant with the ICMC on 3 June 2009. Re-certification is underway. |

### Brief history

Gold was discovered at Kambalda Red Hill camp in 1897 and during the following 10 years, other gold-bearing locations, such as Victory, were discovered with an estimated total production of 31koz, mostly from the Red Hill group of mines.

Iron-nickel sulphides were discovered near the old Red Hill mine. Western Mining Corporation (WMC) acquired ground and developed a mining and milling operation. From 1966 to 1996, the region produced approximately 34.0Mt of ore at an average grade of 3.1% nickel.

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) located at the Kambalda Nickel Concentrator site. In 1988, a new 3.1Mtpa CIL facility was constructed 25 kilometres south of Kambalda at St Ives.

During 2001, a 2.0Mtpa heap leach facility was commissioned during the period when Gold Fields Limited acquired St Ives. In 2004, the 4.8Mtpa Lefroy mill was constructed and fully commissioned in early 2005.

An aggressive exploration programme was started in 2006, with full field air core drilling, and in 2007, the Cave Rocks and Belleisle underground mines were established. Initiation of the consolidated Leviathan open pit area commenced in 2008.

The Athena-Hamlet deposit was discovered in 2009. This was followed by continued discovery and growth of the Hamlet deposit and commencement of the Athena mine with the first ore intersected in May 2010. Athena reached commercial levels of production in September 2011. Hamlet development intersected first ore in October 2011 as part of a new mine development programme.

During 2012, stoping commenced at Hamlet and Cave Rocks LoM was extended, as well as an early-stage discovery of a new camp (Invincible deposit). In addition, conversion to open pit, owner mining was completed and heap leach processing stopped.

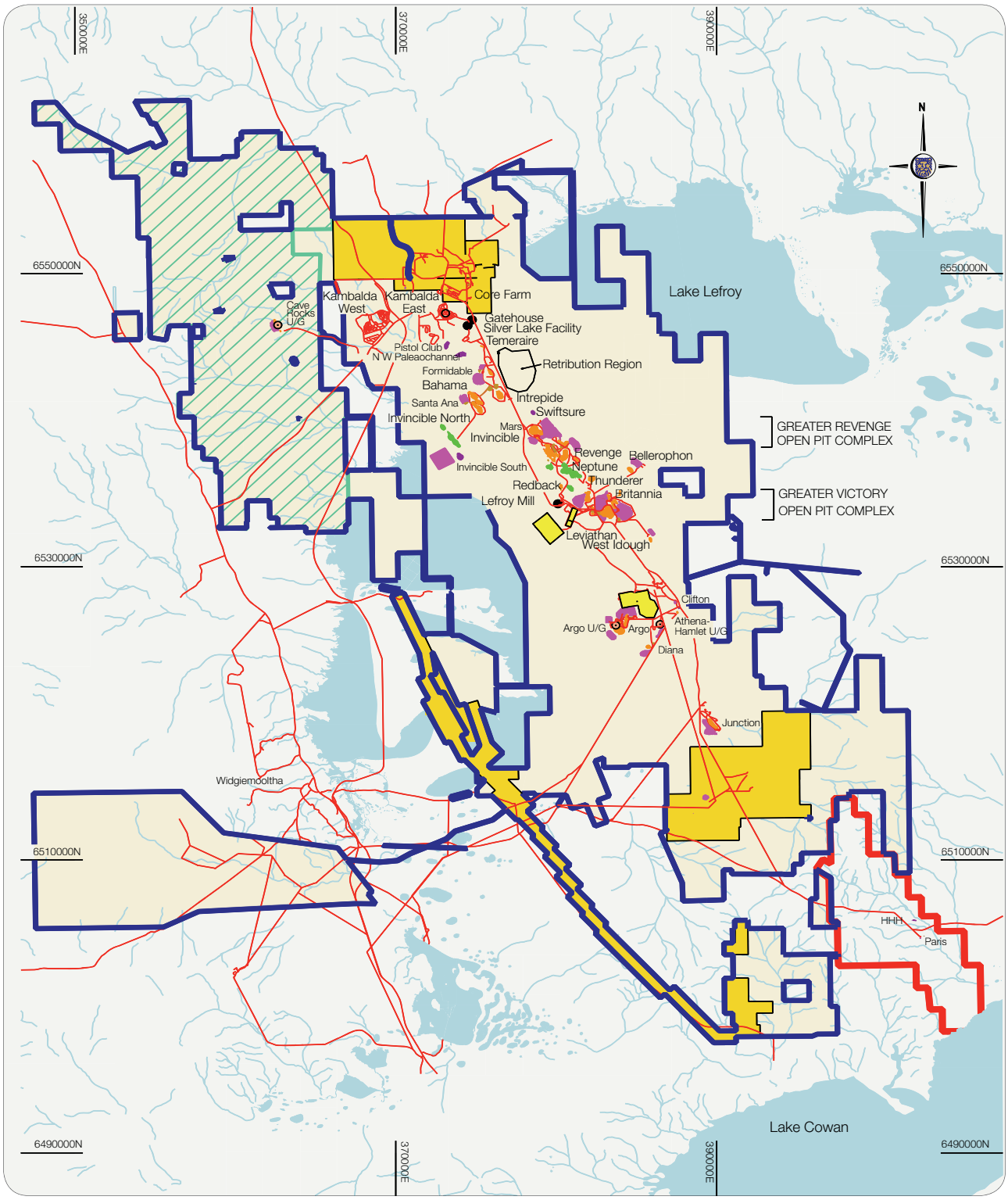
The ongoing exploration strategy delivered the Invincible deposit in 2013, with current Mineral Resources in excess of 0.97Moz and an open pit and underground Mineral Reserve of 540koz and 165koz respectively. First production was achieved at Invincible in Q1 2015. Depth and lateral extensions at Invincible were identified and, along with the newly discovered Invincible South underground deposit, will be actively explored as part of the 2016 exploration programme.

# 2.2 Australia region (continued)

## St Ives Gold Mine (continued)

### Key developments

- Establishment and ongoing production from the Invincible open pit initiated in Q1 2015
- Discovery of Invincible South underground resource. Current total Mineral Resource for Invincible South of 312koz, which is open down plunge
- Exploration of early stage targets along the highly prospective Invincible (Speedway) trend and Eastern Causeway are providing encouraging results
- Neptune open pit, stage 1 stockpiles processed with positive gold reconciliation. Development of Stage 2 Neptune commenced in 2015 with production in 2016
- Invincible underground exploration and down dip growth continued in 2015
- Definition and drill testing of the extensive palaeochannel network across tenements initiated for shallow, high-grade placer deposits
- Athena is near completion and mining of final stopes is scheduled in early 2016
- Cave Rocks mine placed on care and maintenance in Q2 2015
- Approval for in-pit tailing disposal at Leviathan granted in 2015
- Ongoing evaluation and elimination of marginal Mineral Resources and Mineral Reserves contributed to improved quality but lower tonnages primarily at Greater Santa Ana, Swiftsure and Cave Rocks




## Reference

| | | | |
|---|---|---|---|
| U/G Mines | | Stockpiles | |
| Towns | | Tailings/Leach Pad | |
| Buildings | | Waste Dump | |
| Gold Rights only | | Open Pits Inactive | |
| Lease Outline | | Open Pits Active | |
| Kambalda West Lease Outline | | Open Pits Proposed | |
| Paris Sale Lease Outline | | Roads | |

**Gold Fields Limited**
**St Ives Gold Mine**

PLAN SHOWING MINE INFRASTRUCTURE AS AT 31 DECEMBER 2015

0 2 4 6 8 10
Kilometres

Co-ordinate System: Map Grid of Australia Zone 51
(Geodetic Datum of Australia 1994)

# 2.2 Australia region (continued)

## St Ives Gold Mine (continued)

### Operating statistics

| | | Historic performance | | | |
|---|---|---|---|---|---|
| | Units | **C2015** | C2014 | C2013 | C2012 |
| **Open pit mining** | | | | | |
| Total mined | kt | **22,832** | 16,758 | 13,834 | 16,518 |
| – Waste mined | kt | **21,007** | 15,130 | 11,175 | 12,356 |
| – Ore mined | kt | **1,825** | 1,628 | 2,659 | 4,162 |
| Mined grade | g/t | **2.7** | 2.16 | 1.3 | 1.5 |
| Strip ratio (waste/tonne ore) | waste | **11.5** | 9.29 | 4.2 | 3.5 |
| **Underground mining** | | | | | |
| Underground mined | kt | **1,586** | 2,759 | 3,231 | 2,528 |
| – Waste mined | kt | **378** | 683 | 851 | 903 |
| – Ore mined | kt | **1,208** | 2,077 | 2,380 | 1,626 |
| Mined grade | g/t | **4.7** | 4.0 | 4.2 | 5.1 |
| **Processing** | | | | | |
| Total plant treatment | | | | | |
| CIL tonnes treated | kt | **3,867** | 4,553 | 4,763 | 7,038 |
| Head grade | g/t | **3.17** | 2.61 | 2.8 | 2.2 |
| Yield | g/t | **2.95** | 2.42 | 2.6 | 2.0 |
| CIL Plant recovery factor | % | **94.6** | 93.8 | 96.0 | 89.0 |
| Gold production ex CIL Plant | koz | **367** | 354 | 403 | 416 |
| Tonnes to heap leach | kt | **0** | 0 | 0 | 2,287 |
| – Yield ex–heap leach | koz | **4** | 8 | 12 | 27 |
| | g/t | **n/a** | n/a | n/a | 0.4 |
| Total gold production (CIL & HL) | koz | **372** | 362 | 403 | 443 |
| **Financials** | | | | | |
| Average Au price received | US$/oz | **1,161** | 1,266 | 1,413 | 1,668 |
| | A$/oz | **1,548** | 1,407 | 1,372 | 1,720 |
| Exchange rate (annual average) | US$/A$ | **0.75** | 0.90 | 1.03 | 0.97 |
| Operating cost | A$/oz | **697** | 895 | 887 | 884 |
| Capital expenditure | A$/oz | **409** | 360 | 339 | 669 |
| All–in sustaining cost (AISC) | A$/oz | **1,287** | 1,289 | 1,262 | 1,593 |
| **Life-of-Mine** | | | | | |
| Mineral Reserves | Mt | **17.6** | 17.8 | 20.7 | 25.8 |
| Mineral Reserves head grade | g/t | **2.72** | 3.14 | 3.00 | 2.64 |
| Mineral Reserves | Moz | **1.54** | 1.80 | 2.02 | 2.19 |

*Rounding off of figures presented in this report may result in minor computational discrepancies. Where this occurs, it is not deemed significant.*

## Local geology

St Ives lies within the Kambalda domain, a subset of the Norseman-Wiluna Belt. The Kambalda domain is bound by the north-north west trending Boulder-Lefroy fault (BLF) and Zuleika shear. The region has undergone four compressional events predated by early extension and has been metamorphosed to upper greenschist or lower amphibolite facies.

The main structural feature of the St Ives area is the gently south-plunging Kambalda anticline, which extends 35 kilometres from the south end of the Kambalda dome to the Junction Mine. The majority of known gold deposits are proximal to the trace of the anticlinal axis. A major second order structure known as the Playa shear splays off the BLF shear zone and can be traced through the St Ives field for a distance in excess of 10km.

There are several styles of gold mineralisation at St Ives. The individual deposits may contain more than one of these styles:

- Lode mineralisation: Archaean lode mineralisation typically consisting of 0.5 to 20 metre-wide mesothermal vein complexes that may also have hydraulic breccia's and/or mylonites, indicating movement on a shear
- Supergene mineralisation: Broad zones of flat-lying gold mineralisation in weathered Archaean and overlying tertiary sediments
- Palaeoplacer mineralisation: Placer deposits hosted by palaeochannels in the unconsolidated tertiary sediments that overlie the Archaean basement

## Exploration and resource definition drilling

St Ives continuously explores the 108,588 hectares of tenement holding to discover new Mineral Resources. Exploration is split between two teams, the first of which is tasked with target generation and the discovery of new deposits, while the second focuses on developing known resource positions. These teams are supported by in-house geophysics, regional and corporate technical teams, along with an established Mineral Resources team responsible for QA/QC, data management and Mineral Resource modelling.

St Ives maintains rigorous QA/QC protocols on all its exploration programmes. It draws on industry leading practice for data acquisition and utilises accredited laboratories, which are regularly reviewed both internally and externally. Analytical QA/QC is maintained and monitored through the submission of blanks, certified reference material and duplicates, plus umpire laboratory checks.

In 2015, exploration focused on project generation, advancing prospective targets or retiring projects that failed to meet milestone hurdle criteria. Development of a good geological understanding of the Speedway corridor and Eastern Causeway areas continued with ongoing stratigraphic and structural drilling. The Speedway trend is a 20km plus prospective belt where exploration success was achieved in 2015 at the Invincible South and Incredible prospects. A number of high potential targets are still to be tested in 2016.

Significant mineralisation has been identified at the Retribution project, Eastern Causeway, which will be followed up in 2016. The Kambalda West and South West Dome areas are under-explored to date with continued exploration drilling planned for 2016. Confirmation of the continuity of palaeochannel mineralisation up and down stream away from known hard rock mineralised centres, as well as assessment of suitable mining methods will continue in 2016.

## Mining

Conventional drill and blast with truck and shovel mining techniques are employed at all open pits. Grade control is generally expedited by inclined reverse circulation (RC) drilling on grids determined by the ore body characteristics. Certain open pit projects that include 10 metres to 40 metres of unconsolidated sedimentary overburden do not initially require drilling and blasting. In such projects, hard rock is imported for sheeting to facilitate the access of equipment during mining, and/or dewatering of the sedimentary overburden prior to mining.

Load-and-haul is carried out by 90 to 180 tonne dump trucks and 150 to 350 tonne excavators in backhoe and/or face shovel configuration. Mining benches vary from 5 metres to 10 metres, and are excavated in passes (flitches) of about 2.5 metres to 3 metres per flitch. Gold mineralisation is mined selectively to cut-off grades, and segregated into grade ranges to balance the ore production and processing capacities on-site and to maximise cash flow from operations.

Underground mines at St Ives are commonly extensions of open pit mines. Underground operations are characterised by common features, which allow a high level of standardisation in operating strategy, mine design, stoping methods, mining equipment and utilisation. Mines are accessed via declines, with additional raises for return airways and ladder-ways used as a second means of egress. Drives are developed to access the ore and future stoping production areas.

Underground mining at St Ives is predominantly mechanised and conducted by long-hole open stoping (LHoS), with subordinate cut-and-fill and room-and-pillar stoping for the shallower dipping ore bodies. Paste fill and LHoS is used where mandated by geotechnical factors. Electric-hydraulic drilling jumbos and rubber-tyred diesel-powered LHDs are used for development and stoping, while trucks are used for load-and-haul operations. Ore from both open pit and underground operations is transported with road trains from individual mining operations to the central St Ives processing facilities.

# 2.2 Australia region (continued)

## St Ives Gold Mine (continued)

### Mine planning and scheduling

Cut-off grades are used to define potentially economic underground mining panels, taking into consideration direct mining and processing costs, group set commodity prices and other parameters. The economic viability of future mining panels is tested by determining whether the margin, after applying the appropriate cut-off grade, is sufficient to cover the required capital development and mining costs.

Open pit optimisation software, in conjunction with economic parameters and physical constraints is used to generate a series of nested pits for open pit mining. An optimal shell is then selected and a detailed design used to confirm the mineability.

Underground mining methods are largely determined by the geometry of the mineralised zones and evaluation may involve review of more than one method. Sophisticated proprietary software is used for mine design and scheduling.

Mine planning is based on three-dimensional block models of in situ mineralisation, with allowances made for minimum mining widths, dilution and ore loss in line with the mining method being considered.

Infrastructure, waste disposal and ore stockpile management requirements are incorporated into the planning process. Ore stockpile management at St Ives strives to optimise the metallurgical blend requirements of the Lefroy Mill, with regard to material types and grade management. This in turn helps to maximise cash flow from the operations.

### On-mine projects

The current major mine project at St Ives is at the new Invincible open pit mine, which achieved first ore production in 2015. Establishing site infrastructure commenced in late 2014. Additionally, development of Neptune Stage 2 pit and the A5 pit commenced in Q4 2015, utilising a contract mining fleet, and will continue in 2016.

The discovery and opportunity provided by the new Invincible open pit and associated exploration upside is a major contributor to the future of St Ives. Amendments to existing lake based mining permits, as well as technical and feasibility studies were all completed, which enabled the mine to commence production in early 2015. The Invincible underground potential will be assessed further in 2016 as new drilling, which will be conducted below the designed open pit to test for mineralised shoot extensions and geotechnical information, is completed.

An Unmanned Aerial Vehicle (UAV or drone) is used at St Ives to create a digital point cloud of the area flown. All open pit activity, Mine Ore Pads and the RoM pads are picked up on a weekly and monthly basis for reporting and re-calibration purposes. The system uses a GPS controlled guidance system to fly a pre-mapped area that targets the zone of interest.

The system is used to pick up the complete open pit workings, which directs comparisons of week-by-week pit shells. The imagery is then used for reporting, planning and production of the mine, as well as being used for information sessions and presentations.

## Mineral Resources and Mineral Reserves

Geology and evaluation models have been updated to reflect the latest available data sets. An integrated mine design and schedule is based on current performance levels and takes cognisance of any inherent risks associated with mining operations at St Ives.

The Mineral Resources are classified as Measured, Indicated and Inferred as defined in the SAMREC Code. Increasing levels of geoscientific knowledge and confidence are based on geological understanding, grade variance, drill hole/sample spacing, mining development (amount of exposed and mapped mineralisation) and mining history. The economic evaluation is based on the Group planning gold price, taking into account estimates of all costs, the impact of modifying factors such as mining dilution and metal/ore recovery, processing recovery and royalties. All Mineral Resources and Mineral Reserves reported are 100% attributable to St Ives.

### Mineral Resources

The Mineral Resources and Mineral Reserves have been updated using the current Gold Fields planning gold price of A$1,750/oz and A$1,550/oz respectively and reported in accordance with the SAMREC Code. The surface sources include stockpiles that are supported by adequate sampling, and are thus classified as Measured Mineral Resources.

*Mineral Resource classification*

| | Tonnes (kt) | | | Grade (g/t) | | | Gold (koz) | | |
|---|---|---|---|---|---|---|---|---|---|
| **Classification** | **Dec 15** | Dec 14 | Dec 13 | **Dec 15** | Dec 14 | Dec 13 | **Dec 15** | Dec 14 | Dec 13 |
| **Open pit and underground** | | | | | | | | | |
| Measured | **1,268** | 1,475 | 1,750 | **4.59** | 5.53 | 4.93 | **187** | 262 | 277 |
| Indicated | **17,905** | 17,496 | 20,511 | **3.41** | 3.98 | 3.87 | **1,961** | 2,238 | 2,551 |
| Inferred | **6,981** | 6,617 | 10,899 | **4.06** | 4.05 | 3.86 | **912** | 861 | 1,351 |
| **Total open pit and underground** | **26,155** | 25,587 | 33,150 | **3.64** | 4.09 | 3.92 | **3,061** | 3,361 | 4,179 |
| **Surface** | | | | | | | | | |
| Measured stockpiles | **2,967** | 4,498 | 5,294 | **0.85** | 1.02 | 0.94 | **81** | 147 | 160 |
| **Total surface** | **2,967** | 4,498 | 5,294 | **0.85** | 1.02 | 0.94 | **81** | 147 | 160 |
| **Grand total** | **29,122** | 30,085 | 38,444 | **3.35** | 3.63 | 3.51 | **3,141** | 3,508 | 4,340 |

# 2.2 Australia region (continued)

## St Ives Gold Mine (continued)

*Mineral Resource classification per mining area*

| | Measured | | | Indicated | | | Inferred | | | Total Mineral Resource | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Area | Tonnes (kt) | Grade (g/t) | Gold (koz) | Tonnes (kt) | Grade (g/t) | Gold (koz) | Tonnes (kt) | Grade (g/t) | Gold (koz) | Tonnes (kt) | Grade (g/t) | Gold (koz) |
| **Open pit** | | | | | | | | | | | | |
| Apollo | 11 | 2.04 | 1 | 300 | 3.15 | 30 | 188 | 2.41 | 15 | 498 | 2.85 | 46 |
| Incredible | – | – | – | 2,117 | 1.19 | 81 | 206 | 1.34 | 9 | 2,323 | 1.2 | 90 |
| Invincible Pit | 413 | 3.05 | 41 | 4,419 | 4.64 | 659 | 723 | 2.81 | 65 | 5,555 | 4.28 | 765 |
| Invincible South | – | – | – | – | – | – | 163 | 7.36 | 39 | 163 | 7.36 | 39 |
| Neptune | 116 | 1.92 | 7 | 4,635 | 3.42 | 509 | 825 | 2.61 | 69 | 5,576 | 3.27 | 586 |
| NW Palaeochannel | – | – | – | 212 | 5.41 | 37 | – | – | – | 212 | 5.41 | 37 |
| Santa Ana | – | – | – | 1,862 | 1.74 | 104 | 174 | 1.4 | 8 | 2,036 | 1.71 | 112 |
| Yorick | – | – | – | – | – | – | 399 | 3.53 | 45 | 399 | 3.53 | 45 |
| Other | 5 | 2.54 | – | 1,601 | 3.18 | 163 | 516 | 3.14 | 52 | 2,122 | 3.16 | 216 |
| **Total open pit** | **544** | **2.79** | **49** | **15,146** | **3.25** | **1,584** | **3,194** | **2.94** | **302** | **18,885** | **3.19** | **1,935** |
| **Underground** | | | | | | | | | | | | |
| Argo | 150 | 4.57 | 22 | 657 | 4.24 | 89 | 409 | 3.43 | 45 | 1,216 | 4.01 | 157 |
| Hamlet | 448 | 6.78 | 98 | 1,117 | 4.25 | 153 | 913 | 4.01 | 118 | 2,479 | 4.62 | 368 |
| Invincible UG | – | – | – | 914 | 4.28 | 126 | 1,208 | 4.44 | 172 | 2,122 | 4.37 | 298 |
| Invincible South | – | – | – | – | – | – | 1,236 | 6.89 | 274 | 1,236 | 6.89 | 274 |
| Other | 126 | 4.6 | 19 | 71 | 3.86 | 9 | 21 | 2.51 | 2 | 218 | 4.16 | 29 |
| **Total underground** | **724** | **5.95** | **138** | **2,759** | **4.25** | **377** | **3,787** | **5.01** | **610** | **7,270** | **4.82** | **1,126** |
| **Surface** | | | | | | | | | | | | |
| Surface stockpiles | 2,967 | 0.85 | 81 | – | – | – | – | – | – | 2,967 | 0.85 | 81 |
| **Grand total** | **4,235** | **1.97** | **268** | **17,905** | **3.41** | **1,961** | **6,981** | **4.06** | **912** | **29,122** | **3.35** | **3,141** |

*Modifying factors*

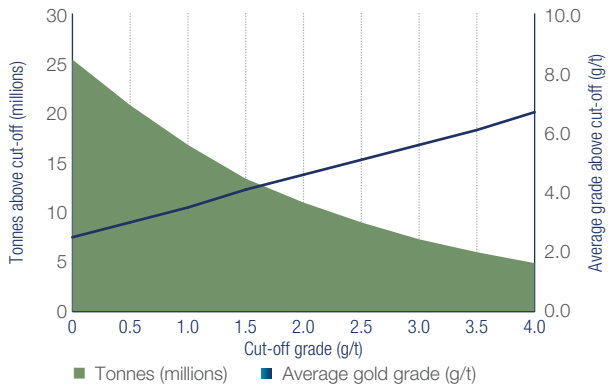
- All Mineral Reserves are quoted in terms of RoM grades and tonnages, as delivered to the metallurgical processing facilities, and are therefore fully diluted
- The Mineral Reserve Statements include only Measured and Indicated Mineral Resources, modified to produce Mineral Reserves that are contained in the LoM plan
- Mineral Resources and Mineral Reserves undergo regular internal and/or external audits, and any issues identified are rectified at the earliest opportunity – usually during current reporting cycle
- The Measured and Indicated Mineral Resources are inclusive of Mineral Reserves

| | | December | | |
|---|---|---|---|---|
| | Units | **2015** | 2014 | 2013 |
| **Mineral Resource parameters** | | | | |
| Mineral Resource gold price | US$/oz | **1,500** | 1,500 | 1,500 |
| | A$/oz | **1,750** | 1,570 | 1,570 |
| Cut-off for oxide ore | g/t | **0.55 – 1.06** | 0.99 – 1.02 | 0.95 – 1.00 |
| Cut-off for fresh ore | g/t | **0.55 – 3.5** | 0.99 – 2.8 | 0.95 – 2.9 |
| Cut-off for mill feed | g/t | **0.55 – 1.06** | 1.00 | 0.95 |
| Cut-off for open pit | g/t | **0.55 – 1.06** | 1.00 | 0.95 |
| Cut-off for underground | g/t | **2.4 – 3.5** | 2.4 – 2.8 | 2.3 – 2.9 |
| **Mineral Reserve parameters** | | | | |
| Mineral Reserve gold price | US$/oz | **1,300** | 1,300 | 1,300 |
| | A$/oz | **1,550** | 1,370 | 1,370 |
| Cut-off for oxide ore | g/t | **0.55 – 0.95** | 0.95 | 0.90 |
| Cut-off for fresh ore | g/t | **0.55 – 3.0** | 0.95 – 3.1 | 0.90 – 2.9 |
| Cut-off for mill feed underground | g/t | **2.3 – 3.0** | 2.7 – 3.1 | 2.6 – 3.0 |
| Cut-off for mill feed open pit | g/t | **0.55 – 0.95** | 0.95 | 0.90 |
| Mining recovery factor (underground) | % | **90 – 95** | 85 – 95 | 85 – 95 |
| Mining recovery factor (open pit) | % | **95 – 98** | 80 – 95 | 80 – 95 |
| Strip ratio (waste:ore) | ratio | **9.3** | 9.3 | 4.2 |
| MCF | % | **100** | 98 | 98 |
| Dilution open pit | % | **20 – 40** | 20 | 20 |
| Dilution underground | % | **5 – 40** | 5 – 40 | 5 – 40 |
| Plant recovery factor | % | **79 – 94** | 86 – 94 | 86 – 94 |
| Processing capacity | Mtpa | **4.7** | 4.7 | 4.8 |

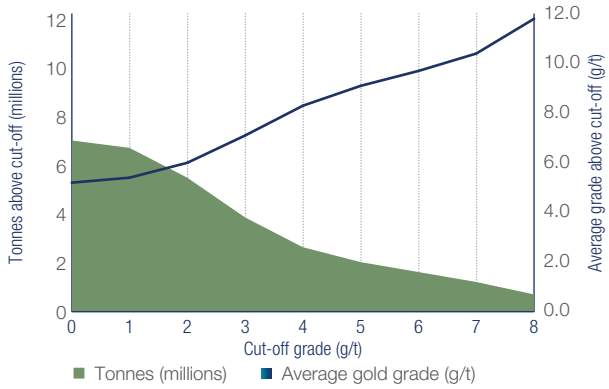
*Grade tonnage curves*

Grade tonnage curves for the underground and open pit Mineral Resource.

