

THE PRECIOUS METALS TRADE - GENERAL INFORMATION HANDBOOK

DIRECTORATE: MINERAL ECONOMICS



mineral resources

Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

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ABBREVIATIONS AND SYMBOLS

ASX	-	Australian Securities Exchange
c	-	South African cent
cm ³	-	cubic centimetre
g	-	gram
GDP	-	gross domestic product
GMT	-	Greenwich Mean Time
kg	-	kilogram
LSE	-	London Stock Exchange
ozt	-	troy ounce
PGMs	-	platinum-group metals
R	-	Rand
SA	-	South Africa/n
t	-	metric ton
\$	-	US Dollar
°C	-	degrees Celsius
%	-	percent

2. PRECIOUS METALS: INTRODUCTION

WHAT ARE PRECIOUS METALS, AND WHY “PRECIOUS”?

The term “precious metal” refers to the metals gold, silver, platinum and the other platinum-group metals (PGMs), namely: palladium, rhodium, iridium, ruthenium and osmium. They are noble metals, in that they resist attack by acids and other reagents and do not corrode easily (although silver does tarnish).

The word “precious” derives from the Latin *pretium*, meaning price, through French word “précieux”. The term “precious” implies that they are by definition, high unit-value and rare metals. They tend to be attractive, durable and workable (malleable and ductile) metals. Precious metals (except for the PGMs: rhodium, iridium, ruthenium and osmium) are best known for their use in jewellery and silverware. In 2005, about 10 580t of gold, platinum, silver and palladium were used in this application (see Table below).

TABLE 1: USE OF PRECIOUS METALS IN JEWELLERY, 2008

PRECIOUS METAL	USE IN JEWELLERY MASS (t)	(% OF TOTAL FABRICATION)	TOTAL FABRICATION (t)
Gold	2 159	76	2 850
Platinum	42	23	184
Palladium	27	13	201
Silver	5	19	26
TOTAL			

Sources: *Gold Survey 2009*
Platinum 2009
World Silver Survey 2009

2. GOLD

2.1 PHYSICAL CHARACTERISTICS

Gold is a unique precious metal. Its rich yellow – golden colour, and its mental-imagery association with the Sun is an integral part of its beauty and mystique.

Possessing a density of 19.3g/cm³, it is one of the densest metals known to man. As the World Gold Council (WGC) illustrates: If the estimated 155 500t of gold mined over history were melted into an equilateral cube, the length of a side of that cube would be a mere 19.7 metres!

Gold is, for all practical purposes, virtually indestructible. At 1 064°C, its melting point is also notably high. It does not corrode (except when treated with aqua regia), and besides some minimal industrial and other losses, almost all the gold that has ever been mined is still in existence in some form or other.

It is ranked third behind silver and copper in terms of its electrical conductivity, and among the metals it is the most resistant to tarnishing. Gold is the most malleable metal (it can be hammered into very thin sheets without structural damage).

2.2 GOLD'S INCORPOREAL CHARACTERISTICS

1. It is a monetary asset (can be monetised).
2. It is a store of value (a hedge against inflation).
3. It is a commodity and a fungible one at that (interchangeable, exchangeable and standardised).
4. Displays counter-cyclical behaviour (zero correlated with stock markets and negatively correlated with the most powerful financial instrument, the US dollar).

2.3 GOLD MINE PRODUCTION

The Egyptians, it is believed, mined gold, as long ago as pre-2000 BC. As stated above, over history some 155 500t of gold have been mined. Currently, World production of gold is about 2 400t a year and has been declining since 2005. Gold is mined in over 60 countries, with the largest producing countries in 2008 being:

1. China (292t or 12.2%),
2. USA (235t or 9.8%)
3. Australia (215t or 9.0%), and
4. South Africa (213t or 8.9%).

The top four mining companies in 2008 were:

1. Barrick Gold of Canada (238t or 9.9%)
2. Newmont Mining of the USA (162t or 6.8%),
3. AngloGold Ashanti of South Africa (155t or 6.5%),
4. Gold Fields Limited of South Africa (104t or 4.3%).

Another South African company in the top ten (9th) in 2008 was Harmony Gold (51t or 2.1 percent).

Gold mining grades are generally very low. In South Africa, gold grades range between 4 and 10 grams per tonne, i.e., gold occurs in a concentration of 4 to 10 parts per million. At a grade of 4 grams per tonne, it would take about 8t of ore to produce one troy ounce (ozt) of gold.

2.4 SOUTH AFRICA – PAVED WITH GOLD

In the modern era, South Africa has dominated production of gold (largest producer from 1898 to 2006). The country's history and development is inextricably linked with gold mining. Johannesburg, its largest city, owes its existence to gold. Johannesburg is in fact the second largest city (after Birmingham in the UK), not to have been built near a port, river or lake.

In the early 1970s, South Africa was producing up to 1 000t of the metal per year, or about 70 percent of World mine production. Currently the country produces about 213t, but still has the World's largest reserve base, at 31 000t. South Africa also has the deepest and some of the largest gold mines in the World.

Gold exports were South Africa's predominant source of foreign exchange between 1970 and 1990, contributing more than 50 percent to foreign exchange revenue until 1983. Gold mining also contributed significantly to the country's economy during this period, accounting for 17 percent of South Africa's GDP in 1980. However, South Africa's economy is much more diversified now, so much so that the entire mining sector contributed only 7.7 percent to GDP and about 30 percent to South Africa's export revenue (from goods) in 2007. The gold mining industry has contracted significantly, but this has been outweighed by growth in the secondary and tertiary

sectors of the economy, which is characteristic of a progressing economy. Nevertheless, gold still contributes about 7 percent to export earnings (from goods) and about 2.5 percent to GDP.

2.5 GOLD ORE PROCESSING AND THE PROCESSES OF SMELTING AND REFINING

After gold-bearing ore has been extracted from surface or underground operations it undergoes the following processes in sequence:

1. Crushing and milling (Comminution),
2. Concentration of crushed ore by gravity techniques and flotation,
3. Extraction of gold from the ore concentrates.

After processing of the ore, the processes of smelting and refining follow:

4. Smelting to a gold-rich doré (containing typically about 60-70 percent gold, and silver),
5. Casting of bars,
6. Refining of doré into gold bars containing 99.5 percent gold or more.

FIGURE 1: SCHEMATIC REPRESENTATION OF GOLD ORE PROCESSING, FOLLOWED BY SMELTING AND REFINING

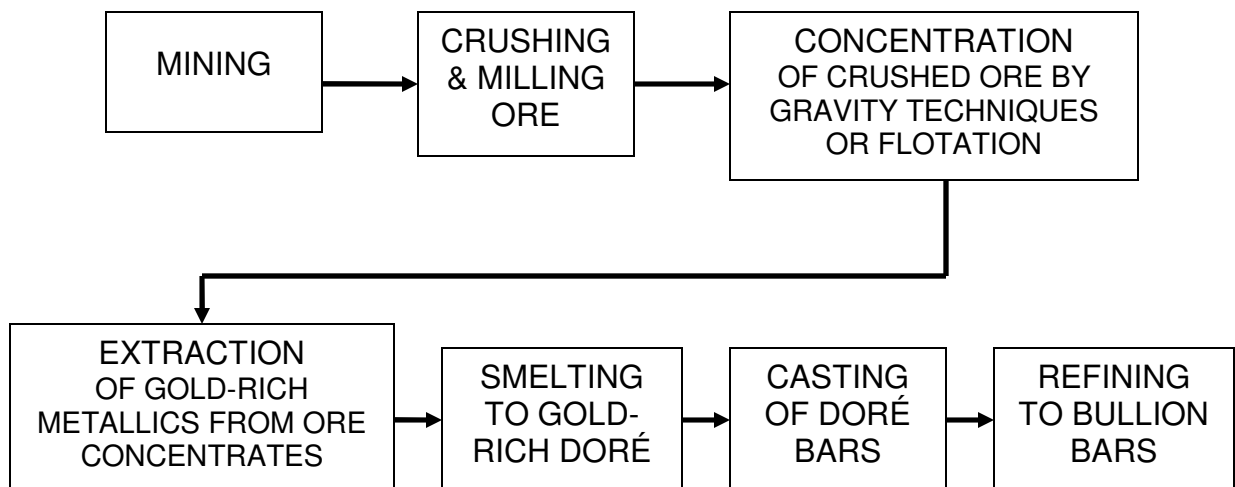
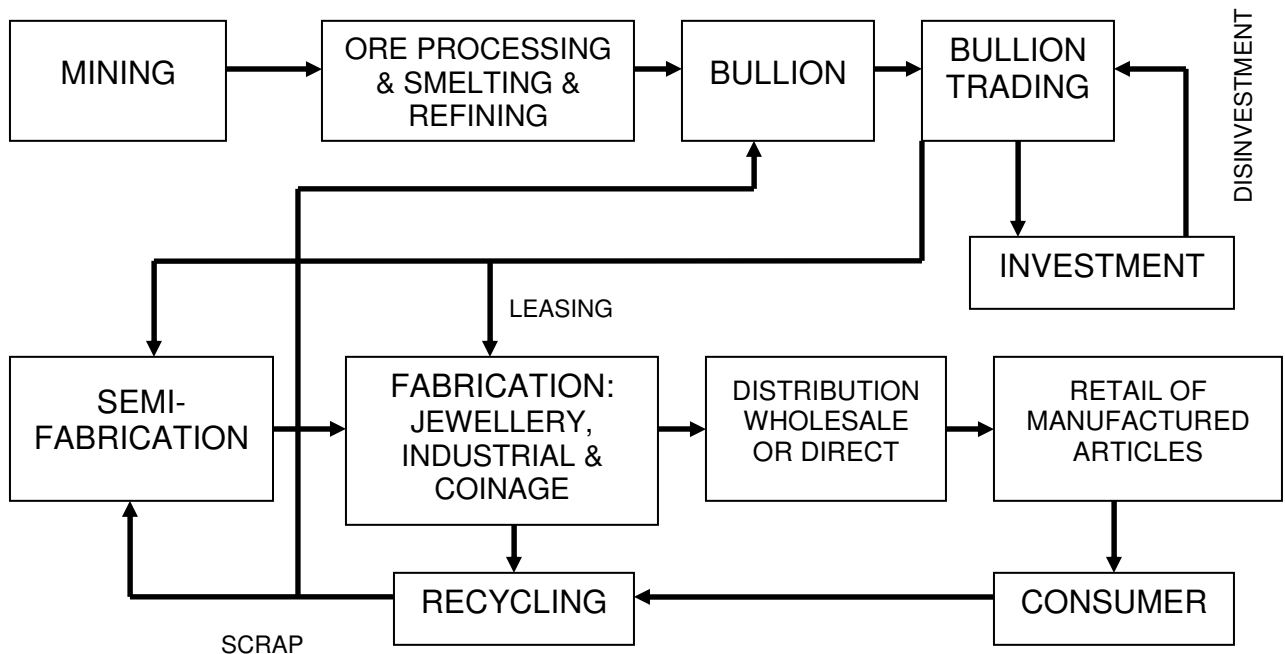


FIGURE 2: SCHEMATIC REPRESENTATION OF THE GENERIC PRECIOUS METALS VALUE CHAIN



2.6 GOLD VALUE CHAIN

Refined bars or bullion bars are usually sold to bullion dealers, although direct marketing by mining companies does occur. The bullion dealers trade with jewellery or electronics manufacturers, who fabricate final consumer goods. In some countries, bullion dealers will also lease gold out to manufacturers since it is cheaper to borrow precious metal for a working inventory than to borrow money to buy precious metal, because precious metal lease rates are usually much lower than interest rates.

