

# Gold

production

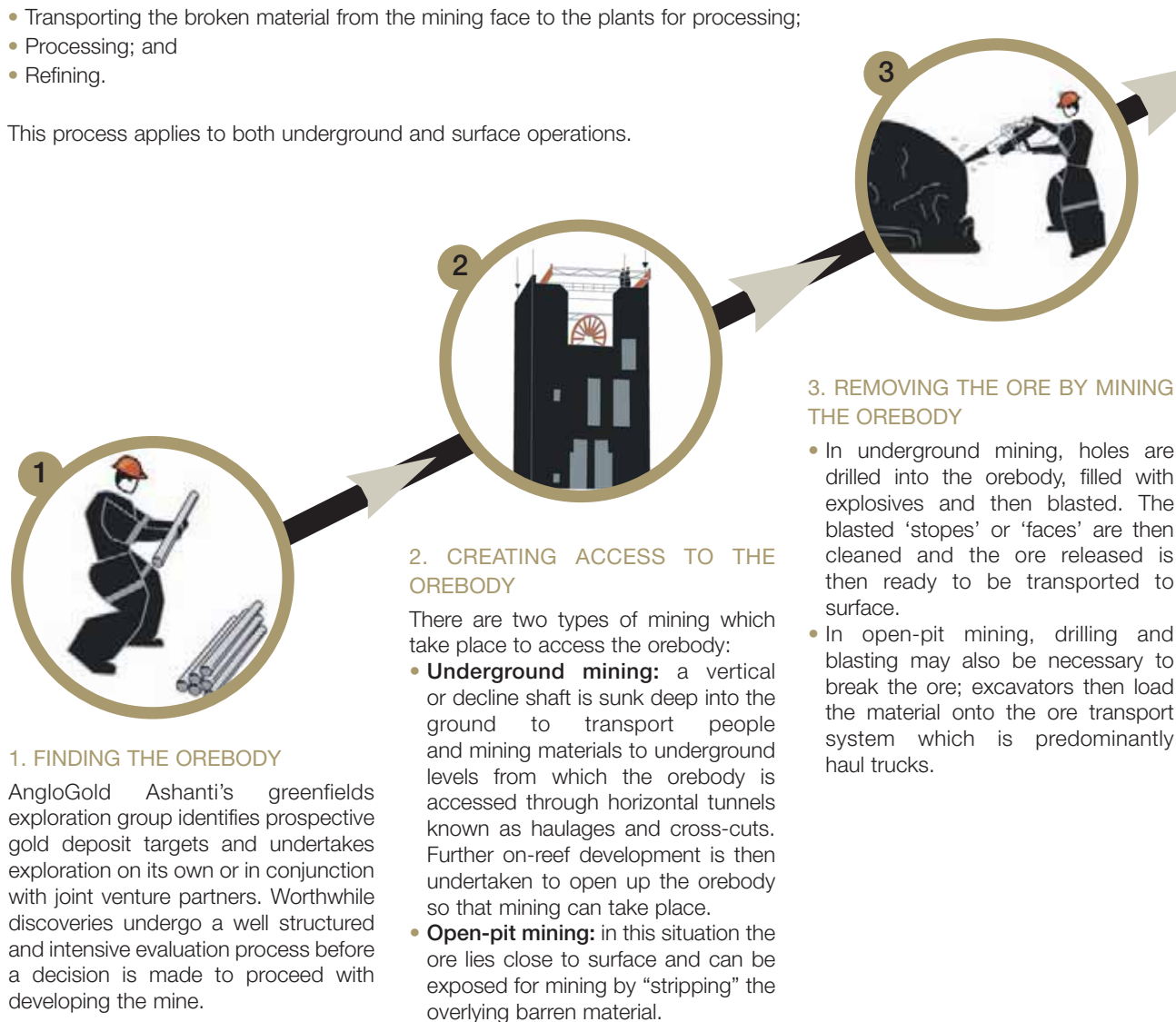
AngloGold Ashanti's core business is the production of gold by exploring for, and mining and processing gold orebodies.

## THE PROCESS OF PRODUCING GOLD

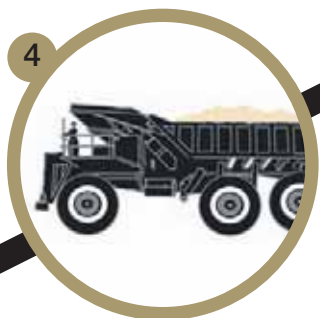
The process of producing gold can be divided into six main activities:

- Finding the orebody;
- Creating access to the orebody;
- Mining (breaking) the orebody;
- Transporting the broken material from the mining face to the plants for processing;
- Processing; and
- Refining.