**Grade tonnage curve – Surface**




**Grade tonnage curve – Underground**



# 2.2 Australia region (continued)

## St Ives Gold Mine (continued)

### Mineral Reserves

Reported Mineral Reserves at St Ives reduced nominally, post mining depletion, to 1.5Moz since December 2014. The dominant contributors to Mineral Reserves are the Invincible, Hamlet and Neptune mines.

The elevated levels of investment in exploration in 2015 are planned to be repeated in 2016 with the expectation of advancing highly ranked projects through development stage gates to deliver the new generation of mines at St Ives to replace the current mining centres. The uncertainty around the timing of discoveries and inherent lead times to bring a new mine into production are characteristic of orogenic style operations. However, where endowment potential is strong with prospective ground as yet largely untested investment in exploration is justified.

The Mineral Reserves are derived from the LoM plan, which is supported by a detailed design and schedule that takes account of cut-off grades, mining fleet productivities, prevailing geotechnical factors directing optimal sequencing and incorporates appropriate modifying factors. Surface sources include stockpiles. Capital requirements are accommodated in the cash flow model to ensure sustainable operations over the LoM.

*Mineral Reserve classification*

| | Tonnes (kt) | | | Grade (g/t) | | | Gold (koz) | | |
|---|---|---|---|---|---|---|---|---|---|
| **Classification** | **Dec 15** | Dec 14 | Dec 13 | **Dec 15** | Dec 14 | Dec 13 | **Dec 15** | Dec 14 | Dec 13 |
| **Open pit and underground** | | | | | | | | | |
| Proved | **1,067** | 1,081 | 1,202 | **3.45** | 4.76 | 4.70 | **118** | 166 | 181 |
| Probable | **13,570** | 12,264 | 14,203 | **3.08** | 3.78 | 3.68 | **1,343** | 1,490 | 1,681 |
| **Total open pit and underground** | **14,636** | 13,346 | 15,405 | **3.11** | 3.86 | 3.76 | **1,461** | 1,655 | 1,863 |
| **Surface** | | | | | | | | | |
| Proved | **2,967** | 4,498 | 5,294 | **0.85** | 1.02 | 0.94 | **81** | 147 | 160 |
| **Total surface** | **2,967** | 4,498 | 5,294 | **0.85** | 1.02 | 0.94 | **81** | 147 | 160 |
| **Grand total** | **17,604** | 17,844 | 20,699 | **2.72** | 3.14 | 3.03 | **1,542** | 1,803 | 2,022 |

At Hamlet, infill drilling and remodelling has seen a decrease in tonnes and grade from the 8680 to 8600 levels, in addition to higher grade material depleted by mining in 2015. The Invincible underground reserves reflect the inclusion of some lower grade material in the south principally due to the decline passing through these levels to access the main part of the ore body.

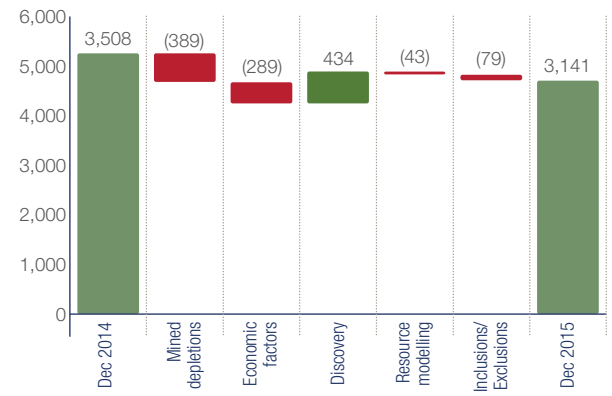
*Mineral Reserve classification per mining area*

| | Proved | | | Probable | | | Total Mineral Reserve | | |
|---|---|---|---|---|---|---|---|---|---|
| | Tonnes (kt) | Grade (g/t) | Gold (koz) | Tonnes (kt) | Grade (g/t) | Gold (koz) | Tonnes (kt) | Grade (g/t) | Gold (koz) |
| **Open pit** | | | | | | | | | |
| A5 | – | – | – | 353 | 1.76 | 20 | 353 | 1.76 | 20 |
| Invincible Pit | 540 | 2.26 | 39 | 4,926 | 3.17 | 501 | 5,466 | 3.08 | 540 |
| Neptune | 129 | 1.41 | 6 | 4,705 | 2.59 | 392 | 4,835 | 2.56 | 398 |
| NW Palaeochannel | – | – | – | 233 | 4.55 | 34 | 233 | 4.55 | 34 |
| Santa Ana | – | – | – | 756 | 2.34 | 57 | 756 | 2.34 | 57 |
| Swiftsure | – | – | – | 140 | 4.77 | 21 | 140 | 4.77 | 21 |
| Other | 5 | | – | 552 | | 57 | 556 | 3.2 | 57 |
| **Total open pit** | **673** | **2.1** | **45** | **11,665** | **2.89** | **1,083** | **12,339** | **2.84** | **1,128** |
| **Underground** | | | | | | | | | |
| Hamlet | 280 | 6.61 | 59 | 757 | 3.74 | 91 | 1,037 | 4.51 | 150 |
| Invincible UG | – | – | – | 1,098 | 4.67 | 165 | 1,098 | 4.67 | 165 |
| Other | 114 | | 14 | 49 | | 4 | 163 | | 18 |
| **Total underground** | **393** | **5.78** | **73** | **1,904** | **4.25** | **260** | **2,298** | **4.51** | **333** |
| **Surface** | | | | | | | | | |
| Surface stockpiles | 2,967 | 0.85 | 81 | – | – | – | 2,967 | 0.85 | 81 |
| **Grand Total** | **4,034** | **1.54** | **199** | **13,570** | **3.08** | **1,343** | **17,604** | **2.72** | **1,542** |

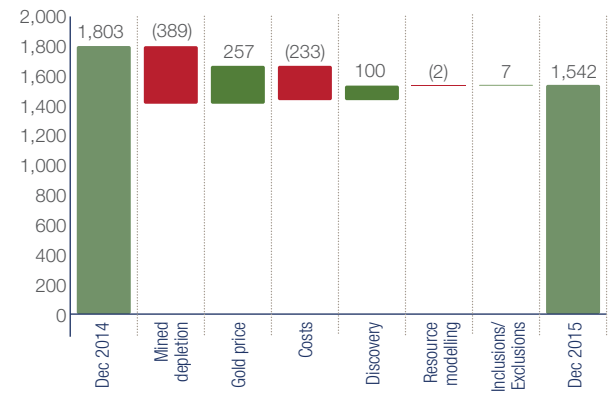
*Mineral Resource and Mineral Reserve reconciliation year-on-year*

| Factors that affected Mineral Resource reconciliation year-on-year | Factors that affected Mineral Reserve reconciliation year-on-year |
|---|---|
| Increased operating costs negated the higher gold price. | Increased operating costs negated the higher gold price. Greater resolution on mining cost assumptions following further review. |
| Discovery at Invincible South, Invincible UG, Incredible, Neptune and NW Palaeochannel. | Discovery at Neptune, NW Palaeochannel and Invincible pit. |
| Mining depletion. | Mining depletion. |

**Mineral Resource Reconciliation**
(Gold – koz)




**Mineral Reserve Reconciliation**
(Gold – koz)



# 2.2 Australia region (continued)

## St Ives Gold Mine (continued)

### Mineral Reserve sensitivity

To illustrate the impact of fluctuations in gold price and exchange rates on the current declaration, St Ives has generated sensitivities with respect to Mineral Reserves. The following graph indicates the Managed Mineral Reserve sensitivity at -15%, -10%, -5%, base (A$1,550/oz), +5%, +10% and +15% to the gold price.

These sensitivities (other than for the base case) are not supported by detailed plans and depletion schedules. They should only be considered on an indicative basis, specifically as such sensitivities assume 100% selectivity, without any operating cost increases.

**Mineral Reserve sensitivity**
(Gold – Moz)


### Competent Persons

Internal technical reviews have been conducted on the St Ives asset by the Competent Persons as listed, who are full-time employees of Gold Fields Limited.

***G Sparks***

*Manager Mineral Resources*

BapplSc, MSc. MAusIMM membership number 108663, GSA membership number 5823.

**Industry experience:** He has 30 years' experience in exploration and mining in Australia. One year at St Ives. Commodities: gold, copper, silver, lead, zinc. He is responsible for the overall accuracy, standard and compliance of this declaration.

***J Woodcock***

*Exploration Manager*

MSc in Geology, MAusIMM (305446).

**Industry experience:** He has 14 years' experience in the mining industry (four years at St Ives) and is responsible for all surface exploration and Mineral Resource development drilling with oversight of exploration geology models.

***L Smuts***

*Resources Manager*

BSc (Hons), Pr Sci Nat (400083/03), PG California (8215).

**Industry experience:** He has 18 years' mining industry experience (three years at St Ives), and is responsible for the oversight and development of technical standards/ auditing and validation for the site-wide Mineral Resource estimation processes and models.

***L Grimbeek***

*Mine Geology Manager*

BSc (Hons), Pr Sci Nat (400086/92).

**Industry experience:** He has 28 years' experience in the mining industry (three years at St Ives) and is responsible for the mine geology processes, exploration and short- to medium-term Mineral Resource development function.

***F Philips***

*Technical Manager*

B Eng Hons (Mining), MAusIMM, (1125384).

**Industry experience:** She has 18 years' experience in the mining industry (three years at St Ives) and is responsible for the overall accuracy, standard and compliance of mine planning, schedules and Mineral Reserve estimation, LoM compilation and financial evaluation.

***S Ellery***

*Resource Evaluation Superintendent*

BSc (Hons), MSc Geology, Grad Dip Applied Finance and Investment (SIA), MAusIMM (110420).

**Industry experience:** He has 26 years' experience in the mining industry (23 years at St Ives) and is responsible for compilation of planning assumptions and reported Mineral Resource and Mineral Reserve estimates.

# Far Southeast – 40% Attributable to GFI

Gold and copper deposit in the Philippines

Mineral Resources of 19.8Moz gold and 9,921Mlb copper

**Location**
The Far Southeast Project is situated in the established mining district of Mankayan in the Cordillera Region of Northern Luzon, approximately 250km north of Manila

## Project ownership and capital expenditure

Exploration is being conducted by Far Southeast Gold Resources, Inc. (FSGRI), a joint venture company of Lepanto Consolidated Mining Company (LCMC) and Gold Fields. To date, Gold Fields has acquired 40% of the project for payments of US$230 million and has the option to acquire a further 20% by paying an additional US110 million and incurring initial development costs totalling US$165 million.

## Regional geology

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.

## Deposit geology

The FSE copper-gold porphyry is a deeply concealed deposit associated with a Pleistocene diorite-dacite intrusion complex intruded into Eocene basaltic country rocks. The intrusion complex is cross-cut by several phreatomagmatic breccia pipes which are pre-, syn- and post-mineralisation. The mineralisation is mostly hosted in the intrusion complex and to a lesser extent the basaltic country rocks and is characterised by disseminated sulphides and multi-phase sulphide-bearing quartz and quartz-anhydrite vein sets and stockworks.

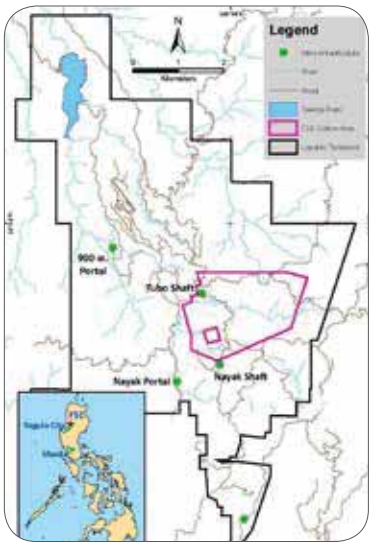
## Exploration and conceptual mine design studies

Conceptual mine design studies were undertaken over the course of the year to investigate a selective mining option for the higher-grade core of the deposit by sub-level open stoping (SLOS). The selective mining option is being considered with a view to exploiting the deposit with minimum environmental and social impact and at the same time taking into account the capacity available potentially using the existing TSF of the Lepanto mine. Further assessment and refining of these studies is continuing. No drilling took place at the FSE project during 2015.

## Social licence to operate

For Gold Fields to obtain a further 20% interest in the project, a Financial or Technical Assistance Agreement (FTAA) will be required from the Philippines Government. This, however, is dependent 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, following protracted




negotiations, a formal 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, LCMC and 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 application for renewal was made, given 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

# 2.2 Australia region (continued)

## Far Southeast – 40% Attributable to GFI (continued)

Philippine Government regarding whether FPIC is also required for the renewal of the MPSA. In November 2015, the arbitration panel issued an award that the FPIC may not be validly imposed as a requirement for the renewal of MPSA 001 and that the MPSA should be renewed under the same terms and conditions. However, the risk of not obtaining the FPIC still exists and the Republic of the Philippines has subsequently filed a petition to vacate the arbitral award.

Environmental baseline monitoring continued throughout the year as part of FSGRI's Environmental and Social Impact Assessment.

### Mineral Resources

The Inferred Mineral Resource for the FSE deposit, first declared in September 2012, reports 891.7Mt at 0.7g/t Au and 0.5% Cu for 19.8Moz of gold and 9,921Mlb of copper. The resource was reported inside a mining constraint, which assumed an eventual non-selective, bulk underground mining method. The classification of Inferred was applied based on drill hole spacing, estimation quality, geological continuity and geological understanding of the deposit in early 2012 and is compliant with the SAMREC code.

| Resource classification | Tonnes (Mt) | Grade Gold (Au g/t) | Metal Gold (Au Moz) | Grade Copper (Cu %) | Metal Copper (Cu Mlb) |
|---|---|---|---|---|---|
| Inferred | 891.7 | 0.7 | 19.8 | 0.5 | 9,921 |
| **Total** | **891.7** | **0.7** | **19.8** | **0.5** | **9,921** |

*Table: FSE Mineral Resources effective 31 August 2012*

*Notes:*
1. *These Mineral Resources are not Mineral Reserves as an assessment to a minimum of a pre-feasibility study is required.*
2. *The Mineral Resource is reported in accordance with the SAMREC Code.*
3. *The Mineral Resource is reported within an optimised underground bulk mining shell that is derived using scoping study mining, processing and cost parameters, and commodity prices of US$1,650/oz Au and US$8,600/t Cu. All Inferred Resource material within the shell is reported.*
4. *The Mineral Resource is reported without dilution and ore loss parameters.*
5. *Rounding-off of figures may result in minor computational discrepancies. Where this happens, it is not deemed significant.*
6. *Lepanto Consolidated Mining Company holds a 60% interest, while Gold Fields holds a 40% interest in the Far Southeast Project. Attributable metal is 11.9Moz Au and 5,953Mlb Cu to Lepanto and 7.9Moz Au and 3,968Mlb Cu to Gold Fields.*

### Outlook

The main focus of the Far Southeast project is to ensure that the project can be advanced subject to technical and economic constraints once the permitting issues are resolved and once the socio-political environment stabilises after the May 2016 national elections. Thus, the project is assisting its joint venture partner to obtain renewal of MPSA001 and is completing the process to obtain the FTAA. Community projects, stakeholder engagement, environmental and social baseline data gathering and studies will continue to support the permitting process. Further testing and refining of the selective mining sub-level open stoping studies will continue.

## Competent Persons

Internal technical reviews have been conducted on the FSE project asset by the Competent Persons as listed, who are full-time employees of Gold Fields Limited.

### *A Trueman*

*Lead Competent Person and Chief Resource Geologist*

BSc (Hons) Geology; PGeo, APEGBC 149753; MAusIMM CP (Geo) 110730.

**Industry experience:** He has geology and resource estimation experience spanning 24 years, including more than 6 years of relevant experience in the estimation of porphyry systems similar to FSE. He has been part of the project since Gold Fields' first involvement in 2009 and is responsible for the overall accuracy, standard and compliance of this declaration.

### *P Dunkley*

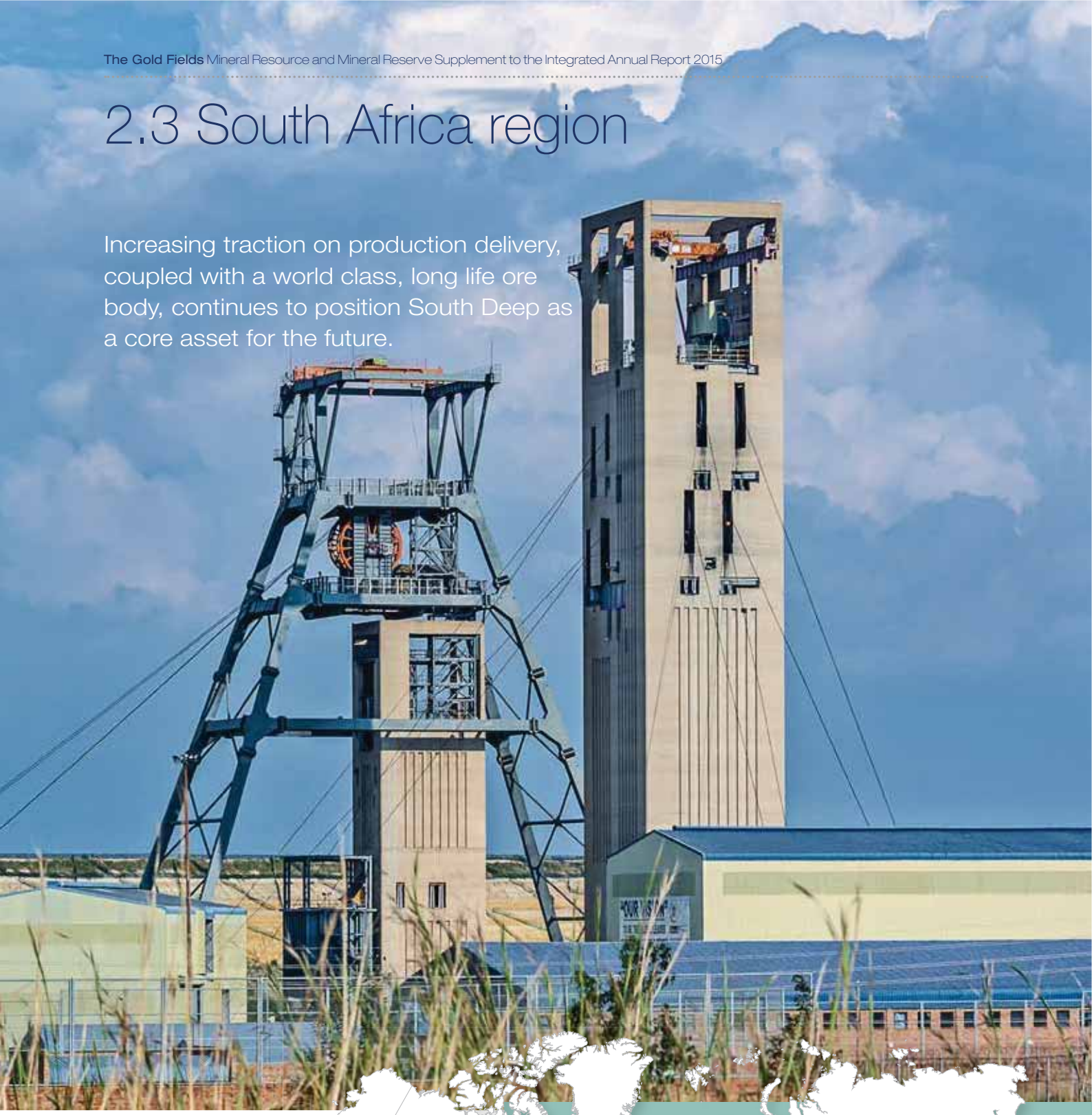
*Site Manager FSE*

BSc (Geology), PhD (Geology – Geochemistry).

**Industry experience:** He has 43 years' experience as a practising geologist, the last nine of which have been with Gold Fields in Venezuela, the Dominican Republic, Peru and the Philippines. He is responsible for the exploration and geological modelling function for the project.

# 2.3 South Africa region

Increasing traction on production delivery, coupled with a world class, long life ore body, continues to position South Deep as a core asset for the future.



## South Africa Region salient points

Mineral Resources
68.4Moz

Mineral Reserves
37.3Moz

## Operation
### South Deep

The South Deep project is still in the production ramp-up phase. During 2015 the mine successfully concluded a new regional stability pillar configuration endorsed by the Geotechnical Review Board (GRB). The independent GRB, a committee of local and international experts, will continue to peer review progress at South Deep to ensure exposure to relevant industry leading practices, operational de-risking and world class geotechnical support in massive underground mining at depth. The new regional design has been incorporated into the 2015 mine design and scheduling process, which informed the December 2015 Mineral Reserve declaration. The reduced spacing between pillars will significantly improve the global geotechnical support regime and the mine will have six producing corridors compared to the previous four, improving overall operating flexibility.

From 2014 the GRB was involved in reviewing the de-stress methodology on South Deep. During 2015 an all-new de-stress mining method for South Deep was developed in conjunction with the GRB. The conversion from the historical low profile de-stress methodology to the new high profile de-stress mining method is being rolled out across all the de-stress sections on the mine, except 95 1W and 90 1W, where the current de-stress method will be maintained, as the area is nearing completion. The high profile de-stress method will open up the ore body more effectively benefiting from a simplified mining cycle and a reduced lead time to stoping.

| Operational profile | |
|---|---|
| **Mining method** | Fully mechanised utilising long-hole stoping, high-profile mining (de-stress) and drift and benching |
| **Infrastructure** | Two shaft systems are in production - the Twin Shaft complex, with the main and ventilation shafts to 110 level, as well as the South Shaft complex, which has a main & two sub-vertical shafts to 95 level and one CIP gold plant with a capacity of 4.0Mtpa |
| **Mineralisation style** | Palaeoplacer |
| **Mineralisation characteristics** | i. Mineralisation hosted by conglomerates (reefs)<br>ii. Laterally continuous with long-range predictability<br>iii. Clear patterns of predictable mineralisation governed by sedimentary characteristics and<br>iv. Exploration programmes and grade control drilling ongoing to test homogeneity of geology and grade domains |

Gold Fields is undertaking a holistic strategic review of South Deep at a time when project construction is moving into full production ramp up. The objective is to re-base the longer term steady state production profile built on a clear understanding of the mines realistic production capability and potential cash flows. Importantly, although the Re-base project will indicate the nature of the long term plan by 2017, ongoing business improvements are expected to continue enhancing performance levels, which will impact the LoM plan on an annual basis.

### Regional geology

South Deep is located in the Far West Rand Goldfield on the north-western rim of the Witwatersrand Basin. This basin comprises a 6,000 metre-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 and largely barren quartzitic units. All major reef units are developed above sedimentary unconformity surfaces. The angle of unconformity is typically greatest near the basin margin and decreases toward more distal areas

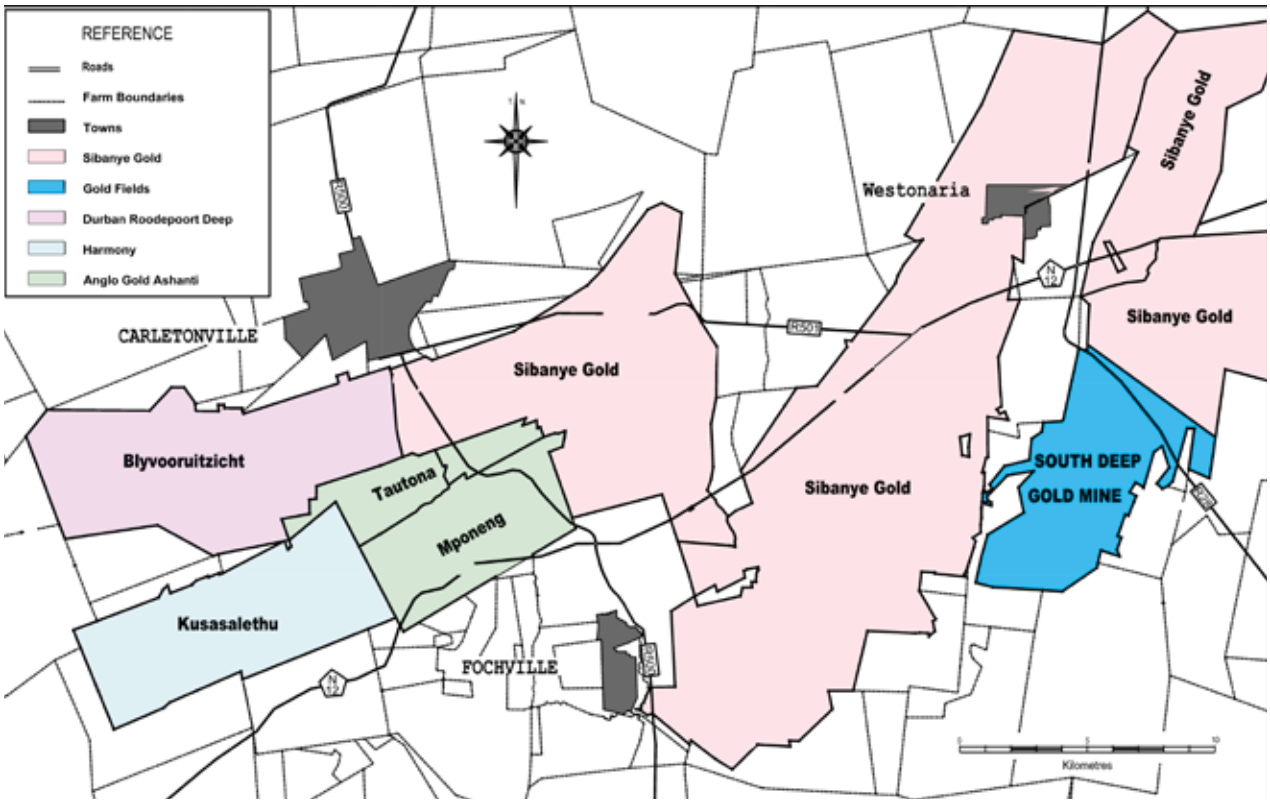
The reefs are considered to represent extensive fluvial deposits into a yoked basin, some 350 kilometres long in an east-north-easterly direction, and 200 kilometres wide in a north-north-westerly direction. The reefs are continuous as a consequence of the regional nature of the erosional surfaces. Preferential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

The gold is deemed to be primarily of detrital origin, deposited syngenetically with the conglomerates. Although the gold generally occurs in native form and is usually associated with pyrite and carbon, most of it has been subsequently modified and locally remobilised during secondary hydrothermalism. The most

*For more information on the Australia region please see our website www.goldfields.com/operationsandprojects*

# 2.3 South Africa region (continued)

## West Wits Line




fundamental control to the gold distribution remains the association with quartz-pebble conglomerates on intra-basinal unconformities. The Modified Palaeoplacer Model is the favoured mineralisation model that is currently in use.