2.7 CONSUMPTION OF GOLD

The physical demand for gold is made up of three main sectors, namely (figures for 2008 in brackets):

1. Jewellery (about 2 159t or 66.7%),
2. Industrial (about 436t or 13.5%) and
3. Investment (about 640t or 19.8%).

2.7.1 Jewellery Sector

The largest gold jewellery consuming countries are (figures for 2008 in brackets):

1. India (502t),
2. China (356t)
3. USA (188t), and
4. Turkey (153t).

2.7.2 Industrial Sector

In 2008 the industrial uses of gold were accounted for by electronics (293t or 67.2 percent), dentistry (56t or 12.8 percent) and other industrial uses (87t or 20.0 percent).

Gold's physical and chemical properties, including high electrical conductivity, high thermal conductivity and resistance to corrosion, make it indispensable in industrial applications. Gold can be found in computer keyboard circuits, electrical contacts and mobile phones. Catalytic applications are also attracting increasing interest.

As a result of its non-allergenic properties gold is used widely in dentistry. In medical applications, its biocompatibility is becoming increasingly important.

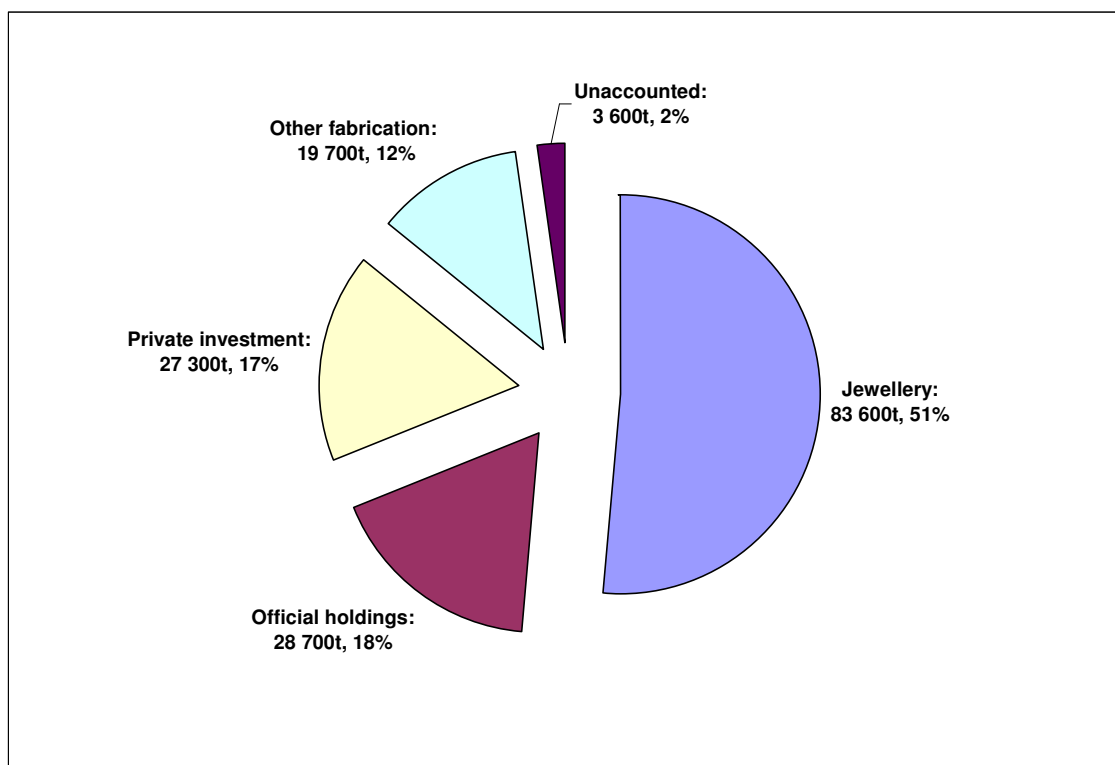
2.7.3 Retail physical investment

Retail physical investment is made up of demand for coins and bars. In most countries this represents an avenue for private individuals to buy gold. See the section on bullion coins, later in this publication, for a more detailed discussion.

2.8 ABOVE-GROUND STOCKS OF GOLD

The above-ground stocks of gold totalled an estimated 162 900t at the end of 2008, which is 67 times the current annual mine production. Figure 3 depicts the different categories of above-ground stocks.

FIGURE 3: GOLD STOCKS



Source: GFMS, 2009

2.9 GOLD AS A FORM OF MONEY

Gold is unique in that it is both a monetary asset and a commodity. As a commodity it is also fungible, i.e., it is exchangeable, interchangeable, standardised and with a unit price set by the market.

2.9.1 Central Bank reserve asset

Central banks have been substantial holders of gold for more than a century and are still expected to maintain significant stocks in the foreseeable future. They account for some 18 percent of above-ground stocks.

Over the last decade, the rebalancing of reserve portfolios and diversification has led to a reduction in the amount of gold held by some central banks. This trend is expected to continue for many years, but central banks have indicated that gold will remain an important reserve asset. Central banks began building up their stocks of gold from the 1880s, during the era of the Gold Standard. Under this monetary system, in countries on the Gold Standard, the amount of money in circulation was linked to the country's gold stock, and paper money was convertible into gold at a fixed price. This is different from the modern Fiat Money (such as the Rand), which is inconvertible paper money established by government fiat (authorisation). The main reasons why central banks still hold gold are:

- **Economic security:** The value of currencies held in reserve, depend on the economic policies of the issuing government. Gold does not suffer from defects in policy in centres where it is held as a reserve
- **Physical security:** If gold is located appropriately, it is much less vulnerable to exchange controls affecting free transfer of currencies or total asset freezes.
- **Unexpected needs:** Gold provides a form of insurance against some unexpected events such as war, surge in inflation, trade blocks and international isolation.
- **Confidence:** Gold affords some measure of comfort because it is an indestructible, "hard" asset. It is something solid and valuable, although now not directly convertible, that underlies the paper money used for everyday transactions.
- **Diversification:** The fact that returns on gold tend to be negatively correlated with other financial assets provides gold-containing portfolios with significant benefits.
- **Income:** Gold lending allows central banks to earn a return on gold.
- **Store of value:** Historically, gold has maintained its purchasing power in real terms.
- **Reserve mobilisation:** Gold plays a role in central bank reserve mobilisation in times of need, usually by lending and swapping. Gold is often used as a collateral for external borrowing. Central Banks conduct many of their gold transactions discreetly and even secretly.

2.10 GOLD TRADING AND HOW THE MARKET WORKS

Mine production of gold currently amounts to about 2 400t per year. In 2008, primary refined production was valued at \$68 billion. If recycled scrap is added, then conventional gold supply was worth some \$102 billion last year (2008).

The global trade in gold consists of over-the-counter (OTC) trades, which are direct, principal-to-principal transactions in spot, forward contracts, options and other derivative products, and exchange-traded futures and options. The OTC market is flexible in contrast to the rigidity of exchange transactions, hence OTC trading accounts for the much greater share of the global trade in gold.

2.10.1 Over-the-Counter (OTC)

The OTC market operates 24 hours a day around the World. The main centres for OTC dealings are London, New York, and Zurich. Generally, mining companies and central banks tend to transact their business through London and New York. The New York market also services fabricators of jewellery and industrial products, and investment and speculative business. Zurich specialises in supplying physical gold to fabricators of jewellery and industrial products. However, bullion dealers tend to have offices around the World. The major bullion dealers around the World are members of the London Bullion Market Association (LBMA).

Most of the OTC trades are cleared through London, although the physical market itself is distributed worldwide. "Loco London", a term often used, refers to gold physically held in London. The LBMA makes stringent specification for "good delivery" bars, especially in terms of mass, fineness (gold content in parts per 1000) and mark (stamp of the official melter or assayer). It must have a minimum fineness of 995.0 and a gold content of between 350 and 430 fine ounces with the bar weight expressed in multiples of 0.025 of an oz - the smallest weight used in the market. Bars are generally close to 400 oz or 12.5kg.

The gold spot price always refers to the price of a London Good Delivery bar.

2.10.2 Price discovery: the London Fix

The price of gold is 'fixed' twice daily at 10H30 and 15H00 (GMT) in London. As of 5 May 2004, the morning and afternoon gold price fixing no longer takes place at the office of NM Rothschild & Sons Ltd., and is now conducted over the telephone. The current members of the fix are Deutsche Bank AG, Barclays Bank plc, HSBC Bank USA NA, Société Générale and the Bank of Nova Scotia-Scotia Mocatta. Any other market participant wishing to trade must do so through one of these five dealers. The fix is based on the original 1919 principle: *"The principle to be maintained with regard to the sale of gold in the free market in London is that everyone attending the gold fixing is entitled to buy or sell gold on equal terms with everyone else present... It is also agreed that only one price shall be quoted and shall represent the price at which all supplies can be absorbed"*.

