

HARMONY GOLD MINING CO LTD

Form 6-K

April 28, 2004





UNITED STATES  
SECURITIES AND EXCHANGE COMMISSION  
Washington, D.C. 20549

**Form 6-K**

REPORT OF FOREIGN PRIVATE ISSUER PURSUANT TO  
RULE 13a-16 OR 15d-16 UNDER THE SECURITIES  
EXCHANGE ACT OF 1934

For the Month of April 2004

**Harmony Gold Mining Company**

**Limited**

Suite No. 1

Private Bag X1

Melrose Arch, 2076

South Africa

(Address of principal executive offices)

(Indicate by check mark whether the registrant files or will file annual reports under cover of  
Form 20-F or Form 40-F.)

Form 20-F  Form 40-F

(Indicate by check mark whether the registrant by  
furnishing the information contained in this form  
is also thereby furnishing the information to the  
Commission pursuant to Rule 12g3-2(b) under the  
Securities Exchange Act of 1934.)

Yes No





**THIS CIRCULAR IS IMPORTANT AND REQUIRES YOUR IMMEDIATE ATTENTION**

1.

If you are in any doubt as to the action that you should take, please consult your broker, banker, accountant, legal adviser or other professional adviser immediately. If you have sold or otherwise disposed of all your shares in Harmony Gold Mining Company Limited ("Harmony") this document should be handed to the purchaser of such shares, or to the broker, banker or agent through whom the disposal was effected.

2.

Certificated shareholders and shareholders who hold dematerialised shares and have elected "own name" registration in the sub-register through a Central Securities Depository Participant ("CSDP") and who are unable to attend the general meeting of shareholders of Harmony, to be held at 10:00 on Friday, 7 May 2004, at Harmony's Corporate Office, Randfontein Office Park, Corner Main Reef Road and Ward Avenue, Randfontein, but wish to be represented thereat, should complete and return the attached form of proxy (blue) in accordance with the instructions contained therein to the transfer secretaries of Harmony, Ultra Registrars (Pty) Limited, 11 Diagonal Street, Johannesburg, 2001 (PO Box 4844, Johannesburg, 2000) or Capita Registrars, The Registry, 34 Beckenham Road, Beckenham, Kent BR3 4TU England, so as to be received by not later than 10:00 on Wednesday, 5 May 2004.

3.

Shareholders who hold dematerialised shares through a CSDP or broker, other than those who have elected "own name" registration, and who wish to attend the general meeting must request their CSDP or broker to provide them with a Letter of Representation or should advise their CSDP or broker as to what action they wish to take. This must be done in terms of the agreement entered into between them and their CSDP or broker. Shareholders who have dematerialised their shares, other than those who have elected "own name" registration, must not complete and return the attached form of proxy.

**Harmony Gold Mining Company Limited**

(Incorporated in the Republic of South Africa)

(Registration number 1950/038232/06)

Share code: HAR

ISIN: ZAE 000015228

("Harmony")

**CIRCULAR TO SHAREHOLDERS**

relating to

-  
**agreement reached between Harmony, Anglovaal Mining Limited ("Avmin") and African Rainbow Minerals & Exploration Investments (Proprietary) Limited regarding a range of indivisible transactions which, if implemented, will result in the creation of the largest black controlled mineral resources company in South Africa;**

-  
**the acquisition by Harmony of 42,1% of the issued share capital of Avgold Limited ("Avgold") from Avmin;**

-  
**the offer by Harmony for the balance of Avgold's issued share capital, to be implemented by way of a scheme of arrangement in terms of section 311 of the Companies Act, 1973 (Act 61 of 1973), as amended, proposed by Harmony between Avgold and its shareholders, other than Harmony;**

-  
**the proposed issue of convertible bonds to the value of up to R1,700 million, convertible into approximately 14 million new ordinary shares in Harmony, representing 5% of Harmony's issued ordinary share capital, by way of a specific issue for cash in terms of Rule 5.51 of the Listings Requirements of the JSE Securities Exchange South Africa;**

and incorporating

-  
**a notice of general meeting of shareholders; and**

-  
**a form of proxy for certificated and own name dematerialised shareholders.**

**Financial adviser and sponsor to Harmony**

**Attorneys to Harmony**

**Reporting accountants**

**Independent technical adviser**

**JPMorgan**

**PricewaterhouseCoopers Inc**

Chartered Accountants (SA)

Registered Accountants and Auditors

(Registration no 1998/012055/21)

SRK Consulting

Engineers and Scientists

Date of issue: 15 April 2004







**Corporate information**

**Company secretary**

Marian van der Walt  
B.Com (Law) LL.B; H Dip Tax; Dip (Ins Law)  
Randfontein Office Park  
Corner Main Reef Road and Ward Avenue  
Randfontein, 1759  
(PO Box 2, Randfontein 1760)