### Exploration drilling and expenditure

On-lease metres drilled and expenditure for the 12-month period ended 31 December 2015 are summarised below. The comprehensive and multi-year surface drilling campaign undertaken to confirm the extensive Indicated Mineral Resource at South Deep was completed in 2014 and consequently no brownfields surface drilling exploration was conducted in 2015.

Underground long inclined borehole (LIB) drilling continues from 100 2W into Corridor 1 to increase geological confidence and the 30 metre by 30 metre underground drilling protocol to provide increased resource definition and grade control is adhered to, where drilling platforms permit. The metres reported in the table below, excludes ongoing grade control drilling.

In accordance with the SAMREC 2007 Code, the region maintains rigorous QA/QC protocols on all its exploration programmes. It draws on industry leading practice for data acquisition and utilises accredited laboratories that are regularly reviewed both internally and externally. Analytical QA/QC is maintained and monitored through the submission of blanks, certified reference material and duplicates, plus umpire laboratory checks.

| | C2015 | | | C2014 | | |
|---|---|---|---|---|---|---|
| **Exploration drilling** | **Metres drilled** | **ZAR (millions)** | **US$ (millions)** | Metres drilled | ZAR (millions) | US$ (millions) |
| South Deep | **1,800** | **4.771** | **0.376** | 3,295 | 6.15 | 0.57 |

## Social licence to operate

South Deep's commitment to continued improvement in health, safety and environmental management is underpinned by its ISO 14001 and OHSAS 18001 certification, and its certification to the ICMC.

Energy and carbon management is a key business imperative to reduce the mine's carbon footprint and to realise cost savings through the implementation of energy efficiency initiatives. South Deep developed a five-year energy security plan during 2015 to manage the supply risks currently faced by South Africa's national electricity utility, Eskom. Implementation of the plan commenced in 2015, during which an option for a solar photo-voltaic (PV) project was identified. Independent power producers were requested to submit their bids through an expression of interest process, followed by a request for proposal being issued during Q4 2015 for an on-site 40MW solar PV installation. The proposals will be evaluated during H1 2016. Having on-site PV power would stabilise the supply, as well as reduce the carbon footprint of South Deep.

Other environmental initiatives are focused on responsible water, air (including dust control) and mine closure management, and on maintaining our licence to operate through regulatory compliance. In 2015, Gold Fields commissioned additional technical studies to identify the steps required to prevent or mitigate the potential acid mine drainage impacts at South Deep during the post-closure phase.

South Deep has an approved Water Use Licence that was issued in November 2011. A water use licence amendment application was submitted to the Department of Water Affairs and Sanitation in May 2015.

South African legislation requires the submission of a Social and Labour Plan (SLP) as a prerequisite for the granting of mining or production rights. The SLP requires mining companies to develop and implement comprehensive human resource development programmes (including employment equity plans) and local economic development programmes. These programmes are aimed at promoting employment and advancing the social and economic welfare of all South Africans, with a strong focus on community development. South Deep continues to implement the commitments in its SLP and provides an annual report to the regulator on its progress with meeting these commitments.

A key aspect of ensuring that South Deep is on track to maintaining its social licence to operate is to measure the strength of relationships with the mines host communities. The Gold Fields and Sibanye Gold Alliance (the Alliance) was formed with the vision of building sustainable host communities that will endure long after the mining in the area has ceased. The Alliance was formally initiated in Q2 2015. The key focus of the Alliance, the South Deep Education and South Deep Community Trusts, as well as other key socio-economic development projects initiated by South Deep, is to increase the mine's spend on host community procurement, to increase employment in host communities and to enhance education related opportunities.

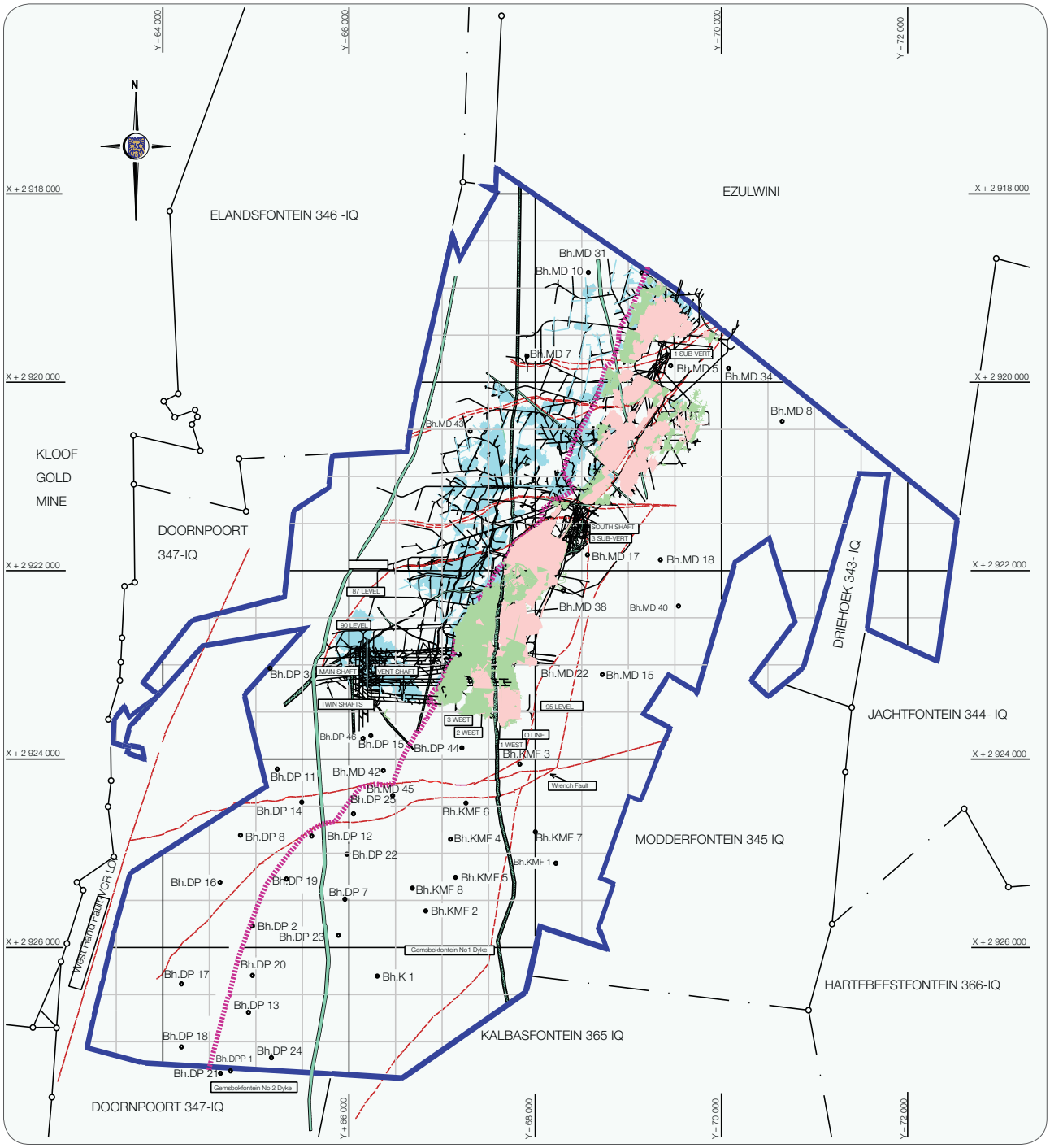
| Sustainability factors | | Fatal injury frequency rate | Total recordable injury frequency rate | Energy consumption (TJ) | $CO_2$ emissions (000 tonnes) (scope 1 & 2) | Water withdrawal (million litres) |
|---|---|---|---|---|---|---|
| **South Deep** | C2014 | 0.16 | 4.65 | 1,807 | 498 | 2,225 |
| | **C2015** | **0.11** | **2.91** | **1,835** | **496** | **2,687** |

# 2.3 South Africa region (continued)

## South Deep Gold Mine (continued)

South Deep Gold Mine is situated in the magisterial districts of Westonaria and Vanderbijlpark (Gauteng province), some 45 kilometres south-west of Johannesburg at latitude 26º 25' south and longitude 27º 40' east. It is accessed via the N12 provincial road between Johannesburg and Potchefstroom.

| Asset fundamentals | |
|---|---|
| **Licence status and holdings** | The conversion of the old order mining right to a new order mining right, as required in terms of the Minerals and Petroleum Resources Development Act, No 28, 2002 (the MPRD Act), was approved in July 2010. The aerial extent of the South Deep lease area is 4,268 hectares. All required authorisation has been obtained and is in good standing. |
| **Operational infrastructure and mineral processing** | The workings are accessed from the surface through two shaft systems - the Twin Shaft Complex (main and ventilation shafts to 110 level), of which the main shaft comprises a single-drop to a depth of 2,995 metres, the vent shaft to 2,947 metres and the South Shaft Complex, which is a sub vertical system to 95 level.<br><br>The mine has been subdivided into three main areas. 'Old Mine' comprises the area above 87 level, and is serviced from the South Shaft Complex. 'Current Mine', which is serviced from the Twin and South Shafts, extends from 87 Level to 95 Level. The deeper part of the mine extends from 100 level down to 110 level and comprises the North of Wrench area extending from a depth of 2,700m to 2,900m and the South of Wrench area extending to a final depth of 3,300m.<br><br>South Deep Gold Mine operates one gold plant with a design capacity of 330ktpm. The milling circuit consists of a single stage SAG mill for primary followed by secondary milling, utilising two overflow ball mills. Classification is done using cyclone clusters and Knelson concentrators facilitate the recovery of free gold. Free gold is upgraded using a Gemini table and the final concentrate is smelted into bullion.<br><br>The cyclone overflow is thickened before the slurry reports to the leach circuit. Cyanide is used for gold dissolution and lime is added to ensure protective alkalinity. An eight-stage, carousel-type CIP circuit is used for gold adsorption. After elution gold is recovered from the solution using electro-winning sludge reactors, dried and gold bullion is produced by smelting in an induction furnace. |
| **Tailings storage facility** | The top of the starter wall will be reached by mid-2018 and the end of Phase 1 by mid-2020. The construction of Phase 2 needs to commence in early-2018 and the main penstock needs to be in place by 2029. |
| **Climate** | No extreme climate conditions are experienced that may affect mining operations. |
| **Deposit type** | Intermediate to deep-level mechanised gold mine (>2,000 m below surface) exploiting auriferous palaeoplacers (reefs), namely the conglomerates that comprise the Upper Elsburg Reefs of the Mondeor Formation. Historically the Ventersdorp Contact Reef (VCR) of the Venterspost Formation has been exploited using conventional mining methods. |
| **Environmental, health and safety** | The key issues at South Deep are related to water management. An amendment of the current approved water use licence was submitted in May 2015 and the time period for approval is 300 days. Several key water related projects were commissioned and are being monitored for progress. The mine participates in the Rietspruit Catchment Forum where water related issues are discussed with authorities and other stakeholders and players in the catchment area. The amendment and the consolidation of the current approved environmental management plan (EMP) (2010 and 2012) has commenced, and will be submitted for approval during H1 2016. The mine environmental management system is ISO14001 accredited. Reporting on environmental, sustainable development and community issues is done according to the Global Reporting Initiative requirements. The mine is in full compliance with the ICMC. |




## Reference

- Development and stoping on Ventersdorp Contact Reef
- Development and stoping on Elsburg Individual Reefs
- Development and stoping on Elsburg Massive Reefs
- Development off Reefs
- Mining Right Area
- Dykes
- Faults
- Shafts — MAIN SHAFT
- Borehole No. and Surface Position of Old Boreholes — Bh.MD 22

**Gold Fields Limited**
**South Deep Gold Mine**

PLAN SHOWING UNDERGROUND WORKINGS AS AT 31 DECEMBER 2015

AREA 4 268 HECTARES

0 1 2 3
Kilometres

Gauss Conform Projection. Central Meridian Lo.27° East

# 2.3 South Africa region (continued)

## South Deep Gold Mine (continued)

### Brief history of South Deep

Commercial production of the Western Areas Gold Mine commenced in September 1951. In 1990, Western Areas Gold Mining Company Limited (WAL) shareholders approved the transfer, cession and assignment of certain land and mineral rights to South Deep Exploration Company Limited in exchange for its shares. WAL and South Deep Exploration Company Limited merged on 1 January 1995. Development of 95 Level across to the planned collar position of Twins commenced.

On 1 April 1999, the Placer Dome/ Western Areas (PDWA) joint venture (JV) was formed and in February 2000, the name of the mine was changed to South Deep Gold Mine. Sinking of the ventilation shaft was completed to 95 level in 2001 and the main shaft to 110 level in 2002, concurrently a 7,200tpd capacity mill was commissioned. The Twin Shaft Complex was officially opened on 4 February 2005.

Barrick Gold Corporation acquired a majority interest in Placer Dome Inc. on 20 January 2006 and Gold Fields acquired Barrick's 50% JV interest in the PDWA JV on 1 December 2006. In April 2007, Gold Fields acquired all remaining WAL shares and consequently owned 100% of South Deep Gold Mine at that time.

Post a pre-feasibility study, the ventilation shaft was deepened to 110 level and was commissioned in 2012.

A new-order mining right was granted to South Deep in 2010, including the area known as Uncle Harry's. During 2011, Newshelf 899 (Proprietary) Limited (Newshelf) was established, which holds a 100% interest in South Deep Gold Mine. Newshelf is a 90% subsidiary of GFI and the remaining 10% is held by outside shareholders as part of the Broad Based Black Economic Empowerment (BBBEE) transaction.

### Key developments at South Deep

South Deep is a mine that has been built to extract one of the largest undeveloped gold ore bodies in the world. The ore body encompassing a ~37Moz Mineral Reserve is well understood as a result of a combination of 3D seismic (vibroseis, 2007) modelling, extensive surface drilling (2007-2013) and effective resource modelling that has provided valuable information on the geological structure and gold distribution patterns at the mine. Key required infrastructure is now installed to support the production ramp up and to deliver the mine as a low cost, long life mechanised mining operation. Due to its depth and full mechanisation, South Deep has no real benchmark operation in the industry and the current focus therefore remains on establishing the basic capability at the mine to drive productivity and leverage unit costs. In addition, a strategic review of the operation is being undertaken with the objective of positioning and re-basing South Deep as a core franchise asset, that aims in the first instance to achieve self-funding (breakeven) as early as possible and then to deliver consistent free cash-flow margins going forward.

### Setting up the mine for long-term success

The review by the appointed GRB of South Deep's current mining layout and methodology was concluded in 2015.

The historic mining corridor and pillar span of 240 metres (corridors) by 60 metres (pillars) has been changed to mining spans initially ranging from 75 metres to a maximum of 180 metres, with pillar widths maintained at 60 metres, with six newly established corridors. This initial variation in mining span will reduce as the new design matures with depth. Instrumentation is being expanded underground to measure rock behaviour in a variety of conditions and to determine the optimal span configuration in the long-term with the aid of numerical modelling. The adopted pillar spacing took into account the position of the Gemsbokfontein dyke and the easterly diverging conglomerate package in a down-dip direction. The configuration will be measured and monitored over the next couple of years as mining progresses further to the south.

The benefits of changing from the historical 240 metre by 60 metre span to the newly designed and modelled pillar design is summarised as follows:

- Improved safety
- Improved stiffness of regional support design
- Will result in less deformation and hence more stable excavations
- Increase from 4 to 6 corridors - increase in number of mining attack points (flexibility)
- Increased reliability of de-stress operations

The mining methods, which have been under review since 2014, including the 4.5 metre by 4.5 metre de-stress and the Inclined Slot method, have evolved to a high profile de-stress mining method with a mining width of 4.5 metres and a height of 5.0 metres. With the exception of 95 1W and 90 1W de-stress (mature mining areas), the new methodology was rolled-out in all the de-stress mining areas during the latter part of 2015.

The new regional pillar design and the new high profile de-stress mining method have been incorporated into the December 2015 LoM plan. These initiatives, which are supported by the GRB, are aimed at improving safety, increasing mining productivities and simplifying the overall mining cycle.

Additional performance improvement focus areas for 2016 include the following:

- Artisan and supervisory mechanised skills development
- Implementation of a planned maintenance mining fleet contract in corridor 2
- Increased effective face time utilisation
- Dilution and ore loss controls
- Improved refrigeration water reticulation system
- Improved ore handling and backfill placement

# 2.3 South Africa region (continued)

## South Deep Gold Mine (continued)

### Operating statistics

| | | Historic performance | | | |
|---|---|---|---|---|---|
| | Units | **C2015** | C2014 | C2013 | C2012 |
| **Development** | | | | | |
| Total development | m | **4,701** | 5,526 | 11,318 | 12,380 |
| – Waste development | m | **990** | 652 | 4,659 | 6,587 |
| – Reef development | m | **3,711** | 4,874 | 6,659 | 5,793 |
| **Underground mining (including development)** | | | | | |
| Total de-stress mined | $m^2$ | **30,499** | 29,071 | 53,694 | 43,356 |
| Total mined | kt | **1,239** | 1,092 | 2,241 | 2,050 |
| – Waste mined | kt | **88** | 65 | 382 | 580 |
| – Ore mined | kt | **1,151** | 1,027 | 1,853 | 1,470 |
| Mined grade (ore only) | g/t | **5.4** | 5.5 | 5.4 | 6.1 |
| Mined grade (ore and waste) | g/t | **5.1** | 5.1 | 4.4 | 4.4 |
| Gold broken | kg | **6,260** | 5,598 | 9,950 | 8,928 |
| **Processing** | | | | | |
| Surface rock dump (SRD) mining | kt | **214** | 57 | 45 | 0 |
| SRD value | g/t | **0.2** | 0.1 | 0.5 | 0.0 |
| Underground ore – mining | kt | **1,231** | 1,176 | 1,874 | 1,558 |
| Underground ore – value | g/t | **5.0** | 5.3 | 5.0 | 5.4 |
| Total tonnes treated | kt | **1,496** | 1,323 | 2,346 | 2,106 |
| Head grade[1] | g/t | **4.3** | 4.9 | 4.2 | 4.1 |
| Yield | g/t | **4.1** | 4.7 | 4.0 | 4.0 |
| Plant recovery factor | % | **96.0** | 96.5 | 96.4 | 96.5 |
| Total gold production | kg | **6,160** | 6,237 | 9,397 | 8,411 |
| Gold sold | koz | **198** | 201 | 302 | 270 |
| **Financials** | | | | | |
| Gold price received | US$/oz | **1,173** | 1,271 | 1,409 | 1,667 |
| | ZAR/kg | **478,263** | 442,144 | 434,884 | 438,945 |
| Exchange rate (annual average) | ZAR:USD | **12.68** | 10.82 | 9.60 | 8.19 |
| Operating cost | ZAR/kg | **487,016** | 425,914 | 328,733 | 294,895 |
| Capital expenditure | ZAR/kg | **137,719** | 159,355 | 206,793 | 306,238 |
| | US$/oz | **338** | 458 | 670 | 1,163 |
| AIC | ZAR/kg | **635,622** | 602,363 | 544,190 | 0 |
| | US$/oz | **1,559** | 1,732 | 1,763 | 0 |
| AISC | ZAR/kg | **607,429** | 538,254 | 475,706 | 0 |
| | US$/oz | **1,490** | 1,548 | 1,541 | 0 |
| **Life-of-Mine** | | | | | |
| Mineral Reserves | Mt | **219** | 223 | 224 | 223 |
| Mineral Reserves head grade | g/t | **5.3** | 5.3 | 5.3 | 5.5 |
| Mineral Reserves | Moz | **37.3** | 38.0 | 38.2 | 39.1 |

[1] *Includes SRD and underground waste development from December 2010*

*Rounding off of figures presented in this report may result in minor computational discrepancies. Where this occurs, it is not deemed significant.*

## Local geology

The South Deep mining right area is underlain by outliers of Karoo Supergroup shales and sandstones, followed by the Pretoria Group sediments and the Chuniespoort Group dolomites. The Chuniespoort Group overlies the Klipriviersberg Group volcanic rocks, which in turn are underlain by the Central Rand Group that hosts the gold-bearing conglomerates (reefs) exploited by South Deep. The reef horizons exploited at South Deep include the VCR and the Upper Elsburg formation conglomerates. In the western half of the mining lease area the VCR occurs as a single reef horizon that overlies footwall lithologies of the Turffontein Subgroup. The Upper Elsburg reefs, subcropping below the VCR in a north-northeast trend, comprise multiple stacked reef horizons forming an easterly-divergent clastic wedge as illustrated in the schematic section below. This wedge attains a thickness of approximately 120 to 130 metres in the vicinity of the eastern boundary of the mining right area. The Upper Elsburg Reefs constitute ~98% of the South Deep Mineral Reserve ounces, while the VCR makes up the remaining ~2%.

The structure at South Deep is dominated by the north-south trending primary fault systems, which include the West Rand, Panvlakte and Waterpan Faults. The West Rand Fault is an activated thrust fault, which is now represented as a normal fault with a maximum throw of 2,200 metres down to the west at the northern extreme of the property. The West Rand - Panvlakte horst block is situated between the Kloof Gold Mine to the west and the South Deep Gold Mine to the east.

### Geological modelling

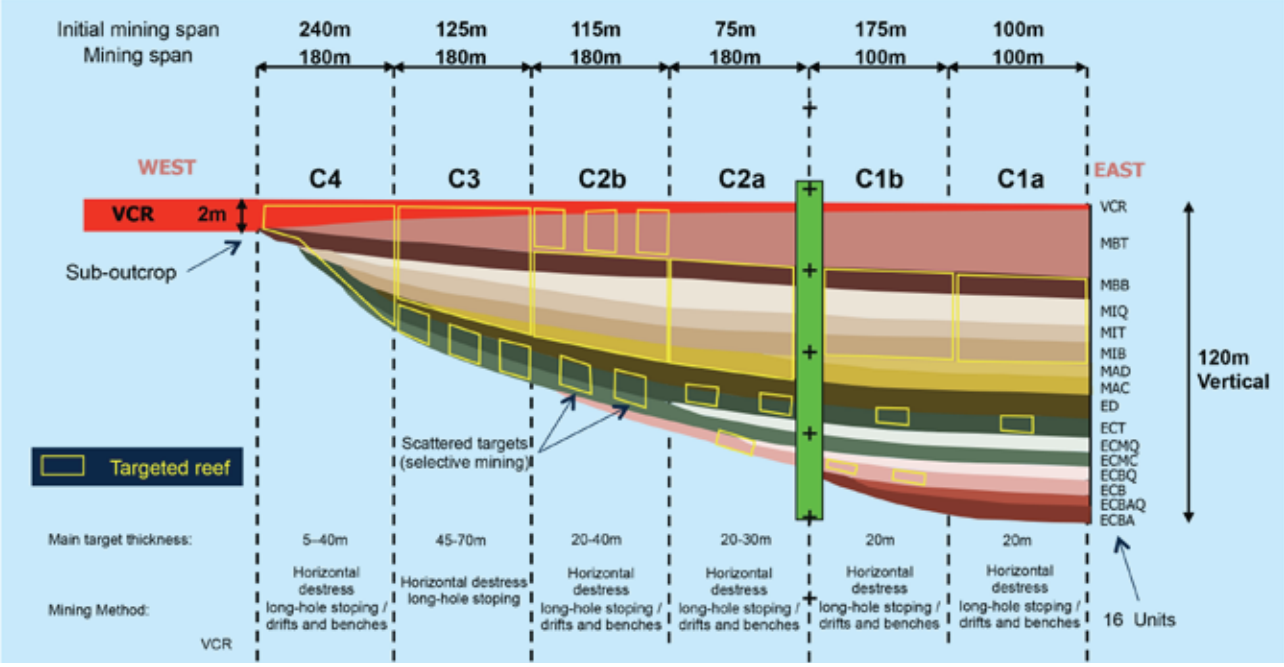
Geological models are based on all available structural, grade and sedimentological data. The structural data is used to generate three-dimensional models whilst the sedimentological, gold value and channel width data is used to delineate the geologically homogeneous local geo-domains for each stratigraphic unit. The geo-domains define the proximal to distal grade relationships and are used to constrain the statistical and geostatistical analyses that form the basis of the resource estimation process. The geological models are updated on an ongoing basis as new data becomes available using proprietary software applications.

## Exploration and resource definition drilling

South Deep maintains rigorous QA/QC protocols on all exploration programmes. Data acquisition adheres to industry leading practice, reputable laboratories are employed and sign-off is carried out by Competent Persons under the 2007 SAMREC Code.