In practice, the process of fixing the gold price works as follows:

- The chairman of the gold fixing (a function which rotates annually through the members) suggests an opening price, which is reported by the representatives by phone to their dealing rooms
- The chairman then invites clients to place orders with the dealing rooms of fixing members, who nets all orders before communicating their interest to their representative at the fixing
- The metal price is adjusted to reflect whether there are more buyers or sellers at a given price until such time as supply and demand is seen to be balanced
- Throughout the proceedings customers may change their orders, at which point the fixing member will raise a small flag to convey visually to the other members that they are changing their order. The price will not be fixed until all flags are down.

The fixing prices are quoted immediately through the various news and business information wires or channels as well as the many gold information websites. The fix is therefore regarded as a full and fair representation of all market interest at the time.

2.10.3 Settlement

The basis of settlement is delivery of a standard London Good Delivery bar, at the London vault nominated by the dealer that made the sale. Currency settlement for gold transactions will usually be in US dollars over a US dollar account held in New York.

2.10.4 Delivery of Physical Gold

Delivery may be made in several ways, including delivery to the dealer's vault, or a credit to an allocated account, or through the London Bullion Clearing to an unallocated account of the third party. In addition to delivery at its own vault, a dealer may, by prior agreement, arrange delivery to any destination around the world and in any form or any fineness. To enable this service, most bullion dealers have consignment stocks in strategic centres around the world. An allocated account refers to an account held in a client's name, where gold is exclusively held separately from other gold in a vault. This gold does not form part of the bullion bank's assets, but is titled over to the allocated holder. The gold in an allocated account cannot be lent out or used by the vault owner. An unallocated account is basically a debit and credit arrangement, which is backed by the general stock of the bullion dealer where the account is held. If the client wishes to receive physical metal by allocating specific bars or equivalent bullion product, the fine metal content of this is debited from the unallocated account. The physical delivery period is normally two business days after the trade is transacted.

2.10.5 The Clearing process

The clearing process is simply a system of paper transfers whereby members offering clearing services use the unallocated gold accounts that they maintain between each other, not only for settlement of mutually agreed trades but also for third party transfers. This system avoids the security risks and costs that would be involved in the physical movement of bullion.

2.10.6 London Bullion Market Association (LBMA)

The LBMA, established in 1987, is the representative body for all sectors of the gold market involved in trading in London or clearing their trades through the London market. Its members include banks, brokers, fabricators, refiners, and shippers. The LBMA's important role is ensuring that the market adheres to a Code of Conduct, which covers, *inter alia*, confidentiality, market ethics, inducements and conflicts of interest. It is also responsible for maintaining good delivery lists and for the governance of market practices such as clearing and settlement.

2.10.7 The Bank of England

The Bank of England has been the focal point of global gold since 1694 and silver trading for more than three centuries. It is undoubtedly one of the most active central banks in the gold market. It is also a recognised IMF gold depository and holds gold for, and will often trade on behalf of, other central banks.

2.10.8 Futures Exchanges

The most important exchanges are the COMEX division of the New York Mercantile Exchange and the Tokyo Commodity Exchange (TOCOM). Trading on these exchanges is less flexible than the OTC market, and much more rigid in terms of delivery dates and transaction size for the futures and options contracts traded. In addition, the Commodity Futures Trading Commission

(CFTC) requires that a large-scale trader on COMEX declare himself and the nature of his business (hedging, speculative, etc). These markets are more geared to the speculator than the physical market and, a case in point is COMEX where usually less than 1 percent of the market turnover actually results in eventual physical delivery.

3. PLATINUM

The section below focuses mainly on platinum, but the market for palladium is similar. It is worth noting, however, that a smaller but growing amount of palladium (26.6t in 2008) is used in jewellery compared with 42.5t consumed in platinum jewellery fabrication.

Palladium is often alloyed with gold to produce white gold jewellery. However, because of record high platinum prices and the higher margins of palladium jewellery, there was a rapid development of palladium jewellery manufacturing in China in 2004/5. As a result, use of palladium in jewellery increased from 8.1t in 2003 to 26.6t in 2008. Palladium jewellery will grow in popularity because the platinum price is expected to stay at high levels in the short term. Palladium is used mainly in autocatalysts (136.2t in 2008).

The other PGMs are not discussed in detail, but brief comments are made towards the end of the section.

3.1 PLATINUM'S UNIQUE PROPERTIES

1. Platinum is rare (about 35 times more rare than gold). About 10t of ore must be mined to produce a oz of platinum.
2. It is the densest known metal (at 21.45 g/cm³ it is 11 percent more dense than gold).
3. It has a silvery-grey white colour (which makes it popular for so-called “white metal” jewellery). This white lustre complements diamonds and other precious stones while its neutral colour enhances a stone’s brilliance and depth.
4. Its melting point (1 769°C) is higher than that of gold, and it has high temperature stability.
5. Its main advantage for use in platinum jewellery fabrication is its strength and resistance to tarnish. Platinum can be repeatedly heated and cooled without hardening and oxidation effects. Platinum is a favoured choice for holding diamonds, because of its density and strength.
6. It is malleable and extremely ductile. The latter is illustrated by the fact that one gram of platinum can be drawn out into a fine wire thread over a 1.5 km long.
7. It is an efficient catalyst, and thus finds use as an autocatalyst in motorcars to reduce air pollution.
8. It is a noble metal, hence, oxidation and corrosion resistant (non-reactive, does not tarnish and is resistant to heat and acids).
9. Very high recyclability (over 96 percent).
10. It is hypoallergenic, so it is the jewellery choice for people who are allergic to other metals.
11. It is biologically compatible, so it is important in many medical applications.

3.2 PLATINUM ORE PROCESSING, SMELTING AND REFINING

After platinum-bearing ore is excavated from the earth, it undergoes the following processes in sequence:

1. Comminution: Crushing and milling to maximise efficiency of the concentration process,

2. Concentration: separating milled ore into concentrate and waste by filtration and floatation.

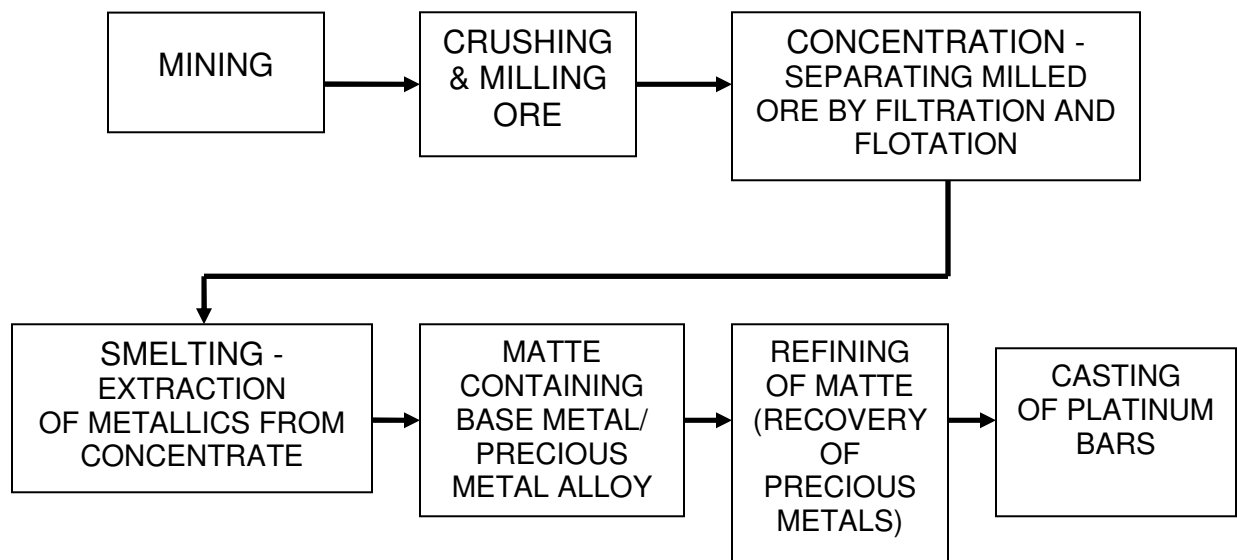
After processing of the ore, the processes of smelting and refining follow:

3. Smelting: Extraction of metallics from the concentrate by pyrometallurgical processes to form a matte containing base metal/precious metal alloy,
4. Refining: Refining of the matte includes extraction of base metals and recovery of precious metals, and finally, the
5. Casting of platinum bars.

3.3 PLATINUM SUPPLY: SOUTH AFRICA – PLATINIZING THE WORLD

Supply of platinum is dominated by South Africa, which supplied about 146.1t or 77 percent of World supply in 2008. Other producing countries are Russia (supplied 25.5t in 2008) and the North American countries, the USA and Canada, which supplied a combined total of 10.1t in 2008. Zimbabwe and Australia are minor producers of platinum.

FIGURE 4: SCHEMATIC REPRESENTATION OF PLATINUM ORE PROCESSING, FOLLOWED BY SMELTING AND REFINING



PGMs contribute about 14 percent to South Africa's export earnings (from goods) and a little over 2 percent to GDP.

3.4 PLATINUM USES

3.4.1 Autocatalysts

Platinum is a precious metal and an industrial metal. The main use for platinum, however, is in autocatalysts, which consumed 118.3t in 2008. Platinum usage in autocatalysts is linked to the

introduction and evolution of emission regulations and standards. These are currently in force in many countries, but standards vary from country to country.

3.4.2 Jewellery

The second biggest demand sector is in jewellery, a sector that consumed 42.5t in 2008. The main jewellery fabricating countries are Asian countries, in particular China (26.4t in 2008), where people have a particular fondness for white metals.

3.4.3 Industrial

Industrial demand for platinum, the third biggest demand component, consumed some 54.6t in 2008. Industrial uses for platinum include platinum-based catalysts in the chemical industry and the petroleum refining industry, electrical applications (e.g., in computer hard disks & fuel cells) and platinum-containing equipment for the glass industry.

3.4.4 Investment

Demand for platinum in investment products, at 13.2t, was strong in 2008 due to the lower price of the metal during the second half of the year. Investment products include platinum coins (such as the famous US American Eagle proof coins), small and large platinum bullion bars. Sales of platinum coins and investment bars are price-sensitive. South Africa, the World's largest producer of platinum, has never minted platinum coins.