This process applies to both underground and surface operations.



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#### 4. TRANSPORTING THE BROKEN MATERIAL FROM THE MINING FACE TO THE PLANTS FOR TREATMENT

- Underground ore is brought to the surface by a combination of horizontal and vertical transport systems. Once on surface the ore is usually transported to the processing facilities by surface rail or overland conveyors.
- In open pit operations the haul trucks deliver the ore directly to the processing facilities.

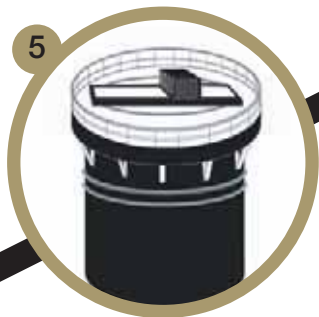
#### 5. PROCESSING

Comminution is the first step in processing and involves the breaking up of the ore, which is delivered as large rocks, into small particles so that the contained gold minerals are exposed and available for recovery. This is usually undertaken by a combination of multi-stage crushing and milling circuits with associated screening and classification processes to ensure that material at the correct size is removed promptly from the comminution circuit.

Recovery of gold can then commence, depending on the nature of the gold contained in the ore. There are two basic classes of ore:

- free-milling, where the gold is readily available for recovery by the cyanide leaching process.
- refractory ores, where the gold is not readily available for leaching because it is locked within a sulphide mineral matrix (e.g. pyrite), extremely finely dispersed within the host rock (and hence not yet exposed) or alloyed with other elements which retard or prevent leaching (e.g. tellurides).

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Free milling and oxidised refractory ores are processed for gold recovery by leaching the ore in agitated (stirred) tanks in an alkaline cyanide leach solution. This is generally followed by adsorption of the gold cyanide complex onto activated carbon-in-pulp (CIP).

Refractory ores undergo pre-treatment to make them more amenable to cyanide leaching. This commonly takes the form of separating the gold bearing sulphide materials from the barren gangue material by using flotation to produce a high-grade sulphide concentrate. The sulphide concentrate is then oxidised by either roasting as at AngloGold Ashanti Brasil Mineração or bacterial oxidation (BIOX) as at Obuasi. This oxidation destroys the sulphide matrix and exposes the gold particles thereby making them amenable to recovery by the cyanidation process.

An alternative process is the heap-leach process. This process is generally considered applicable to high-tonnage, low-grade ore deposits, but it can be successfully applied to medium-grade deposits where smaller ore deposit tonnages cannot economically justify constructing a capital intensive process plant. In this process, ore is crushed and heaped on an impervious or lined leach pad. Low strength alkaline cyanide solution is irrigated over the heaped pad for up to three months. The dissolved gold bearing solution is collected from the base of the heap and transferred to carbon-in-solution (CIS) columns where the gold cyanide complex is adsorbed onto activated carbon. The barren solution is refreshed and recycled to the top of the heaps.

Gold which has loaded (adsorbed) onto activated carbon is recovered by a process of re-dissolving the gold from the activated carbon (elution), followed by precipitation in electro-winning cells

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and subsequent smelting of the precipitate into doré bars that are then shipped to gold refineries for further processing.

At some AngloGold Ashanti operations, valuable by-products are generated at the same time as the gold recovery process. These by-products are:

- silver, which is associated with the gold at some of our operations.
- sulphuric acid which is produced from the gases generated by the sulphide roasting acid plants; and
- uranium which is recovered in a process which involves sulphuric acid leaching followed by recovery of the leached uranium onto resin and subsequent stripping of the resin by ammonium hydroxide and precipitation of uranium oxide as “yellow cake”.

The residue from the process operations are stored in designated tailings storage facilities.

#### 6. REFINING

The doré bars are transported to a precious metal refinery for further processing. In this process gold is upgraded to a purity of 99.5% or greater for sale to a range of final users. High purity gold is referred to as “good delivery” which means that it meets the quality standards set by the London Bullion Markets Association and gives the final buyer assurance that the bar contains the quantity and purity of gold as stamped on the bar.