Gold Fields initiated an exploration programme, which comprised a

### East-West section of the South Deep Ore Body (Linked to Mining Method)

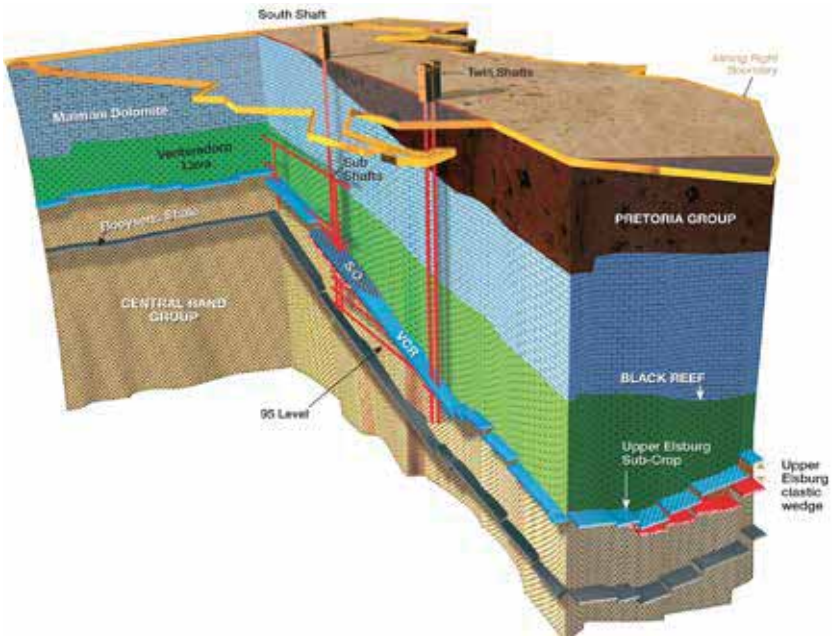


# 2.3 South Africa region (continued)

## South Deep Gold Mine (continued)

surface three-dimensional reflection seismic survey with detailed modelling, combined with a surface and underground exploration drilling programme. The surface drilling programme that targeted the Upper Elsburgs and VCR in the ground south of the Wrench Fault (SoW), started in July 2007 and concluded in 2013. The quality of the resource modelling has continued to evolve at South Deep since acquisition. Since 2008, 16 discrete stratigraphic units comprising the ore body are individually modelled to provide the resolution necessary for detailed mine design and scheduling. The geological modelling and resource estimation processes are supported by a combination of three-dimensional surface seismic modelling, surface exploration drilling and rolling long inclined borehole and grade control drilling programmes.

### 3D schematic illustration of the South Deep Gold Mine




### Mining

#### Mining methods

A variety of mining methods are applied to safely maximise the extraction of the ore body. The South Deep lease area is divided in two along the subcrop, with the VCR occurring alone to the West and the Elsburg massives present to the East of the subcrop. The VCR reserve ounces are scheduled to be mined with low-profile mechanised mining methods.

East of the subcrop, the ore body gradually increases in thickness, from about two metres at its narrowest point at the subcrop to approximately 120 metres in thickness, 900 metres east of the subcrop. Three different mining methods are applied in this area. Initially, in the design, a five metre high horizontal slice is mined through the targeted reef package to de-stress the reef above and below this slice. The de-stressing of the reef allows for the mining of large ~15 metre high by ~15 metres wide long-hole stopes without the high rock stress interactions associated with mining at depths of 2,700 metres to 3,300 metres. These horizontal de-stress cuts are mined at 20 metre vertical intervals and constitute 16% of the total reserve design.

Long-hole stoping is accessed from the de-stress excavations and are large 15 metre (width) by 20 metre (height) excavations with lengths of up to 60 metres. Where the reef targets are thicker than 20 metres, long-hole stopes are stacked with up to three long-hole designs making an overall height of up to 60 metres. Long-hole stoping makes up 52% of the total reserve design.

Where reef targets are thinner, between 5 metres and 15 metres, a more selective drifting and benching method is applied. Drifts are mined at 6m (w) x 5.5m (h) with lengths varying depending on the reef geometries. Benches are mined from the drift's hangingwall or footwall positions up to heights (including the drift) of 15m. Drifting and benching constitute 28% of the reserve design, while development accounts for 4%.

Rock engineering principles are applied to the design of the excavation dimensions, pillars, backfill and support. After the review of the regional pillar layout in 2015, the mining spans were changed from 240 metres to a maximum of 180 metres and applied to the reserve design. The 3.8Moz decrease in Mineral Reserve ounces (1.2Moz NoW) as a direct result of the enhanced pillar design was counterbalanced by an increase in the updated resource model, due to new exploration data. The positive resource model impact was mostly south of wrench.

The implementation of the improved regional pillar design has not presented a constraint to the current life of mine steady state production profile which is based on the high profile destress mining method, revised productivity levels, the allocation of mining fleet and labour resources and work place availability. No mining extraction of the regional pillars is incorporated into the plan, although studies to assess possible future pillar mining may provide a solution to recovering a portion of these ounces in the future. The impact of the change in pillar configuration has resulted in an increase from four to six mining corridors in the North of Wrench (NOW) area, which will enhance operational flexibility due to an increase in the number of working places which can be operated simultaneously.

Both classified cyclone tailings and full plant tailings backfill plants are configured to meet all backfill requirements into the future.

The total reserve mine designs for December 2014 and December 2015 are shown on page 99, indicating the differences in mining spans in the corridors.

### Mine planning and scheduling

Mine design and scheduling at South Deep is done using specialist proprietary mine planning software. All designs are based on three-dimensional resource models.

The depth of the ore body dictates that mining of de-stress horizons have to be scheduled in such a way that sufficient Mineral Reserves are made available for massive mining extraction. Large mechanised targets are then sequentially scheduled for extraction within the de-stressed envelopes. Backfill scheduling is also incorporated in the extraction sequence, both for de-stress and the massive mining.

All designs and schedules are completed in consultation with production and technical personnel to ensure safe and efficient layouts and plans. Production rates and efficiencies are based on past experience and on production models that describe activities for the different fleet combinations.

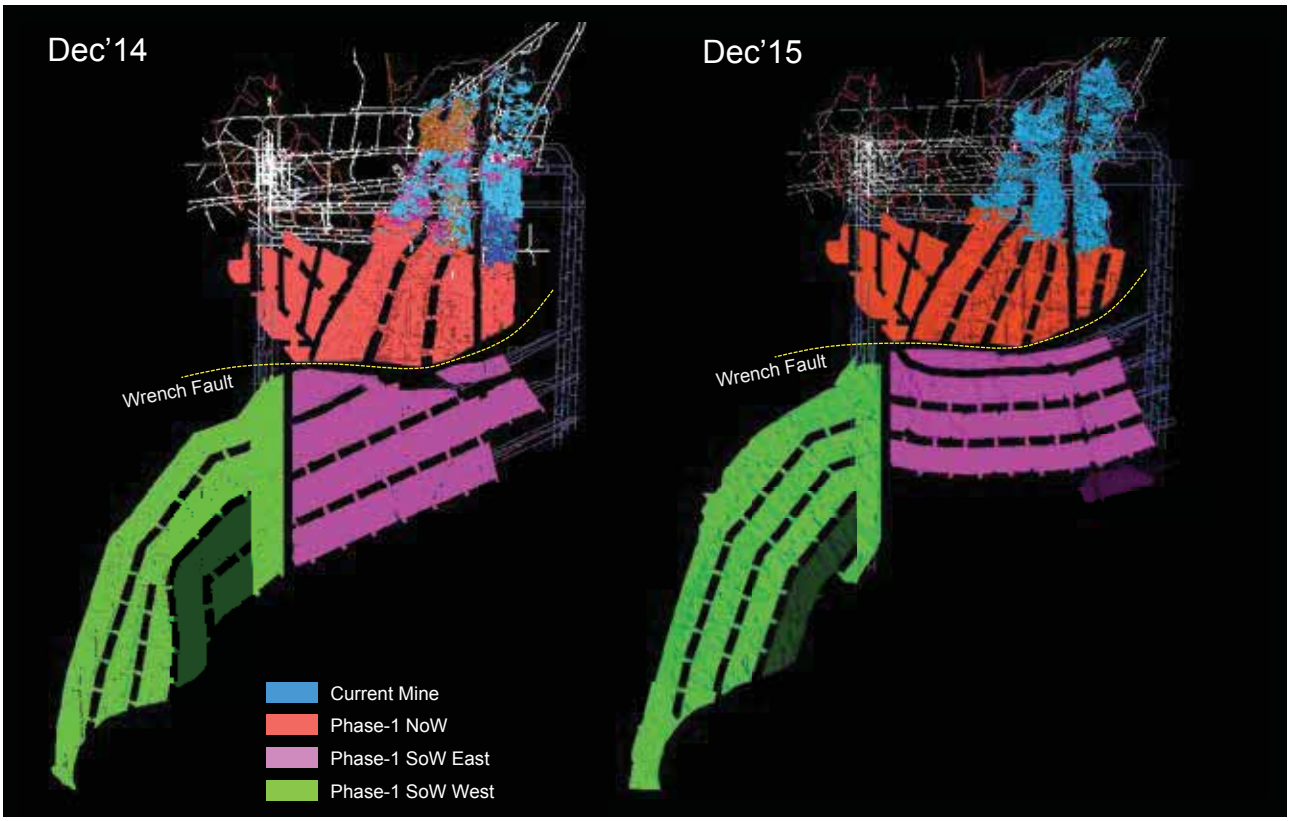
Due to the inability to split ore and waste mined underground, all waste inclusive of in-section waste and capital waste is currently being sent to the processing plant at a fully diluted head grade. Although the impact on the head grade is larger in the initial years, the life cycle impact on the LoM grade is approximately -3%.

## Projects

The following projects were carried out during 2015:

- Development on 100 and 105 levels: This development in an easterly direction will provide additional ore handling facilities and increase the number of airways and cooling facilities to Current Mine. In addition, this will provide a valuable platform to assist with exploration drilling ahead of the current mining horizon. This development programme is scheduled to continue in 2016
- Further review of mining methods and regional pillar designs

### Mining sequence diagram



# 2.3 South Africa region (continued)

## South Deep Gold Mine (continued)

### Mineral Resources and Mineral Reserves

The Mineral Resources are classified according to the SAMREC Code 2007. The classification is a function of the overall confidence derived from the full mineral resource management process covering drilling, sampling, QA/QC, geological mapping, geostatistical analysis, resource modelling and risk profiling.

All Mineral Resources and Mineral Reserves are classified as being above infrastructure, in line with international practice where Mineral Reserves are accessed via ongoing ramps, for which the planned expenditure has been provided in the LoM.

The BBBEE transaction, concluded in December 2010, grants an empowerment consortium ~10% of South Deep. Based on the relevant sliding scale of the vesting of the economic benefit attached to the 10% and the current LoM profile, the Mineral Resource and Mineral Reserve portion currently attributable to Gold Fields is 91.3%.

*Mineral Resources*

Mineral Resources are reported as in situ, inclusive of Mineral Reserves, of which 100% are reported as Managed Resources. As at 31 December 2015, the total Mineral Resource estimate at the South Deep Gold Mine, using a gold price of ZAR550,000/kg, was as follows:

*Mineral Resource classification*

| | Tonnes (kt) | | | Grade (g/t) | | | Gold (koz) | | |
|---|---|---|---|---|---|---|---|---|---|
| **Classification** | **15 Dec** | 14 Dec | 13 Dec | **15 Dec** | 14 Dec | 13 Dec | **15 Dec** | 14 Dec | 13 Dec |
| Underground | | | | | | | | | |
| Measured | **47,476** | 51,560 | 52,800 | **7.66** | 7.58 | 7.52 | **11,688** | 12,559 | 12,767 |
| Indicated | **190,191** | 242,390 | 242,400 | **7.91** | 7.27 | 7.27 | **48,339** | 56,658 | 56,658 |
| Inferred | **31,550** | 26,600 | 26,600 | **7.86** | 7.48 | 7.48 | **7,974** | 6,399 | 6,399 |
| **Total underground** | **269,217** | 320,550 | 321,800 | **7.86** | 7.34 | 7.33 | **68,001** | 75,616 | 75,824 |
| Surface stockpiles | | | | | | | | | |
| TSF (Measured) | **62,639** | 61,800 | 61,000 | **0.22** | 0.22 | 0.22 | **435** | 430 | 425 |
| Surface Stockpiles | | | | | | | | | |
| Total surface stockpiles | **62,639** | 61,800 | 61,000 | **0.22** | 0.22 | 0.22 | **435** | 430 | 425 |
| **Grand total** | **331,856** | 382,350 | 382,800 | **6.41** | 6.19 | 6.20 | **68,436** | 76,046 | 76,249 |

*Mineral Resource classification per mining area (excluding stockpiles)*

| | Measured | | | Indicated | | | Inferred | | | Total Mineral Resource | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Area | Tonnes ( kt) | Grade (g/t) | Gold (koz) | Tonnes ( kt) | Grade (g/t) | Gold (koz) | Tonnes ( kt) | Grade (g/t) | Gold (koz) | Tonnes ( kt) | Grade (g/t) | Gold (koz) |
| **Underground** | | | | | | | | | | | | |
| Current Mine | 40,637 | 7.38 | 9,643 | 13,325 | 6.08 | 2,604 | – | – | – | 53,962 | 7.06 | 12,247 |
| Phase 1 NoW | 5,847 | 8.17 | 1,535 | 44,067 | 7.66 | 10,859 | – | – | – | 49,914 | 7.72 | 12,394 |
| Phase 1 SoW | – | – | – | 72,786 | 7.92 | 18,534 | 3,110 | 5.87 | 587 | 75,896 | 7.84 | 19,120 |
| Phase 2 | – | – | – | 53,901 | 8.30 | 14,377 | 11,609 | 6.71 | 2,504 | 65,510 | 8.01 | 16,881 |
| VCR | 992 | 15.97 | 510 | 6,112 | 10.00 | 1,965 | 16,831 | 9.02 | 4,883 | 23,935 | 9.56 | 7,358 |
| **Total Underground** | **47,476** | **7.66** | **11,688** | **190,191** | **7.91** | **48,339** | **31,550** | **7.86** | **7,974** | **269,217** | **7.86** | **68,001** |

*Modifying factors*

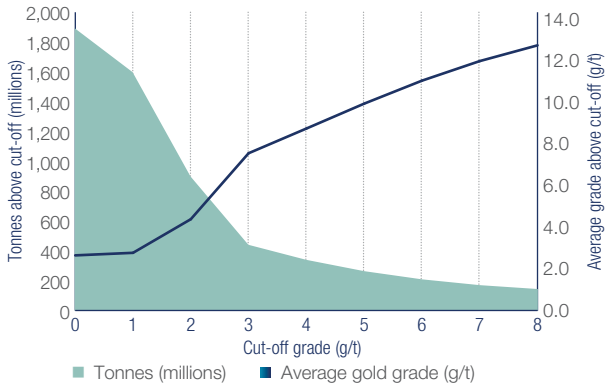
- The Measured and Indicated Mineral Resources are inclusive of Mineral Reserves
- Unless otherwise stated, all Mineral Resources and Mineral Reserves are quoted as 100% and are not attributable with respect to ownership
- All Mineral Reserves are quoted in terms of RoM grades and tonnage as delivered to the metallurgical processing facilities inclusive of in-section waste tonnes, but exclusive of capital waste material
- Mineral Reserve Statements include only Measured and Indicated Mineral Resources, modified to produce Mineral Reserves and contained in the LoM plan
- Mineral Resources and Mineral Reserves undergo regular internal and/or external audits, and any issues identified are rectified at the earliest opportunity

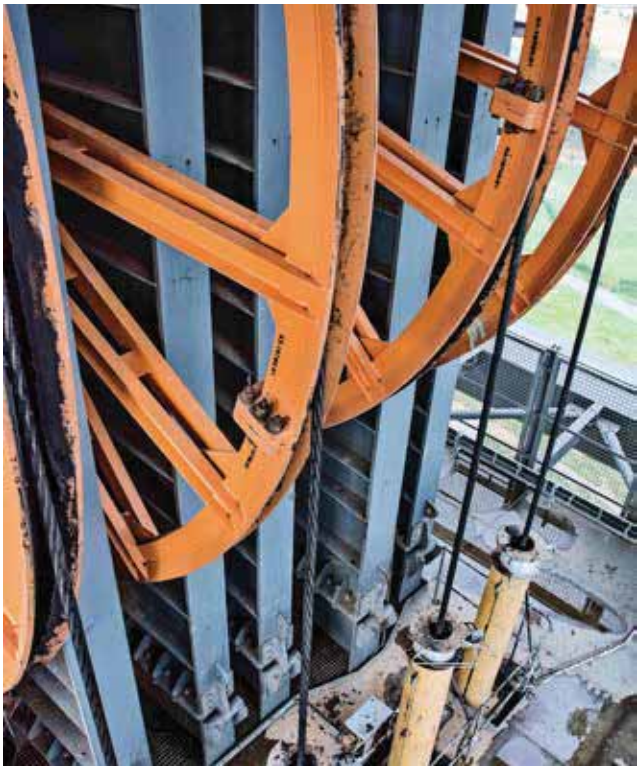
| | | December | | |
|---|---|---|---|---|
| | Units | **2015** | 2014 | 2013 |
| **Mineral Resource parameters** | | | | |
| Mineral Resource gold price | US$/oz | **1,500** | 1,500 | 1,500 |
| | ZAR/kg | **550,000** | 460,000 | 460,000 |
| Cut-off grade | g/t | **3.2 – 3.6** | 3.2 – 3.6 | 3.2 – 3.6 |
| **Mineral Reserve parameters** | | | | |
| Mineral Reserve gold price | US$/oz | **1,300** | 1,300 | 1,300 |
| | ZAR/kg | **500,000** | 400,000 | 400,000 |
| Cut-off grade (NoW- SoW) | g/t | **3.8 – 4.2** | 3.8 – 4.2 | 3.8 – 4.2 |
| MCF | % | **100** | 98 | 98 |
| Dilution underground | % | **7.3** | 7.3 | 7.3 |
| Losses underground | % | **3.9** | 3.9 | 3.9 |
| Plant recovery factor | % | **96.5** | 96.5 | 96.5 |
| Processing capacity | Mtpa | **4.0** | 4.0 | 4.0 |

*Grade tonnage curve*

Grade tonnage curve for the total underground Mineral Resource is presented below.

**Grade tonnage curve – Underground**



# 2.3 South Africa region (continued)

## South Deep Gold Mine (continued)

### Mineral Reserves

The 2015 Mineral Reserve estimation at South Deep was based on the development of an appropriately detailed and engineered LoM plan, which accounts for all necessary access development and stope designs. All design and scheduling work is undertaken within applicable mine planning software. The planning process incorporates realistic modifying factors and the use of appropriate cut-off grades, geotechnical criteria, mining fleet productivities and other techno-economic investigations.

*Mineral Reserve classification*

| | Tonnes (kt) | | | Grade (g/t) | | | Gold (koz) | | |
|---|---|---|---|---|---|---|---|---|---|
| **Classification** | **Dec 15** | Dec 14 | Dec 13 | **Dec 15** | Dec 14 | Dec 13 | **Dec 15** | Dec 14 | Dec 13 |
| **Underground** | | | | | | | | | |
| Proved | **11,822** | 14,440 | 15,700 | **5.92** | 5.86 | 5.80 | **2,252** | 2,720 | 2,927 |
| Probable | **207,014** | 208,781 | 208,700 | **5.26** | 5.26 | 5.26 | **35,005** | 35,296 | 35,297 |
| **Total underground** | **218,836** | 223,221 | 224,400 | **5.30** | 5.30 | 5.30 | **37,257** | 38,016 | 38,224 |
| **Grand total** | **218,836** | 223,221 | 224,400 | **5.30** | 5.30 | 5.30 | **37,257** | 38,016 | 38,224 |

*Mineral Reserves classification per mining area*

| | Proved | | | Probable | | | Total Mineral Reserve | | |
|---|---|---|---|---|---|---|---|---|---|
| Area | Tonnes (kt) | Grade (g/t) | Gold (koz) | Tonnes (kt) | Grade (g/t) | Gold (koz) | Tonnes (kt) | Grade (g/t) | Gold (koz) |
| **Underground** | | | | | | | | | |
| Current Mine | 7,144 | 6.05 | 1,390 | — | — | — | 7,144 | 6.05 | 1,390 |
| NoW | 4,678 | 5.73 | 862 | 51,144 | 5.82 | 9,473 | 55,822 | 5.82 | 10,335 |
| VCR | | | | 1,321 | 8.24 | 350 | 1,321 | 8.24 | 350 |
| SoW | — | — | — | 154,549 | 5.07 | 25,182 | 154,549 | 5.07 | 25,182 |
| **Total underground** | **11,822** | **5.92** | **2,252** | **207,014** | **562.00** | **35,005** | **218,836** | **5.30** | **37,257** |

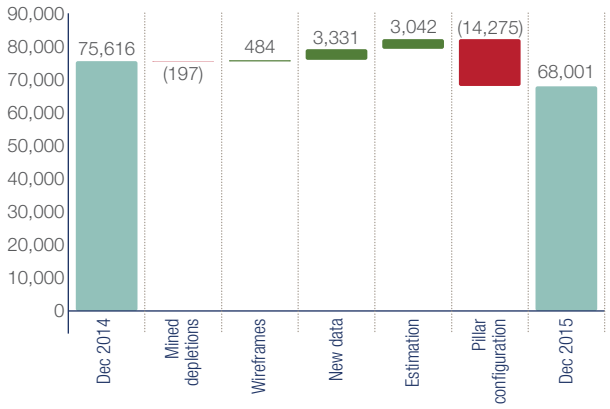
*[1] Inclusion of the capital waste material would result in an underground Mineral Reserve grade of 5.1g/t*

*Mineral Reserves at South Deep are reported at head grade inclusive of ore and in-section ore and waste development tonnes, which cannot be separated in the ore flow. The capital waste is currently excluded as there is the potential to separate it in the ore flow north of wrench. If included in the ore flow for the LoM, the impact on the Mineral Reserve grade would be -0.2g/t.*

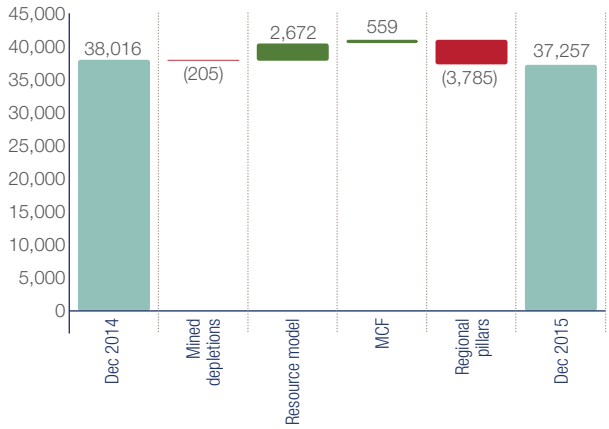
*Mineral Resource and Mineral Reserve reconciliation year-on-year*

| Factors that affected Mineral Resource reconciliation year-on-year | Factors that affected Mineral Reserve reconciliation year-on-year |
|---|---|
| Mined depletion | Mined depletion |
| Geological modelling updates in Current Mine and North of Wrench, due to additional boreholes and mapping data, which increased the ounces by 0.5Moz and 0.8Moz respectively | An increase in the mine call factor from 98.5% to 100% based on the 30-month rolling average increased the reserve by 0.6Moz |
| South of Wrench was geologically and geostatistically remodelled due to the addition of 51 new borehole intersections, resulting in a 4.0Moz upswing | New data, which was included in the updated 2015 resource model, refined the granularity of the resource model, resulting in a 2.7Moz increase in the Mineral Reserve, mostly SoW |
| A new estimate for the VCR reflective of higher channel widths due to additional borehole data resulted in an increase of 1.5Moz | The introduction of a new regional pillar design reduced the reserves by 3.8Moz. As a consequence, the aerial extraction has been reduced from 87% to 83% |
| The introduction of a new regional pillar design reduced the overall Mineral Resource by 14.3Moz | The Mineral Reserve grade remained unchanged at 5.3g/t |

### Mineral Resource Reconciliation
(Gold – koz) – Underground




### Mineral Reserve Reconciliation
(Gold – koz)

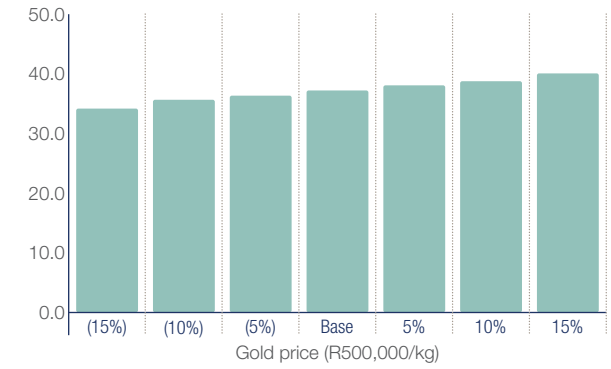



*Mineral Reserve sensitivity*

The Mineral Reserve sensitivity was derived from the application of the relevant cut-off grades to individual grade tonnage curves.

The Mineral Reserve sensitivities are not based on detailed depletion schedules and should be considered on a relative and indicative basis only. The following graph indicates the Managed Mineral Reserve sensitivity at -15%,-10%, -5%, base (ZAR500,000/kg), +5%, +10% and +15% to the gold price.

### Mineral Reserve sensitivity
(Gold – Moz)




## Competent Persons

Internal technical reviews have been conducted by the Competent Persons as listed, who are full-time employees of Gold Fields Limited.

### *H Keyser*

*Manager Mine Planning and Mineral Resource Management*

MEng Mining Engineering, GDE, ND Survey, NHD MRM, SACNASP
(Registration number: 400284/06).

**Industry experience:** He has 22 years' experience in the mining industry. He is the lead Competent Person responsible for the overall correctness, standard and compliance of this declaration.

### *R Pillaye*

*Chief Geologist*

BSc (Hons) Geology, SACNASP
(Registration number: 400247/08).

**Industry experience:** He has 25 years' experience in the mining industry and is responsible for production geology at South Deep.

### *D Kock*

*Chief Resource Geologist*

BSc (Hons) Geology, SACNASP
(Registration number: 400166/07).

**Industry experience:** He has 7 years' experience in the mining industry. He is responsible for resource geology and resource estimation at South Deep.

### *A Miller*

*Chief Surveyor*

ND (Mine Survey), Mine Survey Certificate of Competency, PLATO
(Registration number: PMS 0191).

**Industry experience:** He has 35 years' experience in the mining industry and is responsible for surveying, reporting and historical modifying factors at South Deep.

### *Z Letshuti*

*Manager Operational Planning*

NHD (Mine Survey), Mine Survey Certificate of Competency, Associate Member of IMSSA.
Registration number: MST 0047.

**Industry experience:** He has 30 years' experience in the mining industry. He is responsible for operational planning and reporting.