3.5 PLATINUM TRADING

3.5.1 Size of the market

In comparison with gold, the platinum market is small and illiquid. Dealers suggest that purchases or sales of only 10 000 ozt (311kg) can swing the price by about \$10/ozt.

At an average price of \$1 576.20/ozt the platinum supply of 186t in 2008, was valued at approximately \$9.4 billion, which was a seventh of the value of the 2 416t of primary refined gold production (\$68 billion).

Demand in 2008 amounted to 197t, so if one applied an average price of \$1 576.20/ozt, this consumption was valued at about \$10 billion. Movement of stocks to balance the deficit was a net 11t in 2008, worth an estimated \$0.6 billion.

3.5.2 Lack of above-ground stocks and minor spot market

Platinum's limited supply and the lack of above-ground stocks are essential differences relative to gold. These and irregular shipments from Russia have been responsible for the volatility of the platinum price.

The size of the Russian stockpile was a very important price-influencing factor in the 1990s, but it has dwindled in significance recently. Presently, the factors influencing mining in South Africa and Russia, economic conditions in the main consuming countries such as Japan, USA and China and the price of gold have a greater influence on the platinum price.

Also noteworthy is the fact that most of the World's supply of platinum is sold through long-term contracts to industrial consumers and thus not available on the spot market. These industrial consumers include Johnson Matthey and large motor manufacturers such as General Motors.

The main physical market for spot delivery is the London Platinum and Palladium Market (LPPM). Forward prices are also quoted for stipulated maturity dates, thus allowing producers and industrial consumers to hedge in volatile market conditions.

3.5.3 Price Discovery Mechanism

The LPPM Fixings, also referred to as the London Fix, is considered the international benchmark for platinum and palladium prices and is transmitted by newswires. The quotation is done twice a day at 09H45 and 14H00 (GMT). The fix is a bid price loco London i.e., a price that LPPM members would have been prepared to pay for platinum and palladium in the form of plate or ingot, deposited in a London vault. The fixing procedure is similar to the London Gold Fix, in that it is a balancing exercise of buying and selling orders received from members or their clients, who respond to price announcements and subsequent adjustments. The fixing price is the one at which all orders are cleared. Settlement is made within two days after the date of contract.

The reference price for all PGMs, including platinum, is the Johnson Matthey Base Price. It is Johnson Matthey's quoted selling price for PGMs set by the company's trading desks in the USA, Hong Kong and London, based on market offer prices. The price is for metal in sponge form, ex-Johnson Matthey refinery. The JM Base Price is set at 09H30 and 15H00 EST in the USA, at 09H30 and 15H00 in Tokyo and 09H00 in Zurich every weekday.

3.5.4 Storage and delivery

The London and Zurich markets have facilities for storage of platinum and palladium in high security vaults. The metals can be held on unallocated or allocated accounts. Many clients do not take delivery of their metal and request the members of the market to open metal accounts in their name. In such unallocated accounts, the specific bars are not set aside and clients have a general entitlement to the metal. This practice is popular because it is convenient and cheap. Allocated accounts are opened for clients who prefer their metal to be physically segregated and need a detailed list of weights and assays.

3.5.5 London Platinum & Palladium Market (LPPM)

The LPPM was established in 1987 to promote professional trading in London of both platinum and palladium. The market also maintains the London/Zurich Good Delivery List, which is a list of acceptable melters and assayers. To qualify as good delivery, platinum and palladium metal must conform to the following specifications:

- Form: Plate or ingot
- Weight: The maximum weight permitted is 6kg (192.904 ozt). The minimum weight permitted is 1kg (32.151 ozt).
- Purity: At least 99.95 percent
- Markings: Each plate or ingot must bear the producer's recognised mark, the letters PT or PLATINUM for platinum and PD or PALLADIUM in the case of palladium with a stamp indicating the purity, an individual number or mark, year of manufacture, and the weight in grams, kilograms or troy ounces (if in grams to one decimal place, if in kilograms to four decimal places and if in troy ounces to three decimal places).
- Appearance: Smooth, free from cavities and easy to handle.

3.5.6 Futures Markets and Contracts

Exchanges offer the facility for trading futures and options on behalf of clients. Platinum futures and options are primarily traded on the New York Mercantile Exchange (NYMEX) and TOCOM. The trading of platinum contracts is conducted electronically at TOCOM but by open outcry at NYMEX.

3.5.7 Forward Contracts

Forward contracts are more flexible than futures contracts and are conducted principal-to-principal usually by mining companies to sell their platinum at an agreed price for delivery on a fixed future date. These are not transacted on an exchange, and usually always result in physical delivery of platinum.

3.6 OTHER PGMs – BRIEF COMMENTS

Information on the other PGMs can be found on the Johnson Matthey website (www.platinum.matthey.com) and in the publication *Platinum 2009*, published by the same company.

A few facts are listed below:

1. All the PGMs can be used as catalysts and in the electronics industry.
2. Palladium often substitutes for platinum in autocatalysts and jewellery, because it is currently much cheaper.
3. Rhodium and iridium are difficult to work; they are nevertheless popular in alloys and chemical compounds.
4. Ruthenium and osmium are hard and brittle and thus unworkable in the metallic state, but are used in combination with other metals.
5. Palladium is alloyed with gold to produce white gold jewellery.
6. Iridium is the rarest of the precious metals. In fact, anomalously high concentrations of iridium in the Earth's crust can be indicative of extraterrestrial (meteorite or asteroid) contamination.

4. SILVER

Silver has a history that stretches as far back as 6 000 years. It was used as a form of exchange as early as 700 BC. It is the people's precious metal, steeped in history and celebrated in literature.

Today, silver is used for a great variety of uses. It is still regarded as a precious metal, but in the modern day it is more of an industrial metal, as about two-thirds of silver is used for non-jewellery/silverware/coinage applications.

4.1 SILVER'S PROPERTIES AND CREDENTIALS

1. Silver is the cheapest precious metal. In 2008, the silver price averaged \$14.99/ozt.
2. It is the most abundant of the precious metals. It is about 25 times more abundant than gold in the Earth's crust. Its affordability and abundance makes silver the most ubiquitous jewellery metal.
3. Silver has the highest conductivity.

4. It is a soft and malleable precious metal and it has the lowest melting point among the precious metals, so it is workable into any form.
5. It has high reflectivity and sensitivity to light.
6. It is a silvery-white metal – popular for white jewellery and silverware.
7. Although high in lustre, silver tarnishes when exposed to the elements.
8. Silver also has bactericidal properties, which are employed to sanitise water and wounds.
9. Silver is a store of value – a hedge against inflation.

4.2 SILVER SUPPLY - SA's GOLD HAS A SILVER LINING

World silver mine production totalled 21 178t in 2008. The main silver producing countries in 2008 were:

1. Peru (3 680t or 17.4%),
2. Mexico (3 241t or 15.3%), and
3. China (2 575t or 12.2%).

South Africa produced about 75.2t of silver (ranked 20th) as a by-product from several gold, platinum and non-ferrous metal mines in 2008.

Total silver supply (mine production, official sector sales, scrap recovery and producer hedging) totalled 27 632t in 2008. In the silver market, above-ground stocks (bullion stocks held by governments and investors) are significant. In 2008, Government sales totalled 961t and scrap recycling contributed 5 493t to supply.

4.3 SILVER DEMAND

Fabrication demand amounted to 25 897t in 2008. About 92 percent of the utilisation of silver was accounted for by three sectors, i.e. industrial/decorative uses, photography, and jewellery and silverware. The industrial/decorative sector was the largest consumer of silver, absorbing 13 909t or 53.7 percent of fabrication demand; it was followed by the jewellery and silverware (6 706t or 25.9 percent), photography (3 260t or 12.6 percent), and coinage (2 019t or 7.8 percent) sectors.

The top three silver fabricating countries are the USA, Japan and India. South Africa's silver fabrication amounts to about 3 to 5t a year.

Silver jewellery and silverware usually has a fineness of 925 and is marked "sterling silver".

Silver salts have been used as an image capturing and image forming material in photography since 1839.

4.4 SIZE OF THE SILVER MARKET

Despite the volume of silver mine production being 9 times that of gold, its value, at \$10.2 billion was about 7 times less. Total conventional supply of silver (mine production plus scrap) in 2008 was valued at an estimated \$12.8 billion, which was only about \$3.4 billion higher than the value of platinum supply, but an eighth of the value of conventional supply of gold in that year.

Silver fabrication demand in 2008 was valued at about \$12.5 billion, which was about \$2.5 billion higher than the value of platinum demand.

4.5 SILVER TRADING

Silver, like gold, is traded 24 hours a day, across the time zones in the major centres, viz., London, Zurich, New York, Chicago and Hong Kong.

Silver's fundamentals are currently in good shape, as fabrication demand has outstripped mine production in recent years, leading to a drawdown in bullion stocks to meet demand. However, like most products that are a corporeal store of value, its price is also influenced by inflation, interest rates, currency rates and changes in trade deficits. The majority of silver is mined as a by-product of gold, lead-zinc and copper mining, and therefore its price is also dependent on the vagaries of these metal markets. As a precious metal, silver does ride on "gold's coat-tails" from time to time.

4.5.1 London bullion market and the London Fix

The London market is the oldest, having started trading in the 17th century. The London bullion market is an OTC market rather than an exchange-trading environment, members thus trade on a principal-to-principal basis.

Like most markets, it provides a platform for trade in physical silver on a spot, or on a forward basis for hedging purposes. London is regarded as the World's main centre for the physical silver trade. The London Bullion Market is a wholesale market, where minimum traded amounts are generally 50 000 oz of silver.

The Rand Refinery of South Africa has accreditation or "good delivery" status for silver bars in the London Market, which it obtained from the LBMA.

The London market has a "fix" which allows for the buying or selling of silver at a single price. The fixing process begins at 12h15 each trading day, and culminates in a price fix – the price at which all the members of the Fixing can balance their own and their clients' buying and selling orders.

4.5.2 Futures Trading

To be traded in a futures market, a commodity must be standardised and its price must fluctuate sufficiently to create uncertainty that warrants price risk and profit/loss management. Silver, gold, platinum and palladium are such commodities.