**Registered office**

Remaining extent of portion 3 of the farm  
Harmony Farm 222  
Private Road, Glen Harmony  
Virginia, 9430  
South Africa

**Financial adviser**

JP Morgan Chase Bank, Johannesburg Branch  
1 Fricker Road, corner Hurlingham Road  
Illovo, 2196  
(PO Box 934, Johannesburg, 2000)

**Sponsor**

J.P. Morgan Equities Limited  
(Registration number 1995/011815/06)  
1 Fricker Road, corner Hurlingham Road  
Illovo, 2196  
(PO Box 934, Johannesburg, 2000)

**Attorneys**

Cliffe Dekker Inc.  
(Registration number 1998/018173/21)  
1 Protea Place  
Sandown, 2196  
(Private Bag X7, Benmore, 2010)

**Commercial bankers**

ABSA Bank Limited  
(Registration number 1986/004794/06)  
2nd Floor, ABSA Towers North  
180 Commissioner Street  
Johannesburg, 2001  
(PO Box 7735, Johannesburg, 2000)

**Reporting accountants**

PricewaterhouseCoopers Inc.  
(Registration number 1998/012055/21)  
2 Eglin Road  
Sunninghill, 2157  
(Private Bag X36, Sunninghill, 2157)

**Transfer secretaries**

*In South Africa*

Ultra Registrars (Pty) Limited  
(Registration number 2000/007239/07)  
11 Diagonal Street  
Johannesburg, 2001  
(PO Box 4844, Johannesburg, 2000)

*In England*

Capital IRG plc  
t/a Capita Registrars  
The Registry  
34 Beckenham Road  
Beckenham  
Kent BR3 4TU

**Independent technical adviser**

Steffen, Robertson and Kirsten  
(South Africa) (Proprietary) Limited  
(Registration number 1995/012890/07)  
SRK House  
265 Oxford Road  
Illovo, 2196  
(PO Box 55291, Northlands, 2116)