# 2.4 West Africa region

Tarkwa remains well positioned to deliver value at projected gold prices while the best long-term option for Damang to create future value is being assessed


The West Africa Region currently accounts for 15% of the Group's Mineral Resource and 16% of the Mineral Reserve base, excluding growth projects.

## West Africa Region salient points

Mineral Resources
15.1Moz*

Mineral Reserves
7.7Moz*
*90% attributable to Gold Fields

*For more information on West Africa Region please see our website www.goldfields.com/operationsandprojects*

## Operations

### Damang Gold Mine

Mineral Resources
5.6Moz

Mineral Reserves
1.0Moz

- Re-assessing all relevant options that have the potential to deliver best value to Gold Fields from the asset
- Confirmation of the preferred long-term plan for Damang by mid-2016
- Damang will revert to contractor mining at the end of Q1 2016 while the long-term options are assessed
- Building on the prospectivity assessment conducted in 2014, a continuous process of review and ranking has been developed to maximise the exploration opportunities in line with the LoM strategy
- The current LoM extends to 2020 (five years)

### Tarkwa Gold Mine

Mineral Resources
9.4Moz

Mineral Reserves
6.7Moz

- Owner-operated, high-volume, grade-driven surface operation
- Low-margin reserves removed from the plan
- Maintaining capital waste strip rates to secure a steady flow of consistent grade ore
- Focus on maintaining and improving high mining and processing efficiencies
- LoM remains at 2031 (16 years)

| Operational profile | Damang | Tarkwa |
|---|---|---|
| **Mining method** | Open pit | Open pit |
| **Infrastructure** | Four open pits and one CIL gold plant with a current capacity of 4.5Mtpa | Four open pits and one CIL gold plant with a current capacity of 13.5Mtpa |
| **Mineralisation style** | Hydrothermal (orogenic) and palaeoplacer | Palaeoplacer |
| **Mineralisation characteristics** | i. Mineralisation hosted by structural shears and fault zones<br>ii. Confined to well-defined prospective structural belts<br>iii. Mineralisation within pods with short-range predictability<br>iv. Exploration and resource definition programmes required to define the mineralisation controls and continuity<br>v. Palaeoplacer characteristics are the same as for Tarkwa | i. Mineralisation hosted by conglomerates<br>ii. Laterally continuous with mid- to long-range predictability<br>iii. Clear patterns of mineralisation governed by sedimentary characteristics<br>iv. Exploration programmes ongoing to test homogeneity of geology and grade domains<br>v. Targets are both palaeoplacer and hydrothermal |

# 2.4 West Africa region (continued)

## Regional overview

The Gold Fields attributable portion of the Mineral Resources and Mineral Reserves for Tarkwa and Damang is 90%, with the remaining 10% held by the Ghanaian government as a free carried interest.

The West Africa region's Mineral Resource base has increased from 14.8Moz to 15.1Moz (+2%) net of depletion. The total Mineral Reserve has decreased from 8.7Moz to 7.7Moz (-12%), net of mined depletion.

The West Africa region operations are located in the southern area of western Ghana, 300 kilometres by road west of the capital of Accra and approximately 90 kilometres north of the port city of Takoradi. The ore bodies are located in the West African Craton, near the southern end of the Tarkwa Basin. They occupy a significant portion of the stratigraphy of the Ashanti Belt, which hosts the important Birimian and Tarkwaian geological series.

Damang, which is located 25 kilometres north-north-east of the Tarkwa Gold Mine, exploits predominantly fresh hydrothermal mineralisation and limited oxides, in addition to palaeoplacer mineralisation similar to that of the Tarkwa Gold Mine. The hydrothermal mineralisation occurs at the culmination of a regional anticline and is associated with dominantly east-dipping thrust faults and sub-horizontal quartz veins.

The ore body at Tarkwa consists of a succession of stacked tabular palaeoplacer units consisting of quartz pebble conglomerates (gravel beds called reefs) that are very similar to those mined in the Witwatersrand Basin in South Africa. Tarkwa is currently mining multiple narrow reef horizons from four open pits.

Significant electricity tariff increases were implemented by the Volta River Authority and the Electricity Company of Ghana in 2015 and erratic load shedding was experienced. Consequently, the long-term security of a competitively priced energy supply will therefore remain an important area of focus. The Genser option to secure independent power, was postponed to 2016 and a second phase scheduled to come online early 2018.

## Regional geology

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

## Exploration drilling and expenditure

During the reporting period, exploration activities in the region were dominated by resource conversion campaigns.
At Damang, infill drilling and extensions to known ore bodies to improve confidence and offset mining depletion were completed.

Initial auger and diamond drilling was carried out at Tarkwa during 2015 in areas identified from the geochemical soil sampling programme, which was carried out in 2014 to screen parts of the concession that previously had limited exploration. Although some good results were returned in a number of structural framework holes, continuity and thickness still need to be confirmed. These areas will be the focus for 2016.

The region maintains rigorous QA/QC protocols on all its exploration programmes. It draws on industry leading practice for data acquisition and utilises accredited laboratories that are regularly reviewed both internally and externally. Analytical QA/QC is maintained and monitored through the submission of blanks, certified reference material and duplicates, plus umpire laboratory checks.

| | C2015 | | C 2014 | |
|---|---|---|---|---|
| **Exploration drilling** | **Metres drilled** | **US$ (millions)** | Metres drilled | US$ (millions) |
| Damang | **14,595** | **2.89** | 26,155 | 3.82 |
| Tarkwa | **5,230** | **0.84** | 0 | 0.17 |
| **Total West Africa operations** | **19,825** | **3.73** | 26,155 | 3.99 |

*Exclusive of grade control drilling.*

## Mineral Resources and Mineral Reserves

### Mineral Resources

The Mineral Resources declared are classified as Measured, Indicated or Inferred, as described in the SAMREC Code. Mineral Resource categories are assigned with consideration given to geological complexity, grade variance, drill hole intersection spacing, and mining development. The following factors apply to the Mineral Resources reported:

- Cut-off grades calculated for the individual deposits
- The application of realistic modifying factors to ensure that there is a reasonable prospect of eventual economic extraction
- Use of appropriate in situ economic cut-off grade with tonnages and grades based on the relevant resource block models, and include estimates of any material below the cut-off grade required to be mined to extract the complete pay portion of the Mineral Resource
- Open pit Mineral Resources comprise the material above the nominated cut-off within a diluted optimised pit shell and constrained to an optimised minimum mining width

### Mineral Reserves

The Mineral Reserve estimates are based on appropriately detailed and engineered LoM plans. All design and scheduling work is undertaken to a suitable level of detail by experienced engineers using appropriate mine planning software. The planning process incorporates realistic modifying factors and the use of appropriate cut-off grades, geotechnical criteria, mining fleet productivities and other techno-economic investigations.

*West Africa region summary of the Mineral Resources and Mineral Reserves Statement[1]*

| | Mineral Resources | | | | | Mineral Reserves | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 31 December 2015 | | | Dec 2014 | | 31 December 2015 | | | Dec 2014 |
| Measured, Indicated and Inferred | **Tonnes (Mt)** | **Grade (g/t)** | **Gold (Moz)** | Gold (Moz) | Proved and Probable | **Tonnes (Mt)** | **Grade (g/t)** | **Gold (Moz)** | Gold (Moz) |
| Damang | **79.6** | **2.20** | **5.625** | 5.260 | Damang | **21.2** | **1.43** | **0.973** | 1.235 |
| Tarkwa – open pits | **192.2** | **1.38** | **8.511** | 8.679 | Tarkwa – open pits | **144.8** | **1.25** | **5.822** | 6.601 |
| Tarkwa – surface stocks | **66.6** | **0.43** | **0.924** | 0.889 | Tarkwa – surface | **66.6** | **0.43** | **0.924** | 0.889 |
| Total West Africa | **338.4** | **1.38** | **15.060** | 14.828 | **Total West Africa** | **232.6** | **1.03** | **7.719** | 8.725 |

*[1]Managed, unless otherwise stated*

Mineral Resources are inclusive of Mineral Reserves. All tonnes (t) relate to metric units. Rounding-off of figures may result in minor computational discrepancies, where this happens it is not deemed significant. In West Africa (Damang and Tarkwa) the Mineral Resources and Mineral Reserves were determined using a gold price of US$1,500/oz and US$1,300/oz respectively.

# 2.4 West Africa region (continued)

## Social licence to operate

Both the Tarkwa and Damang mines are ISO 14001 and OHSAS 18001 certified, as well as being certified to the ICMC.

All key licensing and regulatory permits for both Tarkwa and Damang are either in place for the current LoM or have been submitted to the relevant regulatory authorities for approval. Ongoing updates for various permits or applications for new approvals are submitted to the regulator on an ongoing basis, as required by operational needs.

West Africa region developed a five-year energy security plan during 2015 to manage the supply risks from the state utility during 2015, which included load shedding.

Implementation of the plan commenced during 2015 and permits have been received from the Environmental Protection Agency (EPA) for the construction of two gas turbine power plants by Genser Energy (an independent power producer); namely a 20MW plant at Tarkwa and another 20MW plant at Damang. The Genser Power Plants are scheduled for commissioning by the end of Q2 2016 for both Tarkwa and Damang.

Energy efficiency initiatives introduced in 2015 yielded savings of 186,514 GJ and emission reductions of 12,354 tonnes of $CO_2$, representing US$900,000 in savings.

A relationship proximity assessment was carried out in all host communities around Tarkwa and Damang during 2015, which concluded that both mines had strong relationships with their respective communities. Such assessments are an important benchmark in determining the status of the mines' social licence to operate.

The region continued with the implementation of a number of Shared Value and socio-economic development projects during 2015, including education, job creation, sanitation provision, construction of an information, communication and technology (ICT) centre, health care, and community capacity building in the areas of water and sanitation management.

| Sustainability factors | | Fatal injury frequency rate | Total recordable injury frequency Rate | Energy consumption (TJ) | $CO_2$ emissions (000 tonnes) (scope 1 and 2) | Water withdrawal (million litres) |
|---|---|---|---|---|---|---|
| **Damang** | **C2015** | **—** | **2.65** | **1,447** | **103** | **1,458** |
| | C2014 | — | 1.54 | 1,138 | 80 | 1,390 |
| **Tarkwa** | **C2015** | **0.07** | **0.40** | **3,694** | **262** | **4,216** |
| | C2014 | — | 0.52 | 3,357 | 238 | 3,500 |

# Damang Gold Mine

Damang is located in south-western Ghana, approximately 300 kilometres by road west of Accra, the capital, at latitude 5°11'N and longitude 1°57'W. The Damang concession lies to the north of and joins the Tarkwa concession, which is located near the town of Tarkwa. The area is served by access roads with established infrastructure, and a main road connects the mine to the port of Takoradi, some 90 kilometres to the south-east.

| Asset fundamentals | |
|---|---|
| **Licence status and holdings** | The Damang concession covers a total area of 23,666 hectares. All necessary statutory mining authorisations and permits are in place for the Damang mine lease, and Abosso Goldfields is entitled to mine all material falling within the lease. Abosso Goldfields holds a mining lease in respect of the Damang mine dated 19 April 1995, as amended by an agreement dated 4 April 1996. This lease expires in 2025, but is renewable under its terms and the provisions of the Minerals and Mining Law, by agreement between Abosso Goldfields and the Government of Ghana. |
| **Operational infrastructure and processing capacity** | The Damang plant processes mainly fresh ore with approximately 5% oxides, which is sourced from four open pit mining operations and existing surface stockpiles, located on the Damang mine lease.<br><br>The plant has been upgraded from 4.0Mtpa to 4.5Mtpa and is a conventional two-stage grinding circuit using a SAG and ball mill combination, with pebble crusher and gravity concentration, followed by a carbon-in-leach recovery process. Gravity gold is collected and treated by the Knelson Gravity concentrators and an In-line Leach Reactor.<br><br>The East Tailings Storage Facility (ETSF), with additional lifts, supports the LoM plan to December 2016 and then 2017-2020 is catered for by the Far East Tailings Storage Facility (FETSF) where permitting is already in place for the initial placement. |
| **Climate** | A tropical climate, characterised by two distinct rainy seasons from March to July and September to November. Average annual rainfall in the area is 2,245 millimetres. Although there may be minor disruptions to operations during the wet season, there is no operating or long-term constraint on production due to climate. |
| **Deposit type** | The Damang ore body is hosted by a north to north-easterly plunging antiform, developed within Tarkwaian sediments. The main Damang pit is located close to the closure of the antiform, and all other known mineralisation is located on the east and west limbs of the Damang anticline. The mine exploits fresh hydrothermal and oxide mineralisation in addition to Witwatersrand-style, palaeoplacer mineralisation. |
| **LoM** | It is estimated that the current Mineral Reserve will be depleted in 2020 (five years). |
| **Environmental, health and safety** | Damang retained its OHSAS 18001 (Safety Management system) certificate following the re-certification audit conducted in March 2015. Damang is ISO 14001-compliant and holds regulatory Certificates for Environmental Compliance.<br><br>Permits have also been issued for new infrastructure at the Huni Waste Dump and FETSF. An Environmental Impact Statement for the Amoanda – Juno growth Corridor project was submitted to the Ghana Environmental Protection Agency in Q3 2015 for environmental permitting. |

# 2.4 West Africa region (continued)

## Damang Gold Mine (continued)

### Brief history of Damang

#### Late 19th to mid-20th century

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 850 metres. 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 grade of 9.8g/t.

#### Late 20th to early 21st century

In 1989, Ranger Exploration (Ranger) began an investigation of retreating tailings from the Abosso mine. Following a drilling programme and subsequent feasibility study from 1993 to 1996, mining a mineralised quartz vein system to a depth of 200 metres was shown to be viable. Open pit operations commenced in August 1997 on the main pit, following the relocation of 3,000 people. Gold production started in November 1997 at the 3.0Mtpa capacity CIL plant. 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 and Gold Fields a 71.1% interest.

The Damang Expansion Project was initiated in 2004 to identify additional sources of ore from areas around the main pit. Following further drilling, a feasibility study was initiated to test the viability of a cut-back to extend the life of the main pit. Post approval of the necessary capital expenditure, the Damang pit cut-back (DPCB) and waste mining commenced in July 2005. A regional prospectivity study was completed in November 2005. In 2006, Mineral Resource estimation was carried out in the Rex, Tomento North, Tomento East, Tomento West and Huni areas. Amoanda Pit was finally depleted in August 2006. In 2010, drilling and Mineral Resource estimation was carried out at Amoanda North, Rex, Huni and Juno.

An updated conceptual extensional resource model was developed for the Greater Damang pit (Huni, Damang, Main and Juno) in 2011. Portions of the Damang pit down-dip extension drilling programme were completed and incorporated into the Greater Damang pre-feasibility study (PFS) with a resultant increase in Mineral Resource and Mineral Reserve ounces. During Q1 of 2011, the mine moved to owner mining and maintenance. GFG acquired the indirect 18.9% IAMGold interest in Damang and consequently holds 90% with the remaining 10% held by the Ghanaian government.

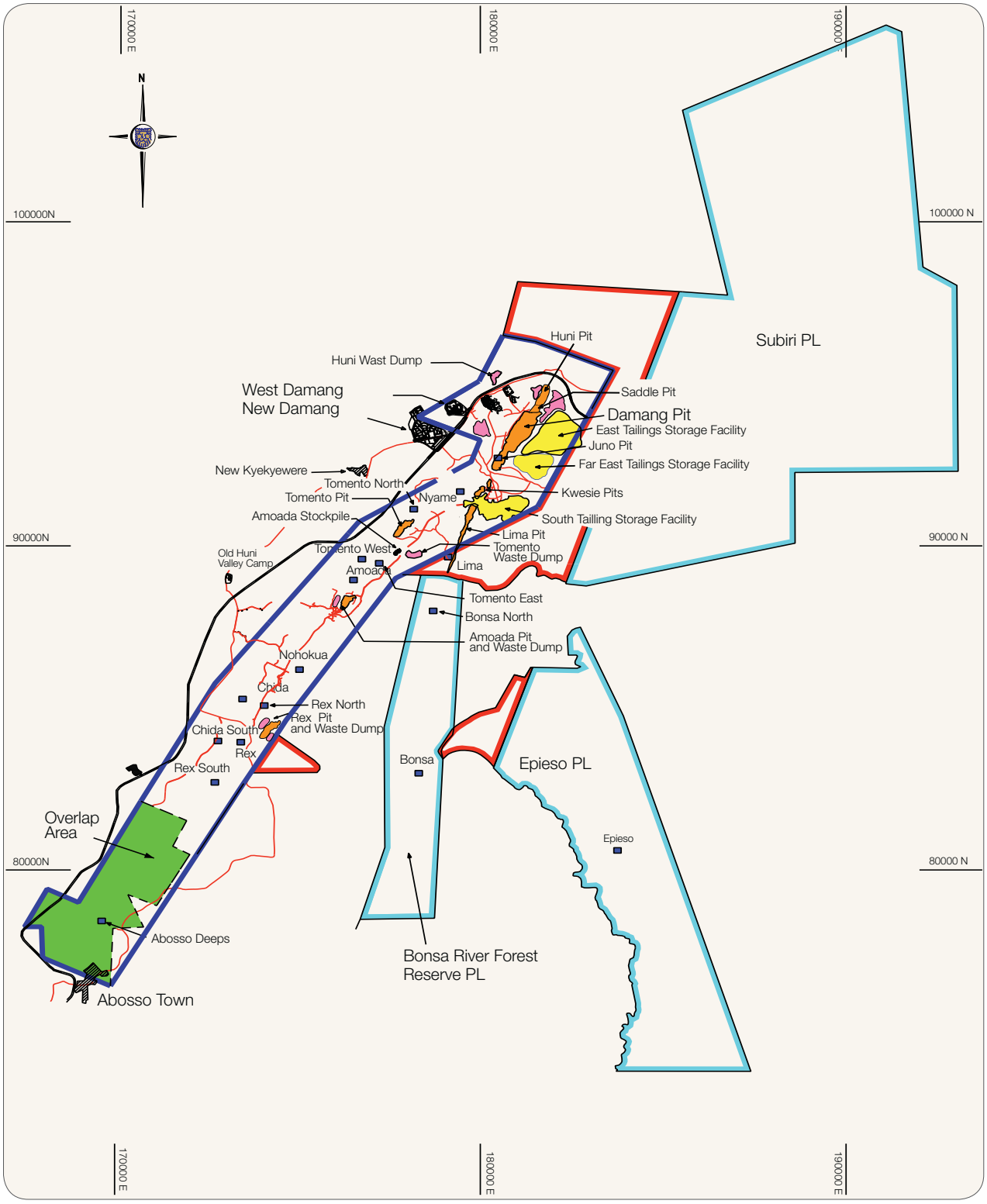
The pre-feasibility study for Greater Damang continued during 2012, following the completion of the Phase 2 drilling campaigns. Resource infill and geotechnical drilling programmes were completed on the Greater Damang Extension Project. Infill drilling and modelling of the Greater Amoanda Project was completed.

The fall in the gold price in 2013 resulted in the Greater Damang project being placed on hold, with the operation being restructured to maintain viability during the expected period of low gold price. The Damang turn around project in 2014 resulted in a return to profitability and positive free cash flow margin.

During 2015, infill drilling was completed at Huni-Saddle Bridge, Amoanda, Tomento North and Tamang with extensional drilling done at Juno East. Updates on the Damang Complex, Rex, Amoanda and Tomento North models were completed. The Damang Complex model was updated based on new drilling information, as well as reinterpretation of the existing five fault block model into six fault blocks.

### Key developments at Damang

- The Mineral Reserves at Damang are based on an interim LoM plan, and have decreased from 1.2Moz to 1.0Moz, mostly as a result of depletion. A comprehensive assessment of strategic options to determine the prognosis for the mine and identify the best long-term plan is underway and we expect to confirm a decision by mid-2016. The mine has a good ore body at depth under the original pit that will require a push-back to expose. Options being reviewed range from 'Care and Maintenance' to a significantly expanded pit and extended LoM including several options in-between
- Near mine exploration continued at Huni, Saddle, Juno, Juno South and Amoanda. Tomento North drilling and modelling was completed in 2015 to better define the structural controls on the reefs. A three-dimensional model covering the Damang Mining Lease is in progress and will form the foundation for the identification of new brownfield exploration targets in 2016
- Advance Grade Control (AGC) drilling programmes have continued with the objective of de-risking the operational plan and keeping nine to 12 months of production within the AGC window
- Mining is designed to prioritise extraction from the pits with the highest economic value and is focused on the Huni, Saddle and Juno pits
- The Mineral Reserves declared as at 31 December 2015 are constrained by the existing ETSF adjacent to the Damang pit, and include Mineral Resources from the Cut-back 2 pit area
- During 2015, Damang reviewed the option of owner vs contractor mining and under the current economic conditions, it is proving feasible to return to a contractor mining operation model for the foreseeable future




## Reference

| | | | |
|---|---|---|---|
| Roads | | Tailing Storage Facility | |
| National Railway | | Open Pit | |
| Mining Lease | | Waste Dumps | |
| Mining Lease Lema South | | Exploration Sites / Projects | |
| Prospecting Licenses (PL) | | | |

**Gold Fields Limited**
**Damang Gold Mine**

PLAN SHOWING MINE INFRASTRUCTURE AS AT 31 DECEMBER 2015

0 1 2 3 4 5
Kilometres

Ghana National Grid Co-ordinate System

# 2.4 West Africa region (continued)

## Damang Gold Mine (continued)

### Operating statistics

| | | Historic performance | | | |
|---|---|---|---|---|---|
| | Units | **C2015** | C2014 | C2013 | C2012 |
| **Open pit mining** | | | | | |
| Total mined | kt | **21,384** | 19,191 | 30,145 | 33,502 |
| – Waste mined | kt | **16,682** | 15,310 | 26,140 | 29,192 |
| – mined | kt | **4,702** | 3,880 | 4,006 | 4,310 |
| Mined grade | g/t | **1.27** | 1.34 | 1.24 | 1.53 |
| Strip ratio (tonnes) | waste:ore | **3.55** | 3.95 | 6.53 | 6.77 |
| **Processing** | | | | | |
| Mill tonnes | kt | **4,295** | 4,044 | 3,837 | 4,416 |
| Mill head grade | g/t | **1.33** | 1.50 | 1.40 | 1.29 |
| Yield | g/t | **1.22** | 1.37 | 1.24 | 1.17 |
| Plant recovery factor | % | **90.9** | 91.0 | 89.2 | 90.2 |
| | koz | **168** | 178 | 153 | 166 |
| Total gold production | kg | **5,220** | 5,528 | 4,761 | 5,174 |
| **Financials** | | | | | |
| Gold price received | US$/oz | **1,161** | 1,266 | 1,413 | 1,668 |
| Operating cost | US$/oz | **1,098** | 999 | 1,118 | 946 |
| Capital expenditure | US$/oz | **101** | 16 | 327 | 732 |
| AISC | US$/oz | **1,326** | 1,176 | 1,558 | |
| **General** | | | | | |
| Mineral Reserves | Mt | **21.2** | 25.7 | 22.8 | 76.1 |
| Mineral Reserves head grade | g/t | **1.43** | 1.49 | 1.46 | 1.67 |
| Mineral Reserves | Moz | **1.0** | 1.2 | 1.1 | 4.1 |

*Rounding-off of figures presented in this report may result in minor computational discrepancies. Where this occurs, it is not deemed significant*

### Local geology

Damang mine exploits fresh hydrothermal and oxide mineralisation, in addition to palaeoplacer material. The hydrothermal mineralisation is located in Tarkwaian sediments and is the only deposit of its kind located on the eastern side of the Ashanti Belt in south-west Ghana.

The Damang ore body is hosted by a north-easterly plunging antiform, developed within Tarkwaian sediments. The main Damang pit is located near to the closure of the antiform, and all other known palaeoplacer mineralisation is located on the east and west limbs of the Damang anticline.

The stratigraphy at Damang is primarily within the Tarkwaian Group and comprises a large-scale fining upwards sequence of clastic sediments, interrupted by up to four major gold-bearing quartz-pebble conglomerate horizons. This sequence unconformably overlies a mixed Birimian Supergroup basement, comprising volcaniclastic units, minor fine-grained clastic sediments and black shales.

### Palaeoplacer mineralisation

There are three gold-bearing conglomerate horizons recognised on the western limb of the Damang anticline. From footwall to hangingwall, these are known as the Star/Composite, Malta/Breccia and Gulder Reefs. There are also three gold-bearing conglomerate horizons recognised on the eastern limb, namely the Lima, Kwesie-K1 and Kwesie-K2 Reefs. These conglomerate horizons are separated by poorly mineralised sandstone units.

The reefs are usually characterised by a fining upwards sequence of poorly- to moderately-sorted, clast-supported polymictic conglomerates. However, local variations are observed where the conglomerate domain is interbedded with fine to coarse-grained, poorly sorted sandstones. The Star/Composite, Malta/Breccia and Gulder Reefs on the west limb and the Lima, Kwesie-K1 and Kwesie-K2 Reefs on the east limb of the Damang anticline feature significantly higher gold grades than the poorly mineralised sandstone units, which separate the reefs. The conglomerate reefs may contain

between 1.3 and 1.5g/t gold, and the poorly mineralised sandstone units usually contain between 0.1 and 0.2g/t gold.

## Hydrothermal mineralisation

Hydrothermal gold mineralisation at Damang occurs in pyrite and pyrrhotite alteration selvages, which are usually less than one-metre wide and located immediately adjacent to en-echelon quartz veins. Gold is also associated with accessory vein minerals such as carbonate, muscovite, tourmaline, ilmenite and apatite. These alteration zones are often linked, and may result in significant volumes, characterised by intense veining and gold mineralisation.

Damang is unique in Ghana by virtue of having hydrothermal mineralisation hosted in the quartzites of the Tarkwaian banket footwall, as opposed to the metavolcanics and metasediments of the Birimian Basement, as seen at Prestea, Bogoso and Obuasi. To date, no significant hydrothermal mineralisation has been encountered in the Birimian lithologies at Damang.

## Exploration and resource definition drilling

Exploration drill programmes are designed to assess the magnitude and style of mineralisation. RC drilling, using a 100 x 100 metre grid, is usually employed for initial exploration drill-testing of both palaeoplacer and hydrothermal styles of mineralisation. To optimise exploration spend, diamond drilling is minimised in the initial exploration stages and it is used to establish stratigraphic and structural relationships, while allowing samples to be collected for metallurgical test work.