The most important silver futures trading market is again the COMEX division of the New York Mercantile Exchange, which is a platform for futures contracts and options.

4.5.3 Silver – the affordable investment

South African citizens can invest in silver coins, fabricated by the South African Mint. The *Protea*, R2, 50c, 20c, 10c and 5c series legal tender coins are available to the public. Note that there is a difference between the face value of a bullion coin (marked on the coin) such as the R2 coin and the market value (not marked on the coin as it changes daily). Bullion coins sell at a premium of 3 to 10 percent over the spot silver price. The market value of a bullion coin is thus related to the silver purity or fineness, silver mass in oz, and the prevailing silver price.

The World's most popular silver bullion coin is the US Mint's American Eagle, a 1 oz bullion coin with a face value of \$1 and 999 fineness. More than 76 million of these coins have been sold since 1986.

Mexico, until recently the world's largest silver producer, is the only country in the World currently using silver in its circulation coinage.

The Precious Metals Act, 2005 introduced the deregulation of the possession of, and dealing in silver (silver has been excluded from the definition of "precious metals" in the *Precious Metals Act, 2005*). The deletion of silver from the definition of "precious metal" in the *Precious Metals Act* is a legislative way of deregulating silver. It simply means that silver would not be regarded as a "precious metal" for the purposes of the Act – which in turn means that the provisions that apply to gold and the PGMs would not apply to silver.

5. SOUTH AFRICAN PRECIOUS METALS LEGISLATION

5.1 INTRODUCTION

The intention of legislators of the pre-1990s was to restrict the precious metals trade in South Africa. The main reason for this was that precious metals, in particular gold, were the most important means of foreign exchange, and a crucial reserve asset. Gold exports contributed about 60 percent to South Africa's foreign exchange earnings in the 1970s. During the isolation period (sanctions), gold trading and the anonymity that went with it was a lifeline for South Africa.

The Witwatersrand Basin, the World's richest gold deposit, and the Bushveld Complex, the World's richest platinum deposit, were and still are South Africa's deepest treasure chests, which the country has drawn on and supplied to the world, in return for foreign exchange. For this reason all mined gold production in the country was, until 1998, sold to the South African Reserve Bank, within 30 days of production.

The different organisations involved in regulating the trade in precious metals are:

1. The Department of Mineral Resources (DMR) is the designated department for granting precious metal prospecting and mining rights and mining permits and for regulating the prospecting for, and mining, of precious metals.
2. The South African Diamond and Precious Metals Regulator, or Regulator for short, is responsible for administration of the Precious Metals Act, 2005 (Act No. 37 of 2005).

5.2 PROSPECTING AND MINING – THE MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT

The legislation controlling all prospecting and mining is the Mineral and Petroleum Resources Development Act (Act No. 28 of 2002) (MPRDA) which came into effect in May 2004. Before one can apply for a prospecting right, mining right or mining permit the following procedures can be followed:

1. Identify the piece of land on which the proposed activity is to take place. Details such as the farm/plot/portion number of the property can be obtained from the Surveyor-General's office in that province.
2. If the applicant is not the surface rights owner, the surface rights ownership relating to that property/land can be obtained at the Deeds Office.
3. The first point of contact should be the Department of Mineral Resources' Regional Office (in the province in which the land, that is the subject of the proposed application to prospect or mine, is situated). Contact details of Regional Offices are given at the back of this publication.
4. It is important to ascertain at the Regional Office if no other person holds a prospecting right, mining right, mining permit or retention permit for the same mineral and land (note that the

transitional period for the processing of unused old order rights lapsed in May 2005). In addition, the MPRDA provides that “old order prospecting rights” must have been converted to new order prospecting rights (by 30 April 2006) and that “old order mining rights” must have been converted to new order mining rights (by 30 April 2009).

5. Further guidance with regard to application for prospecting and mining rights (or mining permit) will be given by the Regional Office of the Department of Mineral Resources.
6. Application forms can be downloaded from the DMR’s website: www.dme.gov.za/minerals/documents.stm, to obtain an understanding of the detailed requirements for an application.

5.3 THE SOUTH AFRICAN DIAMOND AND PRECIOUS METALS REGULATOR

The objects of the Regulator are to:

1. ensure that the precious metal resources of the Republic are exploited and developed in the best interest of the people of South Africa;
2. promote equitable access to, and local beneficiation of, the Republic's precious metals;
3. promote the sound development of precious metal enterprises in the Republic; and
4. advance the objectives of the broad-based socio-economic empowerment as prescribed.

The functions of Regulator are to:

1. implement, administer and control all matters relating to the acquisition, possession, smelting, refining, fabrication, use and disposal of precious metals;
2. advise the Minister on any matter to which this Act relates referred to it by the Minister; and
3. in general perform such acts as may be necessary or expedient for the achievement of its objects.

Applications for licences, permits and certificates are made to the Regulator who also issues them. The South African Police Service (SAPS) is responsible for clearance procedures in respect of applications, through consultation by the Regulator. National Treasury (in particular the Reserve Bank’s Exchange Control Department) are consulted before certificates, permits and licences for unwrought gold are issued. This is for exchange control purposes.

5.4 THE POSSESSION AND TRADE IN PRECIOUS METALS

5.4.1 Prohibitions relating to the acquisition, possession or disposal of unwrought precious metal

1. According to the Precious Metals Act, no person may acquire, possess or dispose of, either as principal or as agent, any unwrought precious metal, unless:
 - a) he or she is the holder of a refining licence and acts in accordance with the terms and conditions of his or her licence;
 - b) he or she is an authorised dealer;
 - c) he or she is a producer who has won or recovered such unwrought precious metal;
 - d) he or she has obtained a certificate from the Regulator authorising him or her to acquire or to dispose of such unwrought precious metal;
 - e) such unwrought precious metal does not exceed a prescribed mass and is acquired in accordance with a special permit issued by the Regulator for scientific or beneficiation purposes or to make jewellery; or he or she is the holder of a precious metal beneficiation licence and acts in accordance with the terms and conditions of his or her licence;
2. The Regulator may only issue a certificate contemplated in point (d) above to a person in consultation with the National Treasury, in the case of gold, and the National Commissioner of the SAPS.

3. No person may have in his or her possession any unwrought precious metal unless he or she is:
 - a) a person contemplated in point 1 above; or
 - b) in possession of such precious metal in fulfilment of a contract of employment with any person contemplated in point 1 above.
4. No person may deliver unwrought precious metal in payment of any debt owed by him or her or any other person or in consideration of any service rendered or to be rendered to him or her or any other person.
5. Only a person contemplated in point 1 a), c), e) or f) may make up, smelt or change the form of any unwrought precious metal in his or her possession.

5.4.2 Prohibitions relating to the acquisition, possession or disposal of semi-fabricated precious metal

1. No person may acquire, possess or dispose of, either as principal or as agent, any semi-fabricated precious metal, unless:
 - a) he or she is the holder of a refining licence and acts in accordance with the terms and conditions of his or her licence;
 - b) he or she is an authorised dealer;
 - c) he or she is a producer who has won or recovered the unwrought precious metal which has been refined and made into such semi-fabricated precious metal;
 - d) he or she has obtained a certificate from the Regulator authorising him or her to acquire or to dispose of such semi-fabricated precious metal;
 - e) such semi-fabricated precious metal does not exceed a prescribed mass and is acquired in accordance with a special permit issued by the Regulator for scientific purposes;
 - f) he or she holds a precious metals beneficiation licence; or
 - g) he or she holds a jeweller's permit.
2. No person may have in his or her possession any semi-fabricated precious metal unless he or she is:
 - a) a person contemplated in point 1 above; or
 - b) in possession of such precious metal in fulfilment of a contract of employment with any person contemplated in point 1 above.

5.5 IMPORT OF PRECIOUS METALS

1. No person may import any unwrought or semi-fabricated precious metal into the country without having a valid import permit.
2. The holder of a refining licence or a precious metal beneficiation licence, a producer, an authorised dealer, a certificate holder or a special permit holder, may apply for an import permit to import any unwrought or semi-fabricated precious metal.
3. Similarly, the holder of a refining licence or a precious metal beneficiation licence, a producer, an authorised dealer, a certificate holder, special permit holder or jeweller's permit holder may apply for an import permit to import any semi-fabricated precious metal.
4. No distinction is made between "new" or virgin precious metal and used and second-hand precious metal waste and scrap.

5.6 EXPORT OF PRECIOUS METALS

1. No person may export any unwrought or semi-fabricated gold except with the approval of the National Treasury in terms of the Exchange Control Regulations made under the Currency and Exchanges Act, 1933 (Act No. 9 of 1933), granted with the concurrence of the Minister.
2. No person may export any unwrought or semi-fabricated metals of the platinum group except with the written approval of the Minister which shall be granted subject to the promotion of equitable access to, and the orderly local beneficiation of such metals.

5.7 TYPES OF PERMITS, LICENCES AND CERTIFICATES ISSUED BY THE REGULATOR

5.7.1 Refining licence

The Regulator may, after consultation with the National Treasury, in the case of gold, and the National Commissioner, issue to any person, in the prescribed form and for a period not exceeding 30 years, a refining licence entitling the holder to do the following, as may be specified in the licence, namely:

1. to buy or receive unwrought precious metal in any form from the South African Mint or any holder of a refining licence or a precious metal beneficiation licence, a producer, an authorised dealer, a certificate holder or a special permit holder;
2. to buy or receive semi-fabricated precious metal from the South African Mint or any holder of a refining licence or a precious metal beneficiation licence, a producer, an authorised dealer, a certificate holder, special permit holder or jeweller's permit holder;
3. to smelt, refine or change the form of unwrought precious metal in his or her lawful possession and thereafter to dispose of such precious metal in accordance with the terms and conditions of his or her licence and the provisions of the Act to the South African Mint or any holder of a refining licence or a precious metal beneficiation licence, a producer, an authorised dealer, a certificate holder or a special permit holder; or in semi-fabricated form to any holder of a refining licence or a precious metal beneficiation licence, a producer, an authorised dealer, a certificate holder, special permit holder or jeweller's permit holder;
4. to extract precious metal from any material, substance or solution in his or her lawful possession and to dispose of such precious metal in accordance with the terms and conditions of his or her licence and the provisions of the Act;
5. to buy or receive from the holder of a refining licence or a precious metal beneficiation licence, an authorised dealer or a producer, any material, substance or solution in the lawful possession of that holder, authorised dealer or producer containing precious metal and to extract from such material, substance or solution precious metal and to dispose of the precious metal in accordance with the terms and conditions of his or her licence and the provisions of the Act; or
6. to import any unwrought or semi-fabricated precious metal into the Republic subject to the terms and conditions of his or her licence.