**United Kingdom secretaries**

St James's Corporate Services Limited  
6 St James's Place  
London SW1A 1NP





1

**Table of contents**

*Page*

**Corporate information**

Inside front cover

**Definitions**

3

**Circular to shareholders**

5

**1.**

**Introduction and background**

5

**2.**

**The Transaction**

6

2.1

Description of the Transaction

6

2.2

Transaction conditions precedent

7

2.3

The ARM voting agreement

7

**3.**

**Rationale for the Avgold share exchange and Avgold offer**

7

**4.**

**The Avgold share exchange**

7

4.1

Terms and consideration

7

4.2

Warranties

8

4.3

Conditions precedent

8

**5.**

**The Avgold offer**

8

5.1

Terms of the Avgold offer

8

5.2

Consideration paid pursuant to the Avgold offer

8

5.3

Avgold conditions precedent

8

**6.**

**Financial effects of the acquisition on Harmony**

9

6.1

Pro forma financial effects

9

6.2

Pro forma balance sheet and income statement of Harmony

9

6.3

Independent reporting accountants' report

9

**7.**

**Information in respect of Avgold**

9

7.1

Background

9

7.2

Nature of business

10

7.3

Historical financial information

10

7.4

Material loans

10

7.5

Material contracts

10

7.6

Material changes

10

7.7

Litigation statement

10

**8.**

**The Kalplats disposal**

10

**9.**

**The specific issue**

10

9.1

Terms of the convertible bonds

10

9.2

Pro forma effects of the specific issue

11

9.3

Shareholder approval

11



9.4  
Use of proceeds  
11





*Page*

**10.**

**Information on Harmony**

12

10.1

Background

12

10.2

Nature of business

12

10.3

Prospects

12

10.4

Material loans

12

10.5

Material contracts

12

10.6

Material changes

12

10.7

Litigation statement

13

10.8

Share capital

13

10.9

Price history of Harmony shares

13

10.10 Major shareholders

13

10.11 Directors

14

10.11.1

Directors and management

14

10.11.2

Directors' remuneration to 30 June 2003

17

10.11.3

Directors' service contracts

17

10.11.4

Directors' interests in Harmony shares

18

10.12 Directors' interests in the acquisition

18

**11.**

**Corporate Governance**

19	
<b>12.</b>	
<b>Significant contracts</b>	
22	
<b>13.</b>	
<b>Working capital</b>	
22	
<b>14.</b>	
<b>Expenses</b>	
22	
<b>15.</b>	
<b>Consents</b>	
22	
<b>16.</b>	
<b>Opinion of the directors of Harmony</b>	
22	
<b>17.</b>	
<b>Directors' responsibility statement</b>	
22	
<b>18.</b>	
<b>Documents available for inspection</b>	
23	
<b>Annexure 1</b>	
Summary of the terms and conditions of convertible bonds	
24	
<b>Annexure 2</b>	
Pro forma balance sheet and income statement of Harmony	
25	
<b>Annexure 3</b>	
Independent reporting accountants' report on the pro forma financial information of Harmony	
29	
<b>Annexure 4</b>	
Interim financial results of Harmony	
31	
<b>Annexure 5</b>	
Historical financial information of Avgold	
34	
<b>Annexure 6</b>	
Interim financial information of Avgold	
46	
<b>Annexure 7</b>	
A competent person's report containing information on the mining assets of Harmony including Avgold	
50	
<b>Annexure 8</b>	
Independent reporting accountants' report on the pro forma financial effects of the issue	
235	
<b>Annexure 9</b>	
Details of material loans to the Harmony group	
236	
<b>Annexure 10</b>	
Agreements relating to the acquisitions and disposals of companies, businesses and properties	

238

**Annexure 11**

Material changes in the financial or trading position of Harmony

239

**Annexure 12**

Price history of Harmony shares on the JSE

240

**Notice of general meeting**

241

**Form of proxy (blue)**

Attached

2







## Definitions

Throughout this circular and the annexures hereto unless otherwise indicated:

-

the words in the first column have the meanings stated opposite them in the second column; words in the singular include the plural and *vice versa*; words importing one gender include the other genders; and references to a person include references to a body corporate and *vice versa*;

- all monetary values are in South African Rands and cents; and

- all times indicated are South African local times.

"the Act"

the Companies Act, 1973 (Act 61 of 1973), as amended;

"acquisition"

collectively, the acquisition by Harmony of the entire issued share capital of Avgold pursuant to the implementation of the Avgold share exchange and the Avgold offer;

"Afrikander Lease"

The Afrikander Lease Limited, a public company incorporated in South Africa, the ordinary shares of which are listed on the JSE;

"Anglo South Africa"

Anglo South Africa Capital (Proprietary) Limited (registration number 1999/002391/07), a private company incorporated in South Africa;

"ARM Platinum"

African Rainbow Minerals Platinum (Proprietary) Limited (registration number 1999/018332/07), a private company incorporated in South Africa;

"the ARM voting agreement"

the agreement entered into between ARMI, Harmony and Clidet No. 454 (Proprietary) Limited, in terms of which ARMI will vote Harmony's shares in Avmin following implementation of the Transaction;

"ARMgold"

African Rainbow Minerals Gold Limited (registration number 1997/015869/06), a public company incorporated in South Africa and a wholly-owned subsidiary of Harmony;

"ARMI"

African Rainbow Minerals & Exploration Investments (Proprietary) Limited (registration number 1997/020155/07), a private company incorporated in South Africa;

"Assmang"

Assmang Limited (registration number 1935/007343/06), a public company incorporated in South Africa and a subsidiary of Avmin;

"Assore"

Assore Limited (registration number 1950/037394/06), a public company incorporated in South Africa and listed on the JSE;

"Avgold"

Avgold Limited (registration number 1990/007025/06), a public company incorporated in South Africa, the shares of which are listed on the JSE, Euronext Brussels in the form of International Depositary Receipts and on the New York Stock Exchange Inc. in the form of American Depositary Receipts;

"Avgold consideration"

the consideration to be paid by Harmony to Avmin and to Avgold shareholders comprising 1 new Harmony share for every 10 Avgold shares held;

"Avgold offer"

the offer made by Harmony to Avgold shareholders, excluding Avmin, to acquire the entire issued share capital of Avgold which it does not already own by way of the scheme;

"Avgold offer conditions precedent"

the conditions precedent to which implementation of the Avgold offer is subject, as reflected in paragraph 5.3;

"Avgold shareholders"

holders of Avgold shares, other than Harmony;

"Avgold share exchange"

the transaction in terms of which Harmony will acquire 286 305 263 Avgold shares, comprising 42,1% of the issued share capital of Avgold, from Avmin, in exchange for the issue to Avmin of the Avgold consideration;

"Avgold share exchange agreement"

the agreement entered into between Harmony and Avmin in respect of the Avgold share exchange;

"Avgold share exchange

the conditions precedent to which implementation of the Avgold share exchange is subject conditions precedent" as reflected in paragraph 4.3;

"Avgold shares"

ordinary shares with a par value of 1 cent each in the issued share capital of Avgold;

"Avmin"

Anglovaal Mining Limited (registration number 1933/004580/06), a public company incorporated in South Africa, the shares of which are listed on the JSE and the LSE, which is to be renamed African Rainbow Minerals Limited;