### 2015 Drilling

Although no brownfield exploration projects were carried out during 2015, a number of resource infill and extension drilling programmes were conducted at the various pits that encompass the Greater Damang ore body, as well as Amoanda. The 2015 phase of RC and diamond drilling completed at the Huni, Saddle, Juno and Juno South pits has increased geological confidence in the 2015 Damang Resource Model. Drilling at the Amoanda Pit targeted extensions to the south. Infill drilling was undertaken at the near surface hydrothermal mineralisation at Tamang to facilitate a maiden resource estimate to be completed in 2016. The drilling campaigns are described in more detail under the section on projects.

## Mining

Mining at Damang is carried out by conventional open pit methods utilising Gold Fields personnel and equipment. Owner mining includes all load and haul, blasting, construction and dewatering activities while contractors are responsible for production drilling, blast hole charging, stockpile rehandling and grade control drilling. From 2016, however, load and haul, blasting, construction and dewatering activities will become the responsibility of a contractor. Load and haul is undertaken using a standard truck-shovel operation, with excavators in backhoe configuration. The haulage fleet consists of twenty-six dump trucks, with an average payload capacity of 91 tonnes each. Off-highway trucks haul ore to the RoM pad, stockpiles and waste dumps. A fleet of tipper trucks reclaims stockpiled ore and transports it to the treatment plant.

Ancillary equipment supporting the drill-and-blast and haulage operations through road and bench maintenance, dust and erosion control, and equipment maintenance includes bulldozers, graders, water trucks and service trucks.

The Damang plant processes mainly fresh and limited oxide ore, which is

# 2.4 West Africa region (continued)

## Damang Gold Mine (continued)

sourced from four open pits and existing surface stockpiles, located on the Damang mine lease.

### Mining methods

Fresh rock and transitional zones are drilled and blasted in nine-metre lifts, with excavation in three-metre flitches. Oxide material, which cannot be "free-dug", is blasted using lower powder factors. Off-highway trucks haul the ore to the RoM pad and waste to the respective planned dumps. For pits that are further than 5km from the RoM pad, the off-highway trucks haul the ore to interim stockpiles near the pits and a fleet of tipper trucks reclaim and transport the ore to the RoM pad.

Damang has a progressive reclamation plan, where areas that become inactive are immediately rehabilitated through contouring and replacement of topsoil, seeding, planting and fertilisation.

### Mine planning and scheduling

The Mineral Resource model forms the basis for subsequent design, planning and extraction scheduling, incorporated into the LoM plan. A combination of commercial software packages is used to produce the LoM plan.

Open pit planning involves the input of economic parameters and physical constraints into optimisation software to generate a series of nested pits from which an optimal shell is selected. Detailed design is then undertaken to confirm the mineability of the optimised shell. Almost all the operating pits in Damang are push-backs, making the pit design exercise critical when it comes to keeping strip ratios low and taking cognisance of minimum mining width restrictions to accommodate planned mining fleet productivities.

Mine planning is based on three-dimensional block models of in situ mineralisation, with allowances made for minimum mining widths, dilution, and ore loss appropriate to the mining method being considered. Historical performance measures are considered in determining these modifying factors. Infrastructure, tailings storage facilities, waste disposal and ore stockpile management requirements are incorporated into the planning process.

### Projects

The primary objectives of 2015's drilling campaign were to:

- Enhance the understanding of the geology and controls on grade distribution
- Increase confidence in the resource models and reconciliation to declared ore mined
- Strengthen the Mineral Resource base through selective infill drilling

The areas that were drilled are the Huni, Saddle, Juno East and South, Tomento North, Amoanda and Tamang projects. A total of 14,595 metres (for 7,045 metres RC and 7,550 metres DD) were drilled during the year.

A target review and ranking exercise was conducted drawing on previous studies to establish a pipeline of brownfield projects for Damang. The aim of the exercise was to identify (and subsequently develop) projects that provide a solid return on exploration investment and provide critical operational flexibility.

Establishing a suitable mining contractor and implementing a fit for purpose mining and haulage fleet is a priority for H1 2016, which, in conjunction with rigorous controls on mining dilution and cost containment, will underpin delivery on the short-term plan.

## Mineral Resources and Mineral Reserves

The Damang Mineral Resource and Mineral Reserve declaration is based on well-defined and robust mineral reporting practices. The geological structure, reef wire frame and ore pod models are updated using systematic RC and DD drilling with subsequent core-logging and sampling. Ongoing assaying of RC and DD, together with grade control samples, provide additional grade and geological data, which is incorporated into each evaluation model.

Updated pit designs and schedules are compiled and evaluated based on the most recent technical and economic parameters, and are used to generate the LoM plan, taking into account pit limits, geotechnical constraints, haul road distance and plant capacity.

### Mineral Resources

Mineral Resources are quoted at an appropriate in situ economic cut-off grade, with tonnages and grades based on the relevant resource block models. They also include estimates of any material below the cut-off grade that needs to be mined to extract the complete pay portion of the Mineral Resource.

*Mineral Resource classification*

| | Tonnes (kt) | | | Grade (g/t) | | | Gold (koz) | | |
|---|---|---|---|---|---|---|---|---|---|
| **Classification** | **Dec 15** | Dec 14 | Dec 13 | **Dec 15** | Dec 14 | Dec 13 | **Dec 15** | Dec 14 | Dec 13 |
| **Open pit** | | | | | | | | | |
| Measured | **8,753** | 8,392 | 4,600 | **1.94** | 1.80 | 2.05 | **545** | 485 | 303 |
| Indicated | **58,076** | 67,996 | 75,700 | **2.33** | 1.96 | 2.16 | **4,357** | 4,285 | 5,252 |
| Inferred | **7,665** | 5,018 | 12,100 | **2.40** | 2.40 | 2.41 | **591** | 388 | 938 |
| **Total open pit and underground** | **74,494** | 81,406 | 92,400 | **2.29** | 1.97 | 2.19 | **5,493** | 5,158 | 6,494 |
| Surface stockpiles | | | | | | | | | |
| **Total surface stockpiles** | **5,112** | 3,870 | 3,400 | **0.80** | 0. 82 | 0.78 | **132** | 102 | 86 |
| **Grand total** | **79,606** | 85,276 | 95,800 | **2.20** | 1.92 | 2.14 | **5,625** | 5,260 | 6,579 |

*Mineral Resource classification per mining area*

| | Measured | | | Indicated | | | Inferred | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Deposit | Tonnes (kt) | Grade (g/t) | Gold (koz) | Tonnes (kt) | Grade (g/t) | Gold (koz) | Tonnes (kt) | Grade (g/t) | Gold (koz) | Tonnes (kt) | Grade (g/t) | Gold (koz) |
| DPCB 2 | 3,564 | 2.15 | 246 | 22,953 | 2.49 | 1,835 | 4,936 | 2.66 | 421 | 31,453 | 2.48 | 2,503 |
| Huni | 384 | 1.92 | 24 | 4,096 | 2.18 | 287 | 22 | 3.8 | 3 | 4,503 | 2.17 | 314 |
| Saddle | 1,058 | 2.23 | 76 | 10,345 | 2.72 | 904 | 1,043 | 2.72 | 91 | 12,446 | 2.68 | 1,071 |
| Juno | 1,643 | 2.02 | 107 | 3,411 | 2.32 | 254 | 0.23 | 1.92 | 0.01 | 5,054 | 2.22 | 361 |
| Amoanda | 772 | 1.59 | 39 | 5,132 | 1.96 | 324 | 186 | 1.22 | 7 | 6,090 | 1.89 | 371 |
| Rex | 1,332 | 1.23 | 53 | 9,119 | 2.19 | 641 | 1,479 | 1.43 | 68 | 11,930 | 1.99 | 762 |
| Tomento East | | | | 500 | 1.21 | 20 | | | | 500 | 1.21 | 20 |
| Abosso Tails | | | | 1,343 | 1.09 | 47 | | | | 1,343 | 1.09 | 47 |
| Lima South | | | | 873 | 1.04 | 29 | | | | 873 | 1.04 | 29 |
| Tomento North | | | | 303 | 1.68 | 16 | | | | 303 | 1.68 | 16 |
| **Total open pit** | 8,753 | 1.94 | 545 | 58,076 | 2.33 | 4,357 | 7,665 | 2.40 | 591 | 74,494 | 2.29 | 5,493 |
| Stockpiles | 5,112 | 0.80 | 132 | | | | | | | 5,112 | 0.80 | 132 |
| **Grand total** | 13,865 | 1.52 | 677 | 58,076 | 2.33 | 4,357 | 7,665 | 2.40 | 591 | 79,606 | 2.20 | 5,625 |

# 2.4 West Africa region (continued)

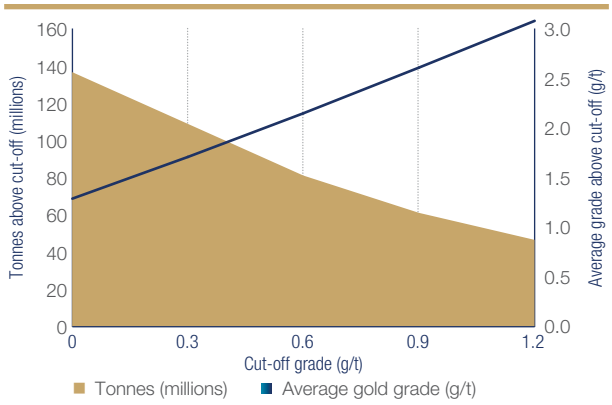
## Damang Gold Mine (continued)

*Modifying factors*

- The Measured and Indicated Mineral Resources are inclusive of those Mineral Resources modified to produce Mineral Reserves
- Unless otherwise stated, all Mineral Resources and Mineral Reserves are quoted as 100% managed and are not attributable with respect to ownership
- All Mineral Reserves are quoted in terms of RoM grades and tonnages as delivered to the metallurgical processing facilities, and are therefore fully diluted
- Mineral Reserve Statements include only Measured and Indicated Mineral Resources, modified to produce Mineral Reserves and contained in the LoM plan
- Mineral Resources and Mineral Reserves have undergone internal and external audits during the year under review

| | | December | | |
|---|---|---|---|---|
| | Units | **2015** | 2014 | 2013 |
| **Mineral Resource parameters** | | | | |
| Mineral Resource gold price | US$/oz | **1,500** | 1,500 | 1,500 |
| Cut-off for fresh ore | g/t | **0.63 – 0.85** | 0.58 | 0.74 |
| Cut-off for oxide ore | g/t | **0.46 – 0.62** | 0.43 | 0.49 |
| **Mineral Reserve parameters** | | | | |
| Mineral Reserve gold price | US$/oz | **1,300** | 1,300 | 1,300 |
| Cut-off for fresh ore | g/t | **0.67** | 0.71 | 0.87 |
| Cut-off for oxide ore | g/t | **0.46** | 0.52 | 0.59 |
| Strip ratio | waste:ore | **6.2** | 4.26 | 4.67 |
| Dilution (hydrothermal) | % | **15 – 20** | 17 – 20 | 6 – 25 |
| Dilution (palaeoplacer) | cm | **40** | 40 | 40 |
| Mining recovery factor | % | **90** | 90 | 90 |
| MCF | % | **95 – 96** | 95 – 98 | 92 |
| Plant recovery factor – fresh ore | % | **92** | 92 | 89 |
| Plant recovery factor – oxide ore | % | **93.5** | 93.5 | 93.5 |
| Processing capacity | Mtpa | **4.5** | 4.5 | 4.0 |

**Grade tonnage curve – Surface**




### Mineral Reserves

The Mineral Reserve estimate for Damang Gold Mine is based on development of appropriately detailed and engineered LoM plans. All design and scheduling work is undertaken to an appropriate level of detail by experienced engineers using appropriate mine-planning software. The planning process incorporates realistic modifying factors and the use of appropriate cut-off grades, geotechnical criteria, mining fleet productivities and other techno-economic investigations.

In general, Proved Mineral Reserves are derived from Measured Mineral Resources, and the Probable Mineral Reserves are derived from Indicated Mineral Resources, except where confidence levels of modifying factors lead to Measured Mineral Resources converting to lower-confidence Probable Mineral Reserves. The stockpiles included in the Mineral Reserve comprise mostly lower-grade mineralisation that has been accumulated since the start of mining the Damang pit.

*Mineral Reserve classification*

| | Tonnes (kt) | | | Grade (g/t) | | | Gold (koz) | | |
|---|---|---|---|---|---|---|---|---|---|
| **Classification** | **Dec 15** | Dec 14 | Dec 13 | **Dec 15** | Dec 14 | Dec 13 | **Dec 15** | Dec 14 | Dec 13 |
| Open pit | | | | | | | | | |
| Proved | **3,126** | 1,732 | 1,067 | **1.29** | 1.55 | 1.61 | **130** | 86 | 55 |
| Probable | **14,531** | 20,096 | 18,373 | **1.58** | 1.62 | 1.58 | **739** | 1,046 | 932 |
| **Total open pit** | **17,656** | 21,828 | 19,440 | **1.53** | 1.61 | 1.58 | **869** | 1,132 | 987 |
| Surface stockpiles | | | | | | | | | |
| Probable low-grade stockpiles | **3,564** | 3,871 | 3,400 | **0.91** | 0.82 | 0.78 | **104** | 102 | 86 |
| **Grand total** | **21,220** | 25,699 | 22,840 | **1.43** | 1.49 | 1.46 | **973** | 1,235 | 1,073 |

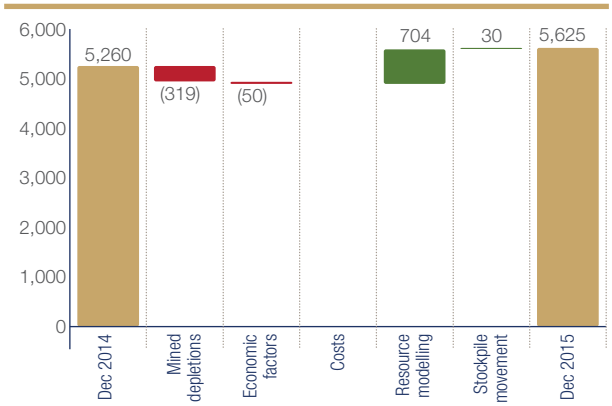
*Mineral Reserve classification per mining area*

| | Proved | | | Probable | | | Total Mineral Reserve | | |
|---|---|---|---|---|---|---|---|---|---|
| Mining area | Tonnes (kt) | Grade (g/t) | Gold (koz) | Tonnes (kt) | Grade (g/t) | Gold (koz) | Tonnes (kt) | Grade (g/t) | Gold (koz) |
| **Open pit** | | | | | | | | | |
| Huni | 260 | 1.16 | 10 | 2,480 | 1.46 | 117 | 2,741 | 1.43 | 126 |
| Saddle | 1,346 | 1.46 | 63 | 3,619 | 1.65 | 192 | 4,965 | 1.60 | 255 |
| DPCB | — | — | — | — | — | — | — | — | — |
| Juno 2 | 2 | 1.10 | — | — | — | — | 2 | 1.10 | — |
| Juno 3 | — | — | — | — | — | — | — | — | — |
| Lima South | — | — | — | 694 | 1.04 | 23 | 694 | 1.04 | 23 |
| Amoanda | 581 | 1.41 | 26 | 1,338 | 1.46 | 63 | 1,920 | 1.45 | 89 |
| Rex | 935 | 1.03 | 31 | 6,399 | 1.67 | 344 | 7,334 | 1.59 | 375 |
| **Total open pit** | **3,126** | **1.29** | **130** | **14,531** | **1.58** | **739** | **17,656** | **1.53** | **869** |
| **Surface** | | | | | | | | | |
| Surface stockpiles | 3,564 | 0.91 | 104 | — | — | — | 3,564 | 0.91 | 104 |
| **Grand total** | **6,690** | **1.09** | **234** | **14,531** | **1.58** | **739** | **21,220** | **1.43** | **973** |

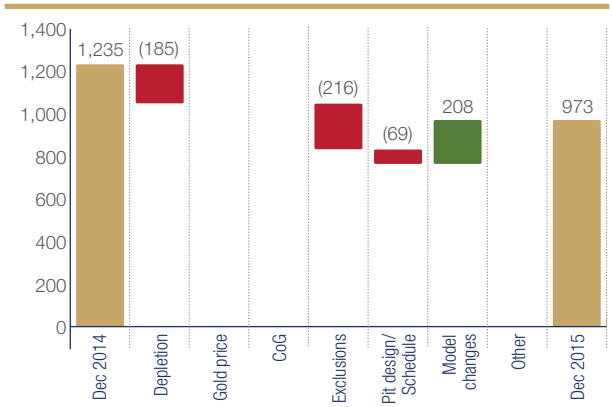
*Mineral Resource and Mineral Reserve reconciliation year-on-year*

| Factors that affected Mineral Resource changes year-on-year | Factors that affected Mineral Reserve changes year-on-year |
|---|---|
| Lower mining cost | Lower mining cost and lower cut-off grades – driven by lower selling and sustaining costs and better plant recoveries |
| Marginally steeper geotechnical pit wall angles | The exclusion of Juno3 and portion of DPCB, together with the inclusion of Huni Cutback 2 and Amoanda |
| Mined depletions | Mined depletions |
| Resource model updates with drilling and mapping information | Updates to Resource Model from grade control and infill drilling, pit mapping and reinterpretations |
| | Marginal ore included is NPV accretive |

**Mineral Resource Reconciliation**
(Gold – koz)




**Mineral Reserve Reconciliation**
(Gold – koz)



# 2.4 West Africa region (continued)

## Damang Gold Mine (continued)

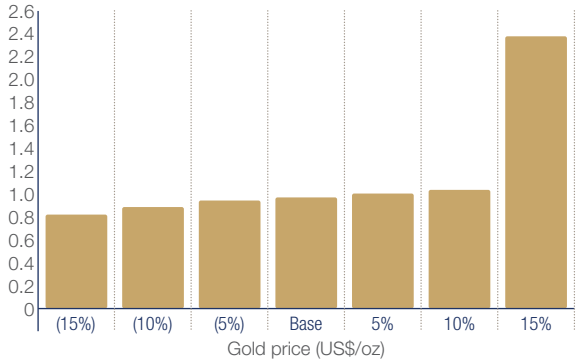
### Mineral Reserve sensitivity

The Mineral Reserve sensitivity has been derived from the application of the relevant cut-off grades to individual grade tonnage curves of the optimised pit shells for the open pits.

The Mineral Reserve sensitivities are not based on detailed depletion schedules and should be considered on a relative and indicative basis only. The sensitivity chart indicates the Managed Mineral Reserve sensitivity at -15%, -10%, -5%, Base (US$1,300/oz), +5%, +10%, and +15% to the gold price.

**Mineral Reserve sensitivity**

Gold – Moz)




### Competent Persons

Internal technical reviews have been conducted by the Competent Persons as listed, who are full-time employees of Gold Fields Limited.

***R Downing***

*Regional Mineral Resources Manager*

BSc Hons (Geology and Environment), GDE: Mining Engineering, MAusIMM (No 229889).

**Industry experience:** He has 35 years' experience in mining and exploration in South Africa, Ireland and Ghana. Commodities: Oil, gold – palaeoplacer, hydrothermal, shear hosted refractory, base metal – zinc, lead, silver. He is the lead Competent Person for the West Africa Region, jointly responsible for the overall correctness, standard and compliance of this declaration.

***M Aidoo***

*Mineral Resources Manager*

BSc Hons (Geology), MSc Mining Engineering, MAusIMM (No 306569).

**Industry experience:** He has 15 years' experience in mining, resource evaluation/modelling and exploration in Ghana and Asia (Laos), Commodities: gold – hydrothermal and palaeoplacer, base metal – copper. He is jointly responsible for the overall correctness, standard and compliance of this declaration.

***K Appau***

*Unit Manager – Strategic Mine Planning*

M.Sc (Mining Engineering), MAusIMM (No. 316308).

**Industry experience:** He has eight years' experience in the mining industry in Ghana. Commodities: gold – hydrothermal and palaeoplacer. He is responsible for the overall accuracy of mine planning, optimisation, scheduling and Mineral Reserve estimation.

***J McNamara***

*Exploration Manager*

BSc (Geology), FAusIMM (No. 226312).

**Industry experience:** He has over 20 years' international mining industry experience in Australia, Asia, Europe and Africa, covering exploration, resource development and operational roles. Commodities: gold – hydrothermal and palaeoplacer, base metal – copper. He is responsible for exploration targeting, data acquisition and interpretation for Damang.

***T Kwesi Abakah***

*Unit Manager – Geostatistics and Resource Modelling*

BSc (Hons) Geological Engineering, MAusIMM (No 316516).

**Industry experience:** He has eight years' experience in mining, exploration, resource evaluation and modelling in Ghana. Commodities: gold – hydrothermal and palaeoplacer. He and is responsible for the compilation of this declaration.

# Tarkwa Gold Mine

Tarkwa is located in south-western Ghana approximately 300 kilometres by road west of Accra, the capital, at latitude 5°15'N and longitude 2°00'W. The Tarkwa Gold Mine is located four kilometres west of the town of Tarkwa with good access roads and an established infrastructure. The mine is served by a main road connecting to the port of Takoradi some 60 kilometres to the south on the Atlantic coast.

| Asset fundamentals | |
|---|---|
| **Licence status and holdings** | The Tarkwa mine operates under mining leases covering a total area of approximately 20,825 hectares. Five mining leases, dated 18 April 1997, cover the Tarkwa property, while two mining leases, dated 2 February 1988 and 18 June 1992 respectively, cover the Teberebie property. The Tarkwa concession mining leases expire in 2027 and the Teberebie property mining leases expire in 2018. Application for an extension of the mining leases has been applied for and all required fees and documentation submitted to the Minerals Commission of Ghana. There is no reason to expect that these will not be granted. All necessary statutory mining authorisations and permits are in place for the Tarkwa Mine Lease and GFG is entitled to mine all material falling within the lease. |
| **Operational infrastructure and processing capacity** | Four large open pits currently exploit the stacked narrow auriferous conglomerates, similar to those mined in the Witwatersrand Basin of South Africa.<br><br>Ore is processed utilising a conventional CIL plant, with a gyratory crusher feeding a SAG mill and ball mill. Gold is recovered from solution by electro-winning and smelted in an induction furnace. Current plant capacity is 13.5Mtpa.<br><br>LoM tailings deposition requirements are catered for in the short term by wall raise sequences at the operating TSF 1, 2 and 3 facilities and in the medium term by TSF 5 whose construction starts in Q1 2016. In the longer term, LoM tailings deposition requirements will be catered for by planned TSF's 4 and 6. |
| **Climate** | A tropical climate, characterised by two distinct rainy seasons from March to July and September to November. Average annual rainfall near the site is 2,245 millimetres. Although there may be minor disruptions to operations during the wet season, there is no operating or long-term constraint on production due to climate. |
| **Deposit type** | The open pit surface operation currently exploits the tabular auriferous conglomerates from four open pits – Pepe-Mantraim, Teberebie, Akontansi and Kottraverchy. |
| **LoM** | It is estimated that the current Mineral Reserves will be depleted in 2031 (16 years). |
| **Environmental, health and safety** | Tarkwa retained its ISO 14001 environmental management system and certification following an external audit during 2015. The mine also retained full compliance to the ICMC, as well as OHSAS 18001 in October and June 2014 respectively. |

# 2.4 West Africa region (continued)

## Tarkwa Gold Mine (continued)

### Brief history of Tarkwa

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.

GFG signed a management contract with the Ghanaian government to operate the mine in 1993, and in 1996 completed a feasibility study 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.

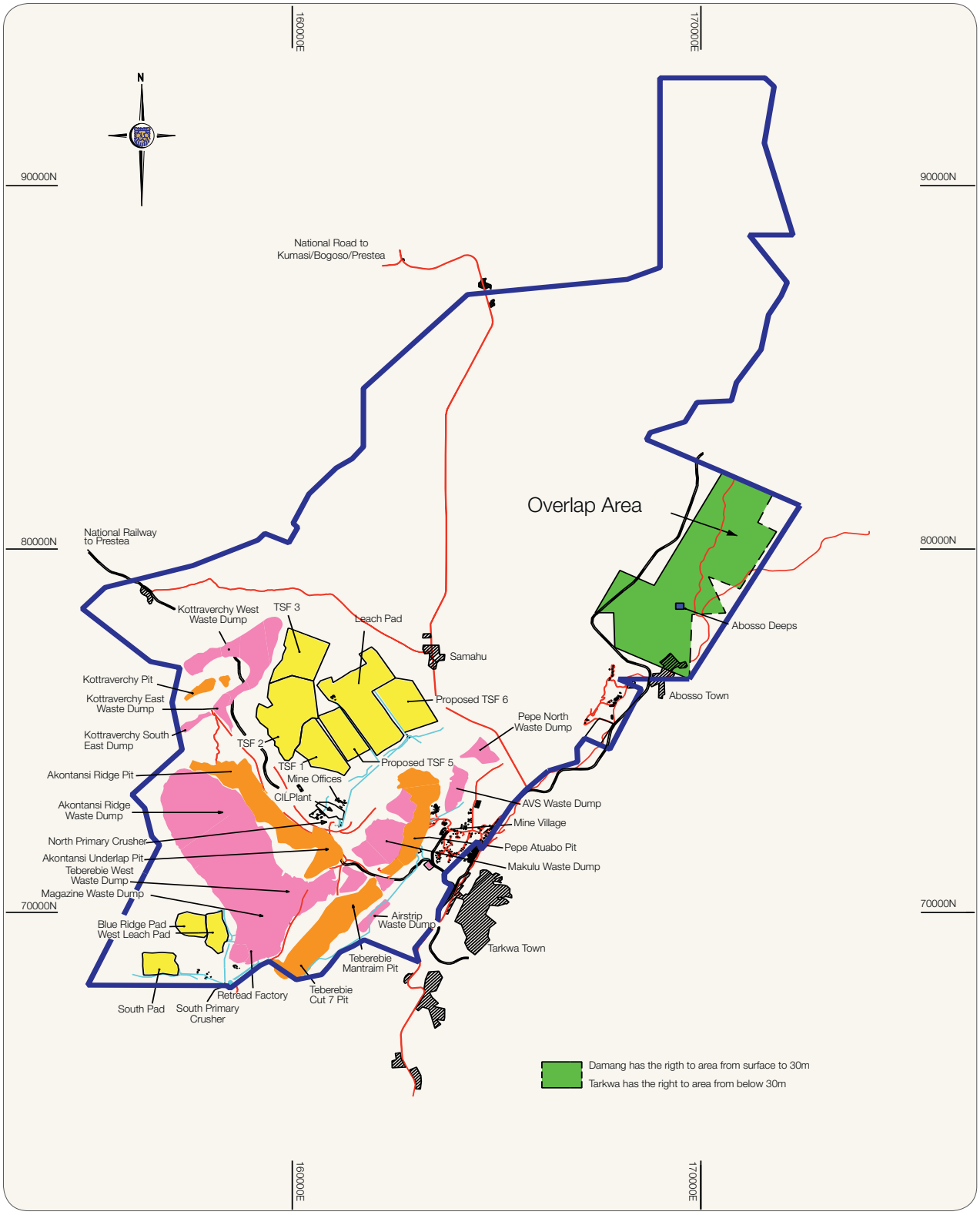
Tarkwa implemented owner mining in July 2004 and commissioned a CIL plant with a name plate capacity of 4.2Mtpa in October 2004. The expanded CIL plant was commissioned in January 2009 and a design throughput of 12.3Mtpa was achieved in September 2009. Conversion to owner maintenance was completed in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

In 2011, GFG acquired the 18.9% IAMGold interest in Tarkwa and now holds 90%, with the remaining 10% is 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.