5.7.2 Precious metal beneficiation licence

The Regulator may issue to any person, in the prescribed form and for a period not exceeding 10 years, a precious metal beneficiation licence entitling the holder to do such of the following, as may be specified in the licence, namely:

1. to buy or receive unwrought or semi-fabricated precious metal in any form from any person authorised under the Act to sell, deal in or dispose of unwrought or semi-fabricated precious metal;
2. to make up, change the form or add value in any other manner to any unwrought or semi-fabricated precious metal in his or her lawful possession; or
3. to dispose of any unwrought or semi-fabricated precious metal in his or her lawful possession.

5.7.3 Jewellers' Permit

The Regulator may issue to any person, in the prescribed form and for a period not exceeding five years, a jeweller's permit entitling the holder to do such of the following, as may be specified in the permit, namely:

1. to buy or receive semi-fabricated precious metal in any form from any person authorised under the Act to sell, deal in or dispose of semi-fabricated precious metals;
2. to change the form of, or in any other manner add value to, semi-fabricated precious metal in his or her lawful possession; and
3. to dispose of any semi-fabricated precious metal in his or her possession.

5.8 FREQUENTLY ASKED QUESTIONS

5.8.1 What is unwrought precious metal according to the Precious Metals Act?

In the Precious Metals Act: "unwrought precious metal" means:

- a) precious metal that—
 - (i) is unrefined (including concentrate and matte); or has been refined to a purity less than 99.9 percent and has not undergone any manufacturing process other than being refined or formed into a bar (but not a minted bar), an ingot, a button, plate, sponge, powder, granules (excluding, granules made from precious metal that has been refined to or beyond 99.9 percent purity, and carat gold alloys), solution; or
 - (ii) is prescribed as any substance, material or product of similar form to any such substance, material or product listed in paragraph a)(i)

or

- b) any article or substance containing or consisting of precious metal contemplated in paragraph (a), but does not include any article that is of archaeological interest or that has been processed or manufactured for one or more specific industrial, professional or artistic uses.

5.8.2 What is semi-fabricated precious metal according to the Precious Metals Act?

In the Precious Metals Act semi-fabricated precious metal means:

refined precious metal that is in the form of sheet, tube, wire, granule, plate, strip, rod, or sponge (including carat gold alloys as prescribed); or such other refined precious metal as may be prescribed.

5.8.3 What is refined precious metal according to the Precious Metals Act?

Refined precious metal means precious metal that has been refined to or beyond 99.9 percent purity.

5.8.4 Who is an authorised dealer according to the Precious Metals Act?

A person authorised by the National Treasury to deal in gold.

5.8.5 Who is an authorised producer according to the Precious Metals Act?

A producer means any person who holds a permit or right to prospect for or mine precious metals in terms of the MPRDA.

6. MAIN PLAYERS (SOUTH AFRICA), PRODUCTS AND RELATED TOPICS

6.1 THE SOUTH AFRICAN RESERVE BANK

The South African Reserve Bank (SARB), is South Africa's Central Bank and until December 1997, it was also South Africa's only bullion bank as it was the sole marketer of South Africa's gold. The South African Reserve Bank Act, 1989, provides for the powers and functions of the South African Reserve Bank. In relation to precious metals, the following extracts from the Act are worthy of note:

1. SARB can coin coins or cause coins to be coined (by its subsidiary, the South African Mint).
2. It can issue banknotes and coins or cause them to be issued (by its subsidiaries the SA Bank Note Company and the South African Mint).
3. SARB can buy, sell or deal in financial instruments.
4. It can buy, sell, or deal in precious metals and hold for other persons, in safe custody, gold, securities or other articles of value.
5. It may make or cause to be made coins of prescribed denominations and mass, and which are made of gold, platinum, silver, nickel, copper, tin, zinc or steel, including their alloys.
6. It can specify which coins made of precious metal will be considered legal tender.
7. The Act also provides for the Minister of Finance to determine the dimensions of, and design of any coin, as well as the compilation of any series of coins (this is thereafter undertaken by the SA Mint).
8. The Act also provides for the Minister of Finance in consultation with SARB to determine a statutory price of gold, at which gold held by the Bank is valued.
9. Gold of the bank is traded for the profit or loss of the Government.
10. Preservation of secrecy: Any information relating to the affairs of the Bank shall not be disclosed by SARB, except to the Minister of Finance and the Director-General of the Department of Finance.

6.1.1 Management of gold reserves

Prior to December 1997, gold producers in South Africa were obliged to sell the bulk of their gold production to the SARB and were paid in US dollars. The SARB would decide whether to hold such production-gold in its reserves or whether it would be more appropriate to dispose of the gold to acquire foreign exchange. The SARB could dispose of the gold, if so desired, in the various gold markets.

In December 1997, the Minister of Finance announced, in a further measure to liberalise exchange controls gradually, that gold producers could apply for exemption from the relevant Exchange Control Regulations if they wished to sell their own gold output themselves. The gold producers have used this opportunity and consequently sell much of their output using the Rand Refinery as their agent. The SARB still, however, purchases some production-gold and still has to take decisions about reserve composition.

6.2 CENTRAL BANKS AND THE BANK OF INTERNATIONAL SETTLEMENTS

Central Banks are one of the greatest influences in the gold market. Their main role in the market is the management of gold reserves, which entails their involvement with leasing, swaps and trading. They usually have their own vaults for physical reserves, but also hold gold in major trading centres like London, which allows them to mobilise it as collateral in the time of need. The lending by central banks is crucial for the liquidity of the market for forward sales, gold loans and the working inventory of fabricators. Central banks lend to the market and write options against their reserves to earn a return from an otherwise non-interest bearing asset.

6.2.1 Bank of International Settlements

The Bank of International Settlements (BIS), located in Switzerland, is the Central Bank to the various national Central Banks. BIS also holds some gold and acts as an intermediary. It discreetly handles many central bank gold transactions, by scouting potential buyers and selling to those selected.

6.2.2 Central Bank Gold Agreement

The Central Bank Gold Agreement (CBGA), involving European central banks, was signed in September 1999. The agreement limited its signatories' (13 European central banks and that of the UK) gold sales to a maximum of 400t annually, over the five year period from September 1999 to September 2004. It has brought some stability to the gold market and is believed to be the reason for the upward trend in the gold price. Since September 1999, gold has risen by an impressive 253 percent in US dollar terms.

In March 2004, the CBGA was renewed for a further five years, but the agreed limit to gold sales was increased to a maximum of 500t annually, over the five year period from September 2004 to September 2009.

During August 2009, the third CBGA was signed. This agreement covers the period from September 2009 to September 2014, and the collective ceiling was reduced so that annual sales will not exceed 400t and total sales over this period will not exceed 2 000t, 500t lower than the 2 500t five-year ceiling provided for in the second agreement.

This third agreement covered the 15 original signatories to CBGA2 (the European Central Bank and the national banks of Belgium, Germany, Ireland, Greece, Spain, France, Italy, Luxembourg, The Netherlands, Austria, Portugal, Finland, Sweden and Switzerland), together with the national banks of Slovenia, Cyprus, Malta and Slovakia, which all joined CBGA2 on (or in Slovenia's case) just prior to) adopting the euro.

6.3 THE RAND REFINERY

The Rand Refinery, situated in Germiston, is the World's largest gold refinery by capacity. The refinery has refined over 40 000t of newly-mined gold to date, which represents some 30 percent of all gold mined worldwide.

The refinery's laboratory is accredited to supply "Good Delivery" gold and silver bullion bars to the LBMA, COMEX Bars to the COMEX division of the New York Mercantile Exchange and 1kg bars to the TOCOM.

Since the year gold miners were allowed to market their production independently (1998), the Rand Refinery has become the agent for the marketing of the bulk of South Africa's gold and silver production.

In recent years, Rand Refinery has evolved from a pure refiner of doré to a more rounded company with an emphasis on beneficiation. It facilitates a wide range of value-added products including: cast bars, minted bars, minted coins, coin blanks and medallions, semi-fabricated products for the jewellery manufacturing industry and dental products.

It is also the sole distributor of the world famous Krugerrand. This coin celebrated its 40th anniversary in 2007. More Krugerrands have been sold worldwide than all other bullion coins combined (more than 54 million to date).

In addition to its smelting and refining services Rand Refinery offers metallurgical, logistics and vault services. It acts as an agent for its precious metal depositing customers and its global markets business unit markets all the precious metal produced by the refinery.

In January 2004, the Rand Refinery was awarded London Bullion Market Association Good Delivery referee status – an honour for the company and South Africa. As a referee, the company is responsible for the pro-active monitoring of performance requirements in the weighing, melting, sampling and assaying of gold and/or silver on behalf of other Good Delivery refiners.

6.4 THE SA MINT COMPANY

The South African Mint is a wholly-owned subsidiary of the South African Reserve Bank. Its main function is to mint coins, which the Reserve Bank is empowered to do through the Reserve Bank Act, 1989.

It mints circulation and commemorative coins. The procedure is simple; once approval is obtained from Cabinet and the coin descriptions are published in the Government Gazette, the coins are minted and are then available for sale to the public.

Legal tender coins are declared as such by the Reserve Bank by Notice in the Government Gazette. They can be used as medium of exchange, i.e., to purchase goods and services to the value indicated on the coin (face value). However since this value is just a nominal value, usually a very small fraction of its intrinsic (metal content) value, this almost never happens. All the SA Mint's commemorative coins are legal tender, silver or gold coins. The following coin series have silver coins and/or gold coins:

1. Protea Series (gold and silver),
2. Natura Series (gold),
3. R2 (gold and silver), R1 (gold), 50c, 20c, 10c and 5c (silver),
4. Krugerrand (gold) bullion and proof.