### Key developments at Tarkwa

- Mineral Reserves decreased net of depletion (0.6Moz) from 7.5Moz to 6.7Moz
- The mine continues to deliver world-class mining and processing costs. Restructuring the mine to operate at lower total mining volumes (90 – 100Mtpa total mining) will facilitate operational flexibility and underpin targeted head grades to deliver 520 – 560koz of gold per annum
- Various alternative mining and processing options have been investigated to identify the best value option for Tarkwa. A CIL-only option proved to be the most operationally and financially viable choice, and, as a result, the throughput has been increased to 13.5Mtpa, with processing of the spent south heap leach material planned at the end of the LoM production profile
- Palaeoplacer and hydrothermal style exploration continues with the intent of defining new higher-grade ore sources
- Options for in-pit waste dumping are being assessed




## Reference

| | | | |
|---|---|---|---|
| Pipe Line | | Waste Dump | |
| National Road | | Open Pit | |
| National Railway | | Tailings/Pad | |
| Mining Lease | | Exploration Drilling Site | |

**Gold Fields Limited**
**Tarkwa Gold Mine**

PLAN SHOWING MINE INFRASTRUCTURE AS AT 31 DECEMBER 2015

0 1 2 3 4 5
Kilometres
Ghana National Grid Co-ordinate System

# 2.4 West Africa region (continued)

## Tarkwa Gold Mine (continued)

### Operating statistics

| | | Historic performance | | | |
|---|---|---|---|---|---|
| | Units | **C2015** | C2014 | C2013 | C2012 |
| **Open pit mining** | | | | | |
| Total mined | kt | **101,421** | 87,343 | 137,449 | 138,237 |
| – Waste mined | kt | **86,667** | 73,719 | 118,379 | 116,330 |
| – Ore mined | kt | **14,754** | 13,625 | 19,070 | 22,647 |
| Mined grade | g/t | **1.42** | 1.31 | 1.25 | 1.25 |
| Strip ratio (tonnes) | waste:ore | **5.9** | 5.4 | 6.2 | 5.3 |
| **Processing** | | | | | |
| **Combined** | | | | | |
| Tonnes treated | kt | **13,520** | 13,553 | 19,268 | 22,910 |
| Head grade | g/t | **1.38** | 1.26 | 1.16 | 1.08 |
| Yield | g/t | **1.35** | 1.23 | 1.02 | 0.98 |
| Plant recovery factor | % | **96.8** | 97.3 | 90.3 | 90.2 |
| | koz | **586** | 558 | 632 | 719 |
| Total gold production | kg | **18,228** | 17,363 | 19,665 | 22,358 |
| **CIL** | | | | | |
| Tonnes milled | kt | **13,520** | 13,361 | 11,823 | 11,600 |
| CIL: head grade | | **1.38** | 1.22 | 1.39 | 1.44 |
| – Yield ex-mill | koz | **586** | 527 | 513 | 540 |
| | g/t | **1.35** | 1.23 | 1.35 | 1.4 |
| CIL: Plant recovery factor | % | **96.8** | 97.3 | 97.5 | 97.0 |
| **Heap leach** | | | | | |
| Tonnes to heap leach | kt | **0** | 192 | 7,445 | 11,310 |
| Heap leach: head grade | | **0** | 0.76 | 0.81 | 0.85 |
| – Yield ex-heap leach | koz | **0** | 31 | 119 | 179 |
| | g/t | **0** | n/a | 0.5 | 0.49 |
| Heap leach: Recovery Factor (RF) | % | **n/a** | n/a | 60 | 61 |
| **Financials** | | | | | |
| Average Au price received | US$/oz | **1,161** | 1,266 | 1,413 | 1,668 |
| Operating cost | US$/oz | **570** | 670 | 749 | 688 |
| Capital expenditure | US$/oz | **348** | 312 | 327 | 361 |
| AISC | US$/oz | **970** | 1,068 | 1,291 | |
| **General** | | | | | |
| Mineral Reserves | Mt | **211.3** | 222.4 | 218.8 | 293.3 |
| Mineral Reserves head grade | g/t | **0.99** [1] | 1.05 | 1.03 | 1.07 |
| Mineral Reserves | Moz | **6.75** | 7.49 | 7.27 | 10.1 |

[1] *Open pit Mineral Reserve grade = 1.25g/t (excluding surface stockpiles)*
*Rounding-off of figures presented in this report may result in minor computational discrepancies. Where this occurs, it is not deemed significant*

### Local geology

The local geology at Tarkwa is dominated by the banket series, which can be further subdivided into a footwall and hangingwall barren quartzite, separated by a sequence of mineralised conglomerates and pebbly quartzites.

The stratigraphy of the individual quartzite units is well established, with auriferous reefs interbedded with barren immature quartzites. The units thicken to the west and current sedimentological parameters indicate a flow from the east and north-east. Structurally, the Tarkwaian belt has been subject to moderate folding, and at least five episodes of deformation are recognised. The original deposition occurred in a district basin environment with associated low to steep-angle normal faulting. Subsequent compression and folding led to the development of thrust faults and inversion of previous normal faults.

The final stages involved further thrusting in a south-westerly direction.

Sedimentological studies of the detailed stratigraphy within individual footwall reef units have led to the recognition of both lateral and vertical facies variations. The modelling of these has resulted in the recognition of a cycle of events from initial channel formation and rapid down-cutting of the central channel, through a period of uplift and reworking. Finally, a period of meandering channel bars and flow reduction led to the development of low-grade conglomerates with silty inter-beds. The period of uplift and reworking has been recognised as being the principal episode of gold deposition and concentration within these reefs. The style of sedimentation ranges from channelised and incised reefs to more localised sheet-flood-dominated alluvial fan deposits.

## Exploration and resource definition drilling

The bulk of the Tarkwa open pit palaeoplacer Mineral Resource has been drilled and classified into the Measured and Indicated Mineral Resource categories at current costs and a gold price of US$1,500/oz. Tarkwa is now a well-established and understood mine, with the value-driven strategy focused on optimising the pit staging, mining mix and processing throughput rates.

Following the results of the reconnaissance soil sampling programme initiated in September 2014, on a 400m x 100m grid pattern and a geophysical survey carried out in 2012 over the lease area, a number of anomalous areas were identified. Previously less understood sectors on the concession were targeted for exploration to assess potential for new discovery. The initial programme was completed at the end of December 2014, and follow-up soil sampling, trenching and infill drilling were conducted over the resulting prioritised anomalies in 2015. The targets were hydrothermal style to the very south of the concession and palaeoplacer units to the north. To the very south, even though some high grades were intersected in the hydrothermal targets, they were very thin and lacked continuity. This area is the focus of the 2016 drilling programme. To the north, where the focus was the extension of the palaeoplacer underground, the basal reef, which carries the highest grades, has been confirmed as extensively mined out from historical underground mining.

## Mining

Tarkwa is a large, highly-efficient open pit gold mine with impressive productivities and operating costs. It utilises well-defined selective surface mining methods to optimise the extraction of the sedimentary mineral deposits.

The mine is owner-operated and has its own load and haul fleet of 16 excavators, which range from 120 to 400 tonnes. The haul fleet includes 67 dump trucks with a payload of 146 tonnes, eight dump trucks with a payload of 240 tonnes and nine dump trucks with a payload of 90 tonnes. The load and haul fleet are supported by an ancillary fleet consisting of dozers, graders, water carts and compactors. A total of 22 owner-operated drill rigs are used for blast hole drilling. Maintenance of the fleet is carried out by Tarkwa mine, while maintenance of the excavators is carried out by contractors.

### Mining methods

Tarkwa utilises a proven and highly-selective mining methodology that optimises ore recovery and minimises dilution. The location and sequencing of the mining areas is defined through the long-term planning process. The boundaries of the pits are pegged out by survey and the area is cleared of bush and

# 2.4 West Africa region (continued)

## Tarkwa Gold Mine (continued)

topsoil, which is relocated for rehabilitation purposes. After clearing, RC grade control drilling is carried out and geological models updated. This grade control information is used to inform the short-term plans and forecasts prior to the commencement of mining. Currently, fresh rock and transitional zones are drilled and blasted in six-metre lifts, with excavation in three-metre flitches.

Backhoe excavators are used to select waste from the ore, and vice versa. This takes place along the sedimentary horizons to an average accuracy of 30 centimetres on the hangingwall, and 20 centimetres on the footwall of a reef. Pit geologists and geo-technicians supervise all digging and mineralised material is classified as either RoM, which is delivered to one of two primary crushers; or low grade material, which is stockpiled close to the primary crushers. Waste material is hauled to the nearest waste dump.

### Mine planning and scheduling

The planning cycle commences with the ratification of key input parameters, before producing a compliant and updated Mineral Resource Statement that is adjusted for all Mineral Resource depletions. This is followed by the planning process, which includes all technical inputs such as geotechnical, hydrogeological and detailed pit engineering and accommodates all modifying factors and fleet productivity rates.

A cut-off grade strategy is used in the Mineral Reserve estimation process whereby the cut-off defines the ore/waste segregation. The optimal cut-off/cut-over is also derived, which can be applied to increase the grade and therefore the cash flow in the initial years of the LoM plan without compromising long-term planning objectives. Material between the optimal cut-off/cut-over and the metallurgical process cut-off is stockpiled for treatment at the end of the LoM. A detailed one-year operating and capital cost budget is developed for all operational plans and, where appropriate, extended for the LoM production schedule. Historic productivity data and operating costs are utilised as the basis from which the operational budget is benchmarked. All capital projects are ranked and prioritised to maximise capital efficiency and return on investment. Importantly, maintenance of the capital waste strip to secure a steady flow of high-grade ore to deliver ongoing mining flexibility is strictly monitored.

### Projects

Business improvement remains 'business as usual' and, together with the priority placed on health and safety, the key areas of production, quality and cash generation continue to receive focus. Optimisation of the crushing rate and stockpile management, improved blast fragmentation and leveraging the shared services strategy are targeted areas.

The major LoM project in 2016 is a study to assess the opportunity to optimise the CIL plant to a potential 15.5Mtpa capacity, to be fed with either the old North Heap leach material or newly mined material from the pits. Additional projects in 2016 will include the continued evaluation of alternative waste dumping and tailings disposal strategies, including in-pit dumping, energy and carbon-efficiency initiatives and ongoing business and performance improvement programmes.

## Mineral Resources and Mineral Reserves

The year-on-year Mineral Resources and Mineral Reserves have changed by -1% and -10% respectively, as a result of mining depletion, resource model and mine design changes, inclusions and cost input updates.

Stockpile tonnage and grade estimates are based on accumulations of estimated tonnage and grades trucked throughout the history of the mine, and are therefore considered to be reasonably accurate. However, the grades and tonnages are discounted by 5% for processing purposes, as experience has shown that this is realistically achievable when reclaiming a stockpile. Unless otherwise stated, all Mineral Resources and Mineral Reserves are quoted as 100% managed and are not attributable with respect to ownership.

### Mineral Resources

Mineral Resources are quoted at an appropriate in situ economic cut-off grade, with tonnages and grades based on the resource block model. They also include estimates of any material below the cut-off grade that is required to be mined in order to extract the complete pay portion of the Mineral Resource.

*Mineral Resource classification*

| | Tonnes (kt) | | | Grade (g/t) | | | Gold (koz) | | |
|---|---|---|---|---|---|---|---|---|---|
| **Classification** | **Dec 15** | Dec 14 | Dec 13 | **Dec 15** | Dec 14 | Dec 13 | **Dec 15** | Dec 14 | Dec 13 |
| **Open pit and underground** | | | | | | | | | |
| Measured | **70,439** | 81,573 | 99,600 | **1.47** | 1.48 | 1.48 | **3,324** | 3,880 | 4,731 |
| Indicated | **117,029** | 109,097 | 109,000 | **1.33** | 1.34 | 1.31 | **5,015** | 4,688 | 4,592 |
| Inferred | **4,752** | 3,060 | 2,930 | **1.13** | 1.13 | 1.07 | **172** | 111 | 101 |
| **Total in situ** | **192,220** | 193,730 | 211,530 | **1.38** | 1.39 | 1.39 | **8,511** | 8,679 | 9,425 |
| **Surface** | | | | | | | | | |
| Measured stockpiles | **6,588** | 5,000 | 4,200 | **0.72** | 0.73 | 0.70 | **152** | 118 | 95 |
| South Heap Leach (Indicated) | **59,977** | 60,000 | 59,977 | **0.40** | 0.40 | 0.40 | **771** | 771 | 771 |
| **Total surface** | **66,565** | 65,000 | 64,177 | **0.43** | 0.43 | 0.42 | **924** | 889 | 866 |
| **Grand total** | **258,785** | 258,730 | 275,707 | **1.13** | 1.15 | 1.16 | **9,435** | 9,568 | 10,291 |

*Mineral Resource classification per mining area*

| | Measured | | | Indicated | | | Inferred | | | Total Mineral Resource | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Open pit | Tonnes (kt) | Grade (g/t) | Gold (koz) | Tonnes (kt) | Grade (g/t) | Gold (koz) | Tonnes (kt) | Grade (g/t) | Gold (koz) | Tonnes (kt) | Grade (g/t) | Gold (koz) |
| Akontansi | 21,443 | 1.27 | 873 | 84,985 | 1.26 | 3,446 | 3,669 | 1.01 | 119 | 110,097 | 1.25 | 4,438 |
| Kottraverchy | 9,039 | 1.66 | 482 | 0 | 0 | 0 | 0 | 0 | 0 | 9,039 | 1.66 | 482 |
| Pepe/ Mantraim | 12,881 | 1.49 | 615 | 8,821 | 1.28 | 364 | 823 | 1.52 | 40 | 22,525 | 1.41 | 1,020 |
| Teberebie | 27,076 | 1.56 | 1,354 | 23,223 | 1.61 | 1,204 | 260 | 1.57 | 13 | 50,559 | 1.58 | 2,571 |
| **Total open pit** | **70,439** | **1.47** | **3,324** | **117,029** | **1.33** | **5,015** | **4,752** | **1.13** | **172** | **192,220** | **1.38** | **8,511** |
| **Surface** | | | | | | | | | | | | |
| Spent Ore (South Heap Leach) | 0 | 0 | 0 | 59,977 | 0.40 | 771 | 0 | 0 | 0 | 59,977 | 0.40 | 771 |
| Surface stockpiles | 6,588 | 0.72 | 152 | 0 | 0 | 0 | 0 | 0 | 0 | 6,588 | 0.72 | 152 |
| **Total surface** | **6,588** | **0.72** | **152** | **59,977** | **0.40** | **771** | **0** | **0** | **0** | **66,565** | **0.43** | **924** |
| **Grand Total** | **77,027** | **1.40** | **3,477** | **177,005** | **1.02** | **5,786** | **4,752** | **1.13** | **172** | **258,785** | **1.13** | **9,435** |

# 2.4 West Africa region (continued)

## Tarkwa Gold Mine (continued)

*Modifying factors*

- The Measured and Indicated Mineral Resources are inclusive of those Mineral Resources modified to produce Mineral Reserves
- All Mineral Reserves are quoted in terms of RoM grades and tonnages as delivered to the metallurgical processing facilities and are therefore fully diluted
- Mineral Resources and Mineral Reserves undergo regular internal and/or external audits, and any issues identified are rectified at the earliest opportunity

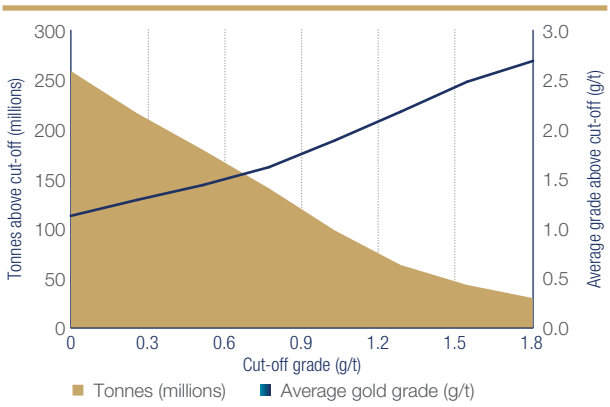
| | | December | | |
|---|---|---|---|---|
| | Units | **2015** | 2014 | 2013 |
| **Mineral Resource parameters** | | | | |
| Mineral Resource gold price | US$/oz | **1,500** | 1,500 | 1,500 |
| Cut-off for mill feed | g/t | **0.38** | 0.4 | 0.46 |
| **Mineral Reserve parameters** | | | | |
| Mineral Reserve gold price | US$/oz | **1,300** | 1,300 | 1,300 |
| Cut-off for mill feed | g/t | **0.45** | 0.48 | 0.52 |
| Mining recovery factor (open pit) | % | **100** | 100 | 100 |
| Strip ratio (waste:ore) | ratio | **5.4** | 5.6 | 5.1 |
| MCF | % | **98** | 100 | 100 |
| Dilution open pit[1] | cm | **30/20** | 30/20 | 30/20 |
| Plant recovery factor – CIL | % | **97.0** | 97.2 | 97 |
| CIL processing capacity | Mtpa | **13.5** | 13.5 | 12.3 |

*[1]Refers to 30cm hangingwall and 20cm footwall dilution respectively.*

*Grade tonnage curve*

Grade tonnage curve for the entire open pit Mineral Resource is presented below

**Grade tonnage curve – Surface**



## Mineral Reserves

The Mineral Reserve estimate for Tarkwa Gold Mine is based on the development of appropriately detailed and engineered LoM plans. All design and scheduling work is undertaken to an applicable level of detail by experienced engineers using mine-planning software. The planning process incorporates realistic modifying factors and the use of appropriate cut-off grades, geotechnical criteria, mining fleet productivities and other techno-economic investigations.

Mineral Reserve statements include only Measured and Indicated Mineral Resources modified to produce Mineral Reserves contained in the LoM plan. This declaration is based on the premise that all the ore will be treated through the CIL plant.

*Mineral Reserve classification*

| | Tonnes (kt) | | | Grade (g/t) | | | Gold (koz) | | |
|---|---|---|---|---|---|---|---|---|---|
| **Classification** | **Dec 15** | Dec 14 | Dec 13 | **Dec 15** | Dec 14 | Dec 13 | **Dec 15** | Dec 14 | Dec 13 |
| **Open Pit** | | | | | | | | | |
| Proved | **63,266** | 77,681 | 82,700 | **1.30** | 1.35 | 1.30 | **2,635** | 3,364 | 3,466 |
| Probable | **81,506** | 79,720 | 71,900 | **1.22** | 1.26 | 1.27 | **3,187** | 3,237 | 2,941 |
| **Total Open Pit** | **144,773** | 157,401 | 154,600 | **1.25** | 1.30 | 1.29 | **5,822** | 6,601 | 6,407 |
| **Surface** | | | | | | | | | |
| Proved stockpiles | **6,588** | 5,015 | 4,231 | **0.72** | 0.73 | 0.70 | **152** | 118 | 95 |
| South Heap Leach (probable) | **59,977** | 59,977 | 59,977 | **0.40** | 0.40 | 0.40 | **771** | 771 | 771 |
| **Total surface** | **66,565** | 64,992 | 64,208 | **0.43** | 0.43 | 0.42 | **924** | 889 | 866 |
| **Grand total** | **211,338** | 222,393 | 218,808 | **0.99** | 1.05 | 1.03 | **6,746** | 7,491 | 7,273 |

*Mineral Reserve classification per mining area*

| | Proved | | | Probable | | | Total Mineral Reserve | | |
|---|---|---|---|---|---|---|---|---|---|
| Mining area | Tonnes (kt) | Grade (g/t) | Gold (koz) | Tonnes (kt) | Grade (g/t) | Gold (koz) | Tonnes (kt) | Grade (g/t) | Gold (koz) |
| **Open pit** | | | | | | | | | |
| Akontansi | 20,924 | 1.14 | 766 | 60,158 | 1.15 | 2,231 | 81,081 | 1.15 | 2,997 |
| Kottraverchy | 6,082 | 1.41 | 275 | 1 | 0.56 | — | 6,083 | 1.41 | 275 |
| Pepe/Mantraim | 10,568 | 1.34 | 455 | 2,574 | 1.18 | 98 | 13,142 | 1.31 | 553 |
| Teberbie | 25,692 | 1.38 | 1,139 | 18,775 | 1.42 | 859 | 44,467 | 1.40 | 1,998 |
| **Total Open Pit** | 63,266 | 1.30 | 2,635 | 81,506 | 1.22 | 3,187 | 144,773 | 1.25 | 5,822 |
| **Surface** | | | | | | | | | |
| Spent Ore (SHL) | — | — | — | 59,977 | 0.40 | 771 | 59,977 | 0.40 | 771 |
| Surface stockpiles | 6,588 | 0.72 | 152 | — | — | — | 6,588 | 0.72 | 152 |
| **Total surface stockpiles** | 6,588 | 0.72 | 152 | 59,977 | 0.40 | 771 | 66,565 | 0.43 | 924 |
| **Grand total** | 69,855 | 1.24 | 2,787 | 141,483 | 0.87 | 3,959 | 211,338 | 0.99 | 6,746 |

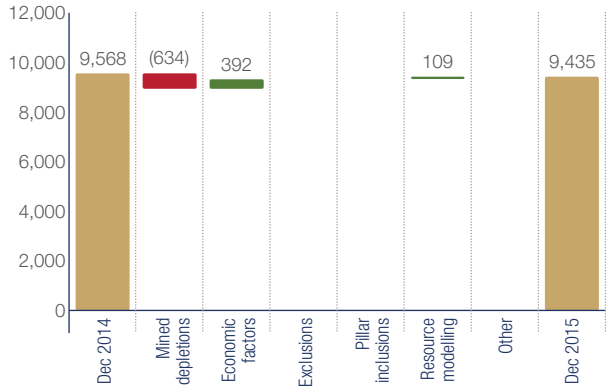
# 2.4 West Africa region (continued)

## Tarkwa Gold Mine (continued)

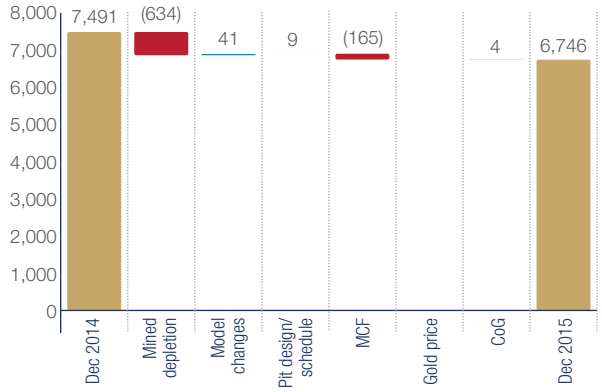
*Mineral Resource and Mineral Reserve reconciliation year-on-year*

| Factors that affected Mineral Resource changes year-on-year | Factors that affected Mineral Reserve changes year-on-year |
|---|---|
| Depletion by mining | Depletion by mining |
| A decrease in mining cost due to a lower Genser power rates | Improvements from Mineral Resource model updates and revised pit designs |
| Updates to the resource models, with increases at the Akontansi and Pepe pits | MCF changed from 100% to 98% based on history post closure of the heap leach operation |
| | Mineral Resource conversion – Inferred Mineral Resource upgraded to Indicated category |
| | Decrease in cut-off grades due to lower electricity costs |
| | Adjustments due to improved pit staging and scheduling |

**Mineral Resource Reconciliation**
(Gold – koz)




**Mineral Reserve Reconciliation**
(Gold – koz)

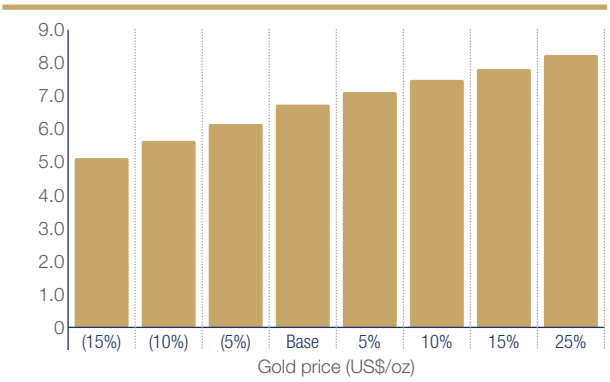



### Mineral Reserve sensitivity

The Mineral Reserve sensitivity has been derived from the application of the relevant cut-off grades to individual grade tonnage curves of the optimised pit shells for the open pits.

The Mineral Reserve sensitivities are not based on detailed depletion schedules and should be considered on a relative and indicative basis only. The following graphs indicate the Managed Mineral Reserve sensitivity at -15%, -10%, -5%, base (US$1,300/oz), +5%, +10%, and +15% to the gold price.

**Mineral Reserve sensitivity**
(Gold – Moz)



## Competent Persons

Internal technical reviews have been conducted by the Competent Persons as listed, who are full-time employees of Gold Fields Limited.

### *G Avane*

*Mineral Resources Manager*

*MSc (Hons) (Geological Engineering); MAusIMM (No 309400).*

**Industry experience:** He has over 20 years' experience in the mining industry and is the lead Competent Person, responsible for overall Mineral Resource Management for Tarkwa and the overall correctness, standard and compliance of this declaration.