There are no platinum coins currently, as Government has not approved their minting. It is a very costly and difficult process to produce platinum blanks.

6.5 BULLION BANKS

Bullion banks are buyers of precious metal (in bullion form) and clearers and distributors of precious metal in the market. They are traders and market makers, in other words they deal two ways – both buyers and sellers. They may also act as intermediaries in the mobilisation of central bank reserves, either for leasing swaps or sales.

Usually these commercial banks, as opposed to central banks, are the main participants in the OTC market. They also play an important role in the circulation of precious metal (the entire pipeline). The facilities provided by international bullion banks, especially in gold leasing, have been central to the development of markets in Hong Kong, Singapore, Japan and India.

Bullion banks also provide precious metal miners with financing, marketing and hedging facilities.

It is believed that all four major banks in South Africa, viz., Standard Bank, Absa Bank, First National Bank and Nedbank are involved to some extent in the bullion trade and can thus be considered as bullion banks. In terms of the Precious Metals Act, they are "authorised dealers".

6.6 GOLD LOANS

Besides the gold loan facility used by miners as a means of raising capital for project financing, gold loans to fabricators such as jewellery manufacturers are also provided by bullion banks. The principle here is that it is cheaper to borrow precious metal for a working inventory than to borrow money to buy precious metal, because precious metal lease rates are usually much lower than interest rates.

In Italy, for example, gold can also be supplied to the jewellery manufacturer by a local bank on working account on behalf of a foreign wholesaler, a practice referred to as "*conto lavorazione*", which translates to "working account". Basically, in this practice, a local or foreign wholesaler "gives" gold to a manufacturer to fabricate for him, for which privilege he will pay only the manufacturing costs.

In South Africa, Standard Bank launched a pilot 1 000kg Gold Advance Scheme in partnership with BAE Systems-SAAB, AngloGold Ashanti and Gold Fields. The scheme, launched in November 2005, is designed to reduce the costs to South African jewellery manufacturers of funding inventory, thereby enabling them to compete more effectively with international manufacturers; to significantly increase the volume and value of South African jewellery manufacture and exports; and to attract new investors and entrants into the jewellery manufacturing sector in South Africa.

6.7 JEWELLERY AND HOW IT IS VALUED

Excluding silver, South Africa supplied an estimated 16.8 percent by value of the mine production of the main raw materials for jewellery fabrication (gold, platinum, diamonds and palladium) during 2008. Including silver, South Africa supplied 15.1 percent of the mine production of the main raw materials for jewellery fabrication (gold, platinum, diamonds, palladium and silver), but contributes very little to World jewellery output.

South Africa produces mainly 9 and 18 carat gold jewellery and platinum jewellery. According to the Jewellery Council of South Africa there are more than 3 000 retail jewellery stores in the country.

TABLE 2: SOUTH AFRICA'S CONTRIBUTION TO JEWELLERY RAW MATERIAL PRODUCTION, 2008

METAL/GEM	WORLD MINE PRODUCTION (\$) ^e	SOUTH AFRICAN MINE PRODUCTION (\$) ^e	SA AS % OF WORLD
GOLD	67 168 726 246	5 966 489 978	8.9
PLATINUM	9 675 562 874	7 405 836 872	76.5
DIAMONDS	12 732 278 808	1 236 240 109	9.7
PALLADIUM	2 571 884 605	854 613 489	33.2
SUB-TOTAL	92 148 452 534	15 463 180 447	16.8
SILVER	10 206 691 000	36 241 356	0.4
TOTAL	102 355 143 534	15 499 421 804	15.1

Note: ^e Estimated

Source: Various sources listed in "References" section

Precious metal jewellery is usually valued according to the following formula:

$(\text{PRECIOUS METAL MASS IN GRAMS}) \times (\text{RAND PRECIOUS METAL PRICE PER GRAM}) + \text{LABOUR COST (USUALLY 10 \%)} = \text{BASE PRICE OF JEWELLERY}$

Retailers will also apply a mark-up and/or brand premium (for the design etc.). The above basic formula excludes embellishments such as gemstones and diamonds.

Pure precious metal is not used in jewellery; rather precious metal alloys of different purities are used. Precious metal purity must be expressed as a fraction, e.g. 18 carat gold jewellery has 18/24 parts gold, or 75 percent of the mass of the jewellery is actually gold. This actual mass in grams must be multiplied by the Rand precious metal price per gram.

The Rand Refinery provides a price list in Rand/gram for its gold and silver products on its web site: www.randrefinery.com. This is a very useful daily service.

The price of precious metals in South Africa is the London fixing price in US dollars multiplied by the Rand/dollar exchange rate plus VAT.

$(\$ \text{ Price/ozt} \times \text{R/\$ EXCHANGE RATE}) \div 31.1 \text{ plus VAT} = \text{R Price/g of pure metal}$

6.8 SOUTH AFRICAN CURRENCY

South Africa moved off the gold standard in 1932, but the South African currency, the Rand, was redeemable in gold ("I promise to pay the bearer...in gold" was printed on paper currency) until 1971, the year in which US President, Nixon, closed the "gold window" by suspending the convertibility of dollar balances into gold. Gold then became one of many reserve assets.

The Rand, like all modern currencies, is fiat currency, which is inconvertible paper money established by government fiat (government authority).

6.9 BULLION COINS AND NUMISMATIC COINS

The most famous coin minted in the modern era is the Krugerrand. The Krugerrand is a 22-carat fine legal tender gold coin first struck in July 1967. It was a 1 ozt gold coin until 1980, when the fractional Krugerrands (1/2 oz, 1/4 oz and 1/10 oz) were added. The Krugerrand is available as the un-circulated (bullion) coin from Intergold and its price is linked to the daily spot gold price. The proof Krugerrand (numismatic coin for collectors) is sold at a fixed price by the SA Mint.

Currently, there are no South African platinum coins. The World's biggest selling platinum coin is the American Eagle Platinum coin minted by the US Mint.

6.10 MINTED BARS

Depending on the way they are manufactured, precious metal bars are classified into two types: cast and minted. Cast bars refer to those made by the pouring of molten precious metal into a mould of specified dimensions. Thereafter, markings are applied manually or by a press. Minted bars are made from precious metal blanks that have been stamped out to the required dimensions from a flat strip of precious metal. Markings are usually then applied by minting presses (as in the case of gold coins).

Minted bars range in size from as small as 0.3g to as large as 500g and range in purity from 99.5 percent to 99.99 percent. Minted precious metal bars are sold at a low premium above the bullion

price and are bought mainly for investment purposes, although they are also used in jewellery. They are popular because they are more attractive (decorative) and affordable.

In South Africa, currently the sole manufacturers of minted bars are the Rand Refinery and the SA Mint, although there are jewellery manufacturers that also have the capability of manufacturing minted bars. The most popular sizes supplied are the 10g, 50g and 100g bars of 99.99 percent purity, which incorporate branding as in the case of the Springbok Brand of the Rand Refinery.

6.11 EXCHANGE TRADED FUNDS (ETFs)

An ETF is an exchange-traded fund that allows an investor to buy and sell securities (shares) in small allotments (usually 1/10th or 1/100th of a oz) of physical gold, silver, platinum or palladium.

ETFs are backed by physical metal held by the custodian of the fund and the securities (shares) are traded on a stock exchange like other exchange-listed securities. It is a cost-effective, secure and convenient way to invest in precious metals because there are no storage and insurance costs associated with traditional bullion accounts, and no company risk associated with mining company shares. Additionally, it is an instrument that is backed on a one-to-one basis by the precious metal, and not through some derivative formula.

Gold ETFs have been available in Australia (ASX) and London (LSE) since 2003. On 2 November 2004, South Africa became only the third country in the World to launch the WGC-backed Gold Bullion securities. Called NewGold Gold Bullion Debentures, the South African Gold ETF is administered by Absa Bank with the Rand Refinery performing the function of Custodian. Each debenture is valued at 1/100th of one fine ounce of gold issued by NewGold Issuer Limited, a public company. The approximate price of each debenture is the ZAR price of 1/100th of one fine ounce of gold.

NewGold Gold Bullion Debenture is listed on the JSE Securities Exchange and trades under the JSE code "GLD". It is designed to track the spot gold price less fees. Pre-listing subscriptions totalled about R230 million, which equated to about 2.7t of gold bullion, or about R26/debenture. Although historic for South Africa, the success of the ETF will depend on generating and sustaining liquidity.

A number of gold ETFs have since been launched, bringing the worldwide total to more than eight.

The first silver ETF, the iShares Silver Trust, was launched in 2006, followed by ETFs from Zürcher Kantonalbank and ETF Securities.

Two separate sets of exchange traded funds were launched in 2007, backed by physical PGMs. In Switzerland, funds based on platinum and palladium were launched by the Zürcher Kantonalbank, while ETF Securities launched two similar funds in London, and another two in Tokyo during 2009.

6.12 GOLD ACCUMULATION PLANS

Gold Accumulation Plans are savings plans, whereby a sum of money is invested monthly in gold. Basically it entails an investor committing to investing a fixed amount of money every month, usually for a minimum period of one year. When the Plan is set up, instalments are withdrawn from the investor's bank account every month and then used to purchase gold every trading day in a month. The advantage of this is that more gold is bought when the price is low and less when the price is high, because the daily amount of money invested is fixed.

When the account is closed, the investor can obtain the gold in the form of bullion bars, coins, and sometimes in the form of jewellery. The investor could also choose to get the cash equivalent, should he wish to sell the gold accumulated in his account. Gold (and platinum) Accumulation Plans, as described, are available in Japan, but are starting to become popular in other countries as well.

In South Africa, current legislation restricts the possession of, and dealing in unwrought gold to precious metal licensees, permit holders and other authorised persons. General citizens can only “possess” precious metal in the fabricated (“wrought”) form as jewellery, or in the legal tender form as Krugerrands and other legal tender precious metal coins. Therefore, Gold Accumulation or Savings Plans would contravene South African legislation relating to the possession of and trading in unwrought gold by general consumers.

7. GLOSSARY

ALLOY - A solid mixture of two or more chemical elements, including at least one metal. In the case of gold, it is mixed with a base metal or metals to lower the purity, influence the colour or add durability.

ASSAY – The testing of metal to determine its fineness or purity.