### *R van der Westhuizen*

*Regional Mine Planning Manager*

*BSc (Hons) (Geology); MSc (Mining); MAusIMM (No 223783).*

**Industry experience:** He has 36 years' experience in the mining industry and is responsible for the overall correctness, standard and compliance of the LoM planning, scheduling, reserve statement and economic assurance for Tarkwa and Damang.

### *J Searra*

*Chief Resource Geologist*

*BSc (Hons) (Geology); MSc (Engineering).*

**Industry experience:** He has over 30 years' experience in the mining industry and is responsible for sampling, geology, exploration and resource estimation for Tarkwa.

# 2.5 Corporate Development – Arctic Palladium-Platinum Project (APP)

## Palladium-Platinum Project in Finland targeted for divestment 100% attributable to GFI

### Location

APP consists of three project areas named Suhanko, Narkaus and Penikat. The projects are located in southern Lapland in Finland, approximately 50km south of the city of Rovaniemi, which is the regional capital with excellent infrastructure and services. A network of well-established roads exist in the area with all-year access to the port of Kemi. Finland is a mining-friendly jurisdiction with a skilled workforce and favourable tax regime.

### Project ownership

APP consists of three valid mining licences, 48 valid exploration claims and one valid reservation licence, with a number of renewal applications in progress. The lease holder is Gold Fields Arctic Platinum Oy (GFAP), which is a subsidiary of Gold Fields Finland Oy. Both companies are 100% owned indirect subsidiaries of GFI.

There has been no commercial mining of these deposits. The locations were originally explored by Outokumpu Oy up to January 2000, which was the start of the Arctic Platinum Partnership agreement between Gold Fields and Outokumpu. Gold Fields was the operator and in 2003 acquired 100% of the partnership and registered GFAP as the operating company in Finland. From 2005 to 2008, GFAP entered into an acquisition and framework agreement with North American Palladium Limited (NAP) and this option agreement expired in 2008, when NAP elected not to follow its rights. GFAP assumed full management and control of GFAP from 1 September 2008.

### Regional geology

The Suhanko and Narkaus deposits are hosted by the 2.44Ga old layered mafic intrusive rocks of the Portimo complex. All the intrusive rocks, including the Penikat intrusion, are intruded into the Archaean Basement and are exposed along or close to the erosional contact with the overlying proterozoic schist belt.

### Project geology

The Suhanko deposits are palladium-rich magmato-hydrothermal zones of stratiform platinum group elements (PGE) – copper – nickel mineralisation at the base of the Konttijärvi – Suhanko intrusion. The zones range from 10 metres to 60 metres in thickness and are laterally continuous for 900 metres at Konttijärvi to 2,600 metres at Suhanko North. The platinum group minerals occur in association with base metal sulphides chalcopyrite > pyrrhotite > pentlandite. Analogous deposits are the Platreef of the Bushveld complex (South Africa), the Roby Zone at Lac des Isles (Thunder Bay, Canada), and Federova in the Kola Peninsula (Russia).

PGE mineralisation at Narkaus and Penikat occurs as reef-type deposits, which subcrop beneath glacial till on ground held by GFAP for 11km at Narkaus and 21km at Penikat. The reefs are developed along the contact between gabbroic footwall rocks and the overlying ultramafic pyroxenite and peridotite stratigraphic units. Offset-style copper-rich mineralisation also occurs at Narkaus in granites of the Archaean Basement with the best developed example being the Kilvenjarvi deposit.

### Exploration process, sampling and QA/QC

All exploration and resource definition drilling has been by diamond core drilling, with logging and sampling undertaken by GFAP employees under supervision of an experienced Finnish management team. Assaying for platinum, palladium and gold was completed by fire assay with Pb collection and ICP – ES finish. Base metals and sulphur were analysed by aqua regia digest followed by an ICP – ES finish. Routine QA/QC procedures have been adopted throughout with external audit of the exploration procedures, assay database and geological modelling. The table below lists the DD drilling metres completed by different companies during respective periods.

| Year | Company | DD metres |
|---|---|---|
| 1981 – 1999 | Outokumpu | 73,294 |
| 2000 – 2005 | GFAP | 205,790 |
| 2006 – 2008 | NAP | 43,437 |
| 2008 – 2015 | GFAP | 135,087 |
| Total metres | | 457,608 |

## Level of study, proposed mining and processing methodology

At Suhanko, GFAP completed a positive pre-feasibility study on the Kilvenjärvi, Ahmavaara and Suhanko North deposits at the end of 2012. The study evaluated a 10Mtpa open pit mining operation followed by sulphide flotation to produce a bulk concentrate. Recovery of metals from the concentrate would be on-site at Suhanko by pressure oxidation and the hydrometallurgical process Platsol® with chloride leaching to produce a PGE + Au precipitate, London Metal Exchange grade copper and a mixed NiCo hydroxide.

Geological modelling and scoping-level open pit optimisation studies have also been completed for the SK Reef deposits and the Kilvenjärvi offset deposit at Narkaus. No open pit or underground mining studies have been completed at Penikat for the reef-style deposits.

Extensive metallurgical sampling programmes have been completed at Suhanko. A pilot plant flotation and Platsol® metal recovery study was completed for the 2012 pre-feasibility study.

## Social licence to operate

GFAP completed the Suhanko environmental impact assessment (EIA) processes in mid-2014, which were initiated in 2011 in order to expand the project footprint and to provide for implementation of the Platsol® metal recovery process and significant increases in total material mined. The permitting authority approved the EIA for the expanded project on 10 March 2014 and the associated Natura 2000 assessment on 19 May 2014, while the EIA for the 220kV power line was approved on 27 February 2014. The local regional authority formally approved the regional land use plan for the expanded Suhanko project area on 25 May 2014, and the plan was ratified by the Ministry of Environment on 13 January 2016. From earlier phases of project permitting, a valid Environmental and Water Management permit is in place for the Suhanko Mining Licence, which allows for open pit mining of the Konttijärvi and Ahmavaara deposits and the flotation concentration of the ores at Suhanko.

## Mineral Resources

No new exploration, geological modelling or metallurgical testing was completed during 2015 that would change the technical Mineral Resources estimation input parameters. As a result, there are no changes to the Mineral Resources from the previous year.

*Arctic Platinum Project: Mineral Resources reported at 1.0g/t 2PGE+Au cut-off*

| Metal (Measured, Indicated and Inferred*) | Gold | Platinum | Palladium | Copper | Nickel |
|---|---|---|---|---|---|
| Tonnes (Mt) | 208.5 | 208.5 | 208.5 | 208.5 | 208.5 |
| | g/t | g/t | g/t | % | % |
| Grade | 0.12 | 0.36 | 1.47 | 0.22 | 0.10 |
| | koz | koz | koz | Mlb | Mlb |
| Total – content | 786 | 2,417 | 9,842 | 1,034 | 438 |

**The Inferred category constitutes 45% of the total Mineral Resource at Suhanko and Narkaus. No change year-on-year in declaration. The commodity prices used in the original study are US$3.90/lb copper, US$1,670/oz gold, US$8.90/lb nickel, US$670/oz palladium and US$1,650/oz platinum.*

### Competent Persons

Internal technical reviews have been conducted by the Competent Persons as listed, who are full-time employees of Gold Fields Limited.

***M Botha***

*VP Strategic Projects*

*BSc (Hons) MSc Geology. MAusIMM (226388).*

**Industry experience:** 32 years' experience in exploration, open pit and underground mining and project evaluation. Commodities: gold, platinum, palladium, copper and nickel. He has been actively involved in the exploration and development of the Arctic Platinum Project since the start of exploration in 2000. He is the lead Competent Person and is responsible for the overall accuracy, standard and compliance of the declaration.

***A Trueman***

*Chief Resource Geologist*

*BSc Geology (Hons). PGeo, APEGBC 149753 and MAusIMM CP 110730.*

**Industry experience:** 24 years' experience in mining, exploration and resource evaluation on projects in Africa, Asia, Australia, Europe, South America and North America. Commodities: Gold, copper, silver, coal, bauxite, PGE's and uranium. He is responsible for Mineral Resource estimation and reporting.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# 3

# Supplementary information


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# Corporate governance (reporting code and code of practice)

This Supplement to the Integrated Annual Report outlines the declared Mineral Resources and Mineral Reserves at each of Gold Fields' business regions, including individual operating mines, as well as its growth projects and primary exploration targets, as at 31 December 2015.

The Group's December 2015 Mineral Resource and Mineral Reserve Statement is in accordance with the requirements of the South African Code for the Reporting of Exploration Results, Mineral Resources and Mineral Reserves (the SAMREC Code, 2007 edition), the South African Code for the Reporting of Mineral Asset Valuation (2009 SAMVAL Code) and Industry Guide 7 for reporting on the United States Securities and Exchange Commission (SEC). Notice is taken of other relevant international codes, where geographically applicable, such as the Australian JORC Code 2012 and the Canadian National Instrument (NI) 43-101.

The SEC permits mining companies, in their filings with the commission, to disclose only those Mineral Reserves that a company can economically and legally extract or produce. In accordance with the SEC guidelines, companies are not permitted to report Mineral Resources in their Form 20-F submissions. However, certain terms referring to Mineral Resources are used in this report, such as 'Measured, Indicated and Inferred Mineral Resources'. Consequently, US investors are urged to consider closely the disclosure in our Form 20-F.

This statement further compares to the previous public declaration made in the Gold Fields Integrated Annual Review for last year dated 31 December 2014 and therefore encompasses a 12-month mined depletion period. The December 2015 declaration aims to report on Mineral Resources and Mineral Reserves information that is rated as important for disclosure and it reflects a level of detail required for completeness, transparency and materiality in reporting. Gold Fields Mineral Resources and Mineral Reserves are reviewed and audited on an ongoing basis by internal and external Competent Persons, with formal reviews conducted on all operations and projects, as follows:

- Ongoing technical review
- Annual executive regional review
- Regular external and internal reviews
- Annual Group executive review

| | |
|---|---|
| **Prepared by** | Competent Persons (CPs) who are full-time employees of Gold Fields Limited in compliance with the South African Code for the Reporting of Exploration Results, Mineral Resources and Mineral Reserves (2007 SAMREC Code) |
| **Effective date** | 31 December 2015 |
| **Source of information** | This Supplement is a summary of the respective Operation's December 2015 Competent Persons Reports (CPR) |
| **Personal inspection** | Personal inspection is conducted by the Competent Persons as listed, who are full-time employees of Gold Fields Limited |
| **Independent review** | Information reported in this declaration is as reviewed by internal consultants as at 31 December 2015. The review identified no material shortcomings in any process by which the Mineral Resources and Mineral Reserves were evaluated. The procedure followed in producing the declaration is aligned to the guiding principles of the Sarbanes-Oxley (SOX) Act of 2002 |

# Competent Persons

The Competent Persons (CPs) designated in terms of SAMREC who take responsibility for the reporting of Gold Fields' Mineral Resources and Mineral Reserves are the respective operation-based Mineral Resource Managers and relevant Project Managers, as listed in the respective sections. The CPs have sufficient experience relative to the type and style of mineral deposit under consideration and are full-time employees of Gold Fields. Corporate governance on the overall regulatory compliance of these figures has been overseen and consolidated by the Gold Fields CP, Tim Rowland, who consents to the disclosure of this Mineral Resource and Mineral Reserve Statement.

Corporate Governance on the overall compliance of these figures and responsibility for the generation of a consolidated statement has been overseen by the respective corporate and regional CPs listed below:

| Competent Person | Title | Qualifications | Years' experience |
|---|---|---|---|
| Tim Rowland[1, 3]<br>Number 400122/00 | Vice-President: Group Mineral Resource Management and Mine Planning | BSc (Hons) Geology; MSc Mineral Exploration;<br>GDE Mining Engineering; Pr Sci Nat, FSAIMM, FGSSA; GASA | 30 |
| Winfred Assibey-Bonsu[1]<br>Number 400112/00 | Group Geostatistician and Evaluator | BSc (Mining); PhD (Eng); EDP Wits Business School | 30 |
| Heinrich Schnetler[2]<br>PMS 0105 | Manager: MRM | NHD (Mine Survey); GDE (Mining Engineering); MSCC | 40 |

*[1] Registered SACNASP members*
*[2] Registered PLATO members*
*[3] Registered SAIMM members*

# Conversion table

| Metric | Imperial |
|---|---|
| 1 centimetre | 0.3937 inches |
| 1 metre | 3.28084 feet |
| 1 kilometre | 0.62150 miles |
| 1 gram | 0.03215 troy ounces |
| 1 gram/tonne | 0.0292 ounce/tonne |
| 1 kilogram | 2.20458 pounds |
| 1 tonne | 1.10229 short tonnes |
| 1 hectare | 2.47097 acres |

| Imperial | Metric |
|---|---|
| 1 inch | 2.54 centimetres |
| 1 foot | 0.3047972654 metres |
| 1 mile | 1.609 kilometres |
| 1 troy ounce | 32.1507466 grams |
| 1 ounce/tonne | 34.28 grams/tonne |
| 1 pound | 0.4536 kilograms |
| 1 short tonne | 0.9072 tonnes |
| 1 acre | 0.4047 hectares |

# Abbreviations

| | |
|---|---|
| **ADR** | adsorption recovery carbon plant |
| **Ag** | silver |
| **AGC** | Advance Grade Control |
| **AGL** | Abosso Goldfields Limited |
| **AIC** | All-in Cost |
| **AISC** | All-in Sustaining Cost |
| **APP** | Arctic Platinum Project |
| **A$** | Australian dollar |
| **A$/oz** | Australian dollar per ounce |
| **Au** | gold |
| **BCM** | bank cubic metres |
| **BW** | block width |
| **CIL** | Carbon in Leach |
| **CIP** | Carbon in Pulp |
| **cm** | centimetres |
| **cm.g/t** | centimetre grams per ton |
| **Co** | cobalt |
| **CP** | Competent Person |
| **Cu** | copper |
| **COG** | cut-off grade |
| **CW** | channel width |
| **DD** | diamond drill |
| **3D** | three-dimensional |
| **DMR** | Department of Mineral Resources |
| **EIA** | Environmental Impact Assessment |
| **EMP** | Environmental Management Plan |
| **EPA** | Environmental Protection Agency |
| **FCF** | Free Cash Flow |
| **GFG** | Gold Fields Ghana |
| **GFI** | Gold Fields Ltd |
| **g** | grams |
| **g/t** | grams per ton |
| **Ga** | billion years |
| **GC** | grade control |
| **GRB** | Geotechnical Review Board |
| **GTC** | Grade Tonnage Curve |
| **ha** | hectare |
| **HL** | Heap Leach |
| **HME** | heavy mining equipment |
| **HPGR** | high pressure grinding roll |
| **ILR** | In-line leach reactor |
| **JORC** | Australian Code for Reporting Exploration Results, Mineral Resources and Ore Reserves |
| **JSE** | Johannesburg Securities Exchange |
| **KE** | kriging efficiency |
| **kg** | kilogram |
| **kg/t** | kilograms per ton |
| **km** | kilometre |
| **ktpa** | thousand tonnes per annum |
| **koz** | thousand ounces |
| **LDIFR** | Lost Day Injury Frequency Rate |
| **LIB** | Long Incline Borehole |
| **LoM** | Life of Mine |
| **m** | metre |
| **$m^2$** | square metre |
| **MCF** | Mine Call Factor |
| **$m^3/s$** | cubic metres per second |
| **Mlb** | million pounds |
| **Mo** | molybdenum |
| **Moz** | million ounces |
| **mRL** | metres relative level |
| **Mt** | million tonnes |
| **mtpa** | million tonnes per annum |
| **MW** | megawatt |
| **NCE** | notional cash expenditure |
| **Ni** | nickel |
| **NPV** | net present value |
| **NSR** | net smelter return |
| **oz** | ounces (troy) |
| **Pd** | palladium |
| **PGE** | Platinum Group Elements |
| **2 PGE** | platinum and palladium |
| **PL** | Prospecting Lease |
| **PRF** | Plant Recovery Factor |
| **Pt** | platinum |
| **RC** | reverse circulation hole |
| **R&D** | Research and Development |
| **RoM** | Run of Mine |
| **SAG** | Semi Autogenous Grind |
| **SAM** | Sub audio magnetics |
| **SAMREC** | South African Mineral Resource Committee |
| **SAMVAL** | South African Mineral Asset Valuation Committee |
| **SEC** | The United States Securities and Exchange Commission |
| **SOX** | Sarbanes-Oxley Act |
| **SV** | sub-vertical |
| **SRD** | surface rock dump |
| **SW** | stoping width |
| **t** | metric tonnes |
| **tpd** | tonnes per day |
| **tph** | tonnes per hour |
| **tpm** | tonnes per month |
| **TSF** | Tailings Storage Facility |
| **VCR** | Ventersdorp Contact Reef |
| **$U_3O_8$** | uranium oxide |
| **US$** | United States dollar |
| **US$/oz** | American dollar per ounce |
| **WAPL** | Western Areas Prospecting Limited |
| **WSF** | Waste Storage Facility |
| **YOY** | year-on-year |
| **ZAR** | South African rand |
| **~** | Circa, about or approximately |

# Glossary of Terms

| | Definition |
|---|---|
| **Auger drill** | An auger drilled hole uses a rotating screw blade acting as a screw conveyor to remove the drilled material out of the hole. |
| **Block Width** | The average width at which it is estimated a block of ore will be mined. |
| **Clastic** | Pertaining to a rock or sediment composed principally of broken fragments that are derived from pre-existing rocks or minerals by the processes of weathering and erosion, and have been transported some distance from their place of origin. |
| **Cut-off grade** | The lowest grade of mineralised rock which determines as to whether or not it is economic to recover its gold content by further concentration. |
| **Diamond Drill** | Diamond drilling uses a diamond encrusted drill bit to drill through the rock and recovers a solid core, for examination on the surface. |
| **Dilution** | Waste or material below the cut-off grade that contaminates the ore during the process of mining operations and thereby reduces the average grade mined. |
| **Destress** | By mining a 2-metre slice through the package in an optimal position to ensure a de-stressed window of 50 to 60 metres above or below the associated stope. |
| **Gold Equivalent Ounces** | A quantity of metal (such as copper) converted to an amount of gold in ounces, based on accepted gold and other metal prices, i.e. the accepted total value of the metal based on its weight and value thereof divided by the accepted value of one troy ounce of gold. |
| **Indicated Mineral Resource** | That part of a Mineral Resource for which tonnage, densities, shape, physical characteristics, grade and mineral content can be estimated with a reasonable level of confidence. It is based on information from exploration, sampling and testing of material gathered from locations such as outcrops, trenches, pits, workings and drill holes. The locations are too widely or inappropriately spaced to confirm geological and/or grade continuity but are spaced closely enough for continuity to be assumed. |
| **Inferred Mineral Resource** | That part of a Mineral Resource for which tonnage, grade and mineral content can be estimated with a low level of confidence. It is inferred from geological evidence and sampling and assumed but not verified geologically or through analysis of grade continuity. It is based on information gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drill holes that may be limited or of uncertain quality and reliability. |
| **Intracratonic basin** | Refers to a basin on top of a craton, which is part of the earth's crust that has attained stability and has been little deformed for a prolonged period. |
| **Kriging Efficiency (KE)** | Provides a measure of the reliability of block evaluations. |
| **Lacustrine** | Produced by or formed within a lake or lake environment. |
| **Life of Mine (LoM)** | Number of years that an operation is planning to mine and treat ore, based on the current mining plan. |

# Glossary of terms (continued)

| | Definition |
|---|---|
| **Littoral** | Pertaining to the zone between the highest and lowest levels of spring tides known as the fore-beach. |
| **Measured Mineral Resource** | That part of a Mineral Resource for which tonnage, densities, shape, physical characteristics, grade and mineral content can be estimated with a high level of confidence. It is based on detailed and reliable information from exploration, sampling and testing of material from locations such as outcrops, trenches, pits, workings and drill holes. The locations are spaced closely enough to confirm geological and grade continuity. |
| **Mine Call Factor** | The ratio expressed as a percentage which the specific product accounted for in 'recovery plus residue' bears to the corresponding product 'called for' by the mine's measuring and evaluation methods. |
| **Mineral Reserve (Reserve)** | The economically mineable material derived from a Measured and/or Indicated Mineral Resource. It is inclusive of diluting and contaminating materials and allows for losses that are expected to occur when the material is mined. Appropriate assessments to a minimum of a pre-feasibility study for a project and an LoM plan for an operation must have been completed, including consideration of and modification by, realistically assumed mining, metallurgical, economic, marketing, legal, environmental, social and governmental factors (the modifying factors). Such modifying factors must be disclosed. |
| **Mineral Resource (Resource)** | A concentration or occurrence of material of economic interest in or on the earth's crust in such form, quality and quantity that there are reasonable and realistic prospects for eventual economic extraction. The location, quantity, grade, continuity and other geological characteristics of a Mineral Resource are known, or estimated from specific geological evidence, sampling and knowledge interpreted from an appropriately constrained and portrayed geological model. Mineral Resources are subdivided, and must be so reported, in order of increasing confidence in respect of geoscientific evidence, into Inferred, Indicated and Measured categories. |
| **Net Smelter Return (NSR)** | Is defined as the return from sales of concentrates expressed in US$/tonne, i.e.: NSR = (Au price-Au selling costs) x Au grade x Au recovery + (Cu price-Cu selling price) x Cu grade x Cu recovery. |
| **Pay limit** | The value at which it is estimated that ore can be mined at break-even. |
| **Peneplain** | A low, nearly featureless, gently undulating land surface of considerable area, which has been produced by the processes of long continued sub-aerial erosion. |
| **Plant Recovery Factor** | The ratio, expressed as a percentage, of the mass of the specific mineral product actually recovered from ore treated at the plant to its total specific mineral content before treatment. |
| **Probable Mineral Reserve** | Economically mineable material derived from a Measured or Indicated Mineral Resource or both. It is estimated with a lower level of confidence than a Proved Mineral Reserve. It includes diluting and contaminating materials and allows for losses that are expected to occur when the material is mined. Appropriate assessments to a minimum of a pre-feasibility study for a project or an LoM plan for an operation must have been carried out, including consideration of and modification by, realistic assumed mining, metallurgical, economic, marketing, legal, environmental, social and governmental factors. Such modifying factors must be disclosed. |

| | Definition |
|---|---|
| **Proved Mineral Reserve** | Economically mineable material derived from a Measured Mineral Resource. It is estimated with a high level of confidence. It includes diluting and contaminating materials and allows for losses that are expected to occur when the material is mined. Appropriate assessments to a minimum of a pre-feasibility study for a project or an LoM plan for an operation must have been carried out, including consideration of and modification by, realistic assumed mining, metallurgical, economic, marketing, legal, environmental, social and governmental factors. Such modifying factors must be disclosed. |
| **Regolith** | Is a layer of loose unconsolidated rock that lies above a layer of bedrock. |
| **tonnage discrepancy** | Difference between the tonnage hoisted as ore and that accounted for by the plant measuring methods. Discrepancy is referred to as a shortfall when the calculated tonnage is less than the tonnage accounted for by the plant, or an excess when the opposite occurs. |
| **Tonne(s)** | Metric ton (tonnes) = 1,000 kilograms. |
| **Uraninite** | A strongly radioactive, brownish-black mineral, $UO_2$, forming the chief ore of uranium ($U_3O_8$) and containing variable amounts of radium, lead, thorium and other elements as impurities. |
| **Witwatersrand Basin** | A sedimentary basin in South Africa that contains close to a 6,000 metre thick sequence of principally argillaceous and arenaceous sediments with inter-bedded conglomerates |

# Forward looking statements

This report contains forward looking statements within the meaning of section 27A of the U.S. Securities Act of 1933, as amended, or the Securities Act, and section 21E of the U.S. Securities Exchange Act of 1934, as amended, or the Exchange Act, with respect to Gold Fields' financial condition, results of operations, business strategies, operating efficiencies, competitive position, growth opportunities for existing services, plans and objectives of management, markets for stock and other matters.

These forward looking statements, including, among others, those relating to the future business prospects, revenues and income of Gold Fields, wherever they may occur in this report and the exhibits to the report, are necessarily estimates reflecting the best judgement of the senior management of Gold Fields and involve a number of risks and uncertainties that could cause actual results to differ materially from those suggested by the forward looking statements. As a consequence, these forward looking statements should be considered in light of various important factors, including those set forth in this report. Important factors that could cause actual results to differ materially from estimates or projections contained in the forward looking statements include, without limitation:

- overall economic and business conditions in South Africa, Ghana, Australia, Peru and elsewhere;
- changes in assumptions underlying Gold Fields' mineral reserve estimates;
- the ability to achieve anticipated efficiencies and other cost savings in connection with past and future acquisitions;
- the ability to achieve anticipated cost savings at existing operations;
- the success of the Group's business strategy, development activities and other initiatives;
- the ability of the Group to comply with requirements that it operate in a sustainable manner and provide benefits to affected communities;
- decreases in the market price of gold or copper;
- the occurrence of hazards associated with underground and surface gold mining or contagious diseases at Gold Field's operations;
- the occurrence of work stoppages related to health and safety incidents;
- loss of senior management or inability to hire or retain employees;
- fluctuations in exchange rates, currency devaluations and other macroeconomic monetary policies;
- the occurrence of labour disruptions and industrial actions;
- power cost increases as well as power stoppages, fluctuations and usage constraints;
- supply chain shortages and increases in the prices of production imports;
- the ability to manage and maintain access to current and future sources of liquidity, capital and credit, including the terms and conditions of Gold Fields' facilities and Gold Fields' overall cost of funding;
- the adequacy of the Group's insurance coverage;
- the manner, amount and timing of capital expenditures made by Gold Fields on both existing and new mines, mining projects, exploration project or other initiatives;
- changes in relevant government regulations, particularly labour, environmental, tax, royalty, health and safety, water, regulations and potential new legislation affecting mining and mineral rights;
- fraud, bribery or corruption at Gold Field's operations that leads to censure, penalties or negative reputational impacts; and
- political instability in South Africa, Ghana, Peru or regionally in Africa or South America.

Gold Fields undertakes no obligation to update publicly or release any revisions to these forward looking statements to reflect events or circumstances after the date of this report or to reflect the occurrence of unanticipated events.

GOLD FIELDS