ASSAY MARK - The stamp by an assayer on a bar or piece of precious metal to guarantee its fineness.

BENEFICIATION - Adding value to a mineral product.

BLANK - A blank disc of metal with milled edges used to make a coin.

BULLION - Gold, silver and PGMs in bulk trading form, e.g., bars, ingots and plate, rather than in grain or sponge.

BULLION COINS - Contemporary precious metal coins minted by official agencies in unlimited numbers for investment purposes.

CAST BAR - A bar made by the process of forming a bar in a mould (contrast minted bar).

COMEX - The Commodity Exchange in New York, a division of NYMEX.

DELIVERY - The actual transfer of the ownership of precious metal. It may not involve physical movement of metal and is usually made by a simple paper transfer in the clearing system.

DERIVATIVE - A highly leveraged financial instrument or paper product, the value of which is based on the underlying precious metal, e.g., futures contracts, gold-backed bonds and options.

DORÉ – An unrefined (therefore impure) alloy of gold with variable quantities of silver and smaller quantities of base metals, which is produced at a mine before passing on to a refinery for upgrading to London Good Delivery standard, usually consists of 85 percent gold on average.

EAGLE – The earliest legal tender US gold coin, first minted in 1795. It is 900 fine.

FABRICATION - The manufacturing of semi-finished or final products.

FACE VALUE – The value of a coin or paper money, as printed on the coin or bill itself by the minting authority. While the face value usually refers to the true value of the coin or bill in question, it can sometimes be largely symbolic, as is often the case with bullion coins.

FINENESS – The proportion of precious metal in an alloy expressed as parts per 1000.

FINE OUNCE - A troy ounce of "pure" precious metal.

FORWARD CONTRACT - A cash market transaction in which two parties agree to the purchase and sale of a commodity at some future date. The essential difference from a futures contract is that a forward contract is much more flexible and usually results in physical delivery.

FUTURES CONTRACT - A legally binding standard contract offered by exchanges, which allow for the purchase or sale of a specified quantity of precious metal at a pre-agreed price for future delivery at a pre-agreed date.

GOLD FIXING – Held twice each working day, at 10H30 and 15H00 GMT.

GOLD LOAN – The provision of finance in gold for a gold-related project or business, typically in mining or jewellery inventory finance, which provides a combination of generally inexpensive funding together with built-in hedging.

GOLD STANDARD - A monetary system with a fixed price for gold, and with gold coin either forming the whole circulation of currency within a country or with notes representing and redeemable in gold.

GOOD DELIVERY - The specification which a bar must meet in order to be acceptable for delivery in a particular market, e.g. London Good Delivery.

GRAIN – One of the earliest units of weight for gold, one grain being the equivalent of one grain of wheat taken from the middle of the ear.

GRANULES – Bullion, including its various alloys presented for sale in granulated form, often referred to as grain.

HALLMARK – A mark or number of marks made on jewellery and other fabricated products to confirm that the quality is of the fineness marked on the item.

HEDGE - Price risk management action using the various derivative products available. The intention is to try to even out prices by entering into contracts that balance each other out or provide protection from sudden price fluctuations. Use is made of forward sales, futures and options to afford such protection. For example, hedging may be undertaken by a mining company selling output forward or writing put options to protect against a price fall, or by a fabricator who will need precious metal for working inventory in the near future buying a futures contract or call option to insure against a price rise.

KARAT - The proportion of gold in a gold alloy, on the basis that 24 carat is pure gold, often expressed as K or k, e.g. 18k is 75 percent gold. Gold is often alloyed with silver, nickel, copper or other metals to improve its workability and make the soft metal more durable.

KILOBARS - (1000 grams) is the world's most widely traded small gold bar, popular among investors and jewellery manufacturers as it is normally sold at an extremely low premium above the prevailing value of its gold content.

KRUGERRAND – South African gold coin first issued in 1967 with a fineness of 916.6. The Krugerrand bullion coin, with 180 serrations, is linked to the daily gold price while the proof

Krugerrand (with 200 serrations) is available in limited quantities with a yearly fixed price. A proof coin is punched three times and the bullion coin only once. The imagery on the proof coin is frosted whereas the bullion imagery is of the same finish as the rest of the coin.

LBMA – The London Bullion Market Association was formally incorporated on 14 December 1987 to represent the interest of the participants in the wholesale bullion market and to encourage the development of the London market in every possible way.

LBMA GOOD DELIVERY LISTS – Lists of acceptable refiners of gold and silver whose bars meet the required standard (of fineness, weight, marks and appearance) of the London Bullion Market Association.

LEASING/LENDING - The process by which holders of physical precious metal can earn a return on what would otherwise remain a non-interest bearing asset by lending precious metal to fabricators. This lent gold provides the necessary liquidity for day-to-day transactions.

LEGAL TENDER – Legal tender is payment that, by law, cannot be refused in settlement of a debt denominated in the same currency.

LOCO – The place or location at which a commodity, e.g. loco London gold, is physically held.

LONDON GOOD DELIVERY - This an international standard in terms of which gold bars must have a minimum gold purity of 99.5 percent. Central banks normally hold gold in the form of these bars.

MAPLE LEAF – Canadian gold coin with a fineness of 999.9.

MINTED BARS – A bar punched out of a strip of metal which has been produced by continuous casting. The punched-out bar is then minted in a purpose-designed minting press, similar to the process used to make coins. (contrast cast bar).

MINTED COIN – A coin punched out of a strip of metal which has been produced by continuous casting. The punched out coin is then minted in a purpose-designed minting press.

NUMISMATICS – The specialized sector of the coin business for the study and collection of rare coins and other media of exchange, particularly those with archaeological and historic interest.

NYMEX – A US futures exchange consisting of two divisions, NYMEX (the New York Mercantile Exchange) and COMEX (the Commodities Exchange).

OPTION - An option gives the holder the right, but not the obligation, to buy or sell precious metal at a pre-determined price by a pre-agreed date, for which right the buyer must pay a premium. This premium is the cost of the option, paid to the writer or grantor of the option. The right to buy is referred to as a call option and the right to sell, a put option. The predetermined price is referred to as the strike price. The premium is calculated based on a combination of the current price of the precious metal in question, the strike price, current interest rates, time to expiry and the anticipated volatility of the gold price. Options are of two types: options offered on an exchange and OTC options granted by an individual bank or bullion dealer, which are flexible and tailored for the client's needs. Exchange Options, on the other hand, offer a standard contract, which can be traded on the exchange many times before it expires. A PUT OPTION gives the purchaser the right but not the obligation to sell precious metal at a predetermined strike price. A CALL OPTION on the other hand gives the purchaser the right but not the obligation to buy precious metal at a predetermined strike price.

OPTION CONTRACT - Is different from an OTC as it is an exchange product offering the holder the right but not the obligation to buy or sell gold at a pre-agreed price by an agreed date.

OTC - Over-the-counter is a term used to describe an option that is written and traded through principals rather than an exchange, i.e., directly between buyer and seller.

PLATINUM-GROUP METALS (PGMs) - Six metallic elements clustered together in the periodic table. These elements are ruthenium, rhodium, palladium, osmium, iridium, and platinum. They have similar physical and chemical properties, and tend to occur together in the same mineral deposits.

PRECIOUS METALS - Metal of great value being gold, silver, and PGMs.

PRECIOUS METALS ACT - The parliamentary Act regulating precious metals in South Africa.

REFINING – The separating and purifying of gold, silver and PGms from other metals.

ROLLED GOLD – The process in which a layer of carat gold alloy is mechanically bonded to another metal.

SCRAP GOLD – The broad term for any gold which is sent back to a refiner or processor for recycling.

SMELTING – The process of melting ores or concentrates to separate out the metal content from impurities.

STANDARD BAR - Gold bar weighing approximately 400 ozt or 12.5kg and having a minimum fineness of 995 parts per 1 000 pure gold. Silver bar weighing approximately 1 000 ozt with a minimum fineness of 999.

STERLING SILVER - Silver of 925 fineness - 92.5 percent silver and 7.5 percent copper. Also called "Standard Silver."

SWAP - A spot sale of precious metal usually gold, with a simultaneous equal forward purchase of equal tonnage.

Tael – Traditional Chinese unit of weight for gold, widely traded in the Far East. 1 tael = 1.20337 ozt = 37.4290g.

TOCOM – The Tokyo Commodity Exchange, established in 1984.

TOLA - Traditional Indian unit of weight for gold, 1 tola = 0.375 ozt = 11.6638g. The most popular sized bar is 10 tola = 3.75 ozt. These bars are used widely in jewellery manufacture and are traded in the Middle and Far East.

TROY OUNCE - A unit of measure equivalent to 31.1034768g traditionally used for precious metals.

WHITE GOLD - A gold alloy containing whitening agents such as silver, palladium or nickel as well as other base metals. Often used as a setting for diamond jewellery.

8. USEFUL CONTACTS

1. Department of Mineral Resources – Provincial Offices

The Regional Manager: Mineral Regulation –
Eastern Cape: Tel: +27 41 396 3900
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Limpopo: Tel: +27 15 287 4700
Mpumalanga: Tel: +27 13 656 1448
Northern Cape: Tel: +27 53 830 0800
North-West: Tel: +27 18 464 1631
Western Cape: Tel: +27 21 427 1000
Website: www.dme.gov.za

2. Jewellery Council of South Africa

Tel: +27 11 544 7958
Fax: +27 865 049 512
Website: www.jewellerysa.com

3. Krugerrand

Tel: +27 11 418 9000
Fax: +27 11 418 9231
Website: www.krugerrand.org

4. NewGold Gold Bullion Debenture (“GLD”)

NewGold Call Centre: +27 11 647 0800
Website: www.absa.co.za/absacoza/content.jsp?/Home/Personal/Products-and-Services/Saving-and-Investing/Investment-Accounts/Exchange-Traded-Funds/NewGold

5. Rand Refinery

Tel: +27 11 418 9000
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6. Reserve Bank

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Website: www.reservebank.co.za

7. SA Diamond and Precious Metals Regulator

Tel: +27 11 334 8980
Fax: +27 11 334 8898
Website: www.sadpmr.co.za

8. SA Mint Company

Tel: +27 12 677 2777
Fax: +27 12 677 2690
Website: www.samint.co.za

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