3





"Avmin shareholders"  
holders of Avmin shares;  
"Avmin shares"  
ordinary shares with a par value of 5 cents each in the share capital of Avmin;  
"business day"  
any day other than a Saturday, Sunday or official public holiday in South Africa;  
"circular"  
this bound document, dated 15 April 2004, including the annexures attached hereto;  
"Competition Authorities"  
the authorities established in terms of the Competitions Act, 1998 (Act 89 of 1998), as amended;  
"directors"  
the directors of the company;  
"Harmony" or "the company"  
Harmony Gold Mining Company Limited (registration number 1950/038232/06), a public company incorporated in South Africa, the shares of which are listed on the JSE, the LSE and Euronext Paris and are quoted on Euronext Brussels in the form of International Depository Receipts and on the New York Stock Exchange, Inc. in the form of American Depository Receipts;  
"Harmony group"  
Harmony and its subsidiaries;  
"Harmony shares"  
ordinary shares with a par value of 50 cents each in the share capital of Harmony;  
"the JSE"  
the JSE Securities Exchange South Africa;  
"Kalgold"  
Kalahari Goldridge Mining Company Limited (registration number 1982/002818/06), a public company incorporated in South Africa;  
"Kalplats"  
a platinum exploration project of Kalgold which comprises certain platinum discovery and associated mineral rights;  
"last practicable date"  
5 April 2004, being the last practicable date prior to finalisation of this circular;  
"Nkomati"  
a division of Avmin which, through the Nkomati mine, produces nickel, copper, cobalt and PGMs by-products;  
"LSE"  
London Stock Exchange plc;  
"shareholders"  
holders of Harmony shares;  
"scheme" or "scheme of arrangement"  
the scheme of arrangement proposed by Harmony between Avgold and the Avgold shareholders, in terms of section 311 of the Act;  
"the scheme meeting"  
the meeting of scheme members, convened in terms of an Order of Court, which is expected to be held at 10:00 at 56 Main Street, Johannesburg on Monday, 3 May 2004, at which meeting scheme members will consider and vote on the scheme;  
"scheme members"  
Avgold shareholders who are entitled to vote at the scheme meeting, being all Avgold shareholders registered as such on the voting record date, excluding Avmin, if the Avgold share exchange agreement has not been ratified;  
"South Africa"  
the Republic of South Africa;  
"specific issue"  
the specific issue for cash of convertible bonds to international investors to the value of up to R1,700 million, convertible into approximately 14 million Harmony shares, a summary of the terms and conditions of which are

reflected in Annexure 1;

"SRP"

the Securities Regulation Panel;

"SRP Code"

the Securities Regulation Code on Takeovers and Mergers and the Rules of the SRP;

"Transaction"

collectively, the indivisible transactions reflected in paragraph 2, excluding the specific issue;

"Transaction conditions precedent"

the conditions precedent to which implementation of the Transaction is subject, as reflected in paragraph 2.2;

"transfer secretaries"

in South Africa, Ultra Registrars (Proprietary) Limited (registration number 2000/007239/07) and in England, Capita IRG plc (registration number 2605568) trading as Capita Registrars;

"Two Rivers"

Two Rivers Platinum (Proprietary) Limited (registration number 2001/007354/07), a private company incorporated in South Africa and a subsidiary of Avmin;

"United Kingdom Secretaries"

St James's Corporate Services Limited; and

"voting record date"

the latest time and date for Avgold shareholders to be recorded in the register as shareholders of Avgold in order to vote at the scheme meeting, which is expected to be at 17:00 on Friday 30 April 2004.

4







**Harmony Gold Mining Company Limited**

(Incorporated in the Republic of South Africa)

(Registration number 1950/038232/06)

Share code: HAR

ISIN: ZAE 000015228

**Directors**

P T Motsepe

Z B Swanepoel

F Abbott

Dr M M M M Bakane-Tuoane

F Dippenaar

V Fakude

T Grobicki

W M Gule

M W King

D S Lushaba

M F Fleming

Lord Renwick of Clifton KCMG\*

C M L Savage

Dr S P Sibisi

D V Simelane

Dr R V Simelane

M V Sisulu

\* British

**Circular to shareholders**

**1.**

**INTRODUCTION AND BACKGROUND**

In a detailed joint cautionary announcement published on 13 November 2003, shareholders were advised that Harmony, Avmin and ARMI had reached agreement in principle regarding a range of indivisible transactions which, if implemented, would result in the creation of the largest black controlled mineral resources company in South Africa, under the leadership of mining entrepreneur, Patrice Motsepe. In terms of the Transaction:

- Avmin will exchange its entire 42,1% interest in Avgold for the issue to it of new Harmony shares;
- Avmin will acquire from ARMI:

·  
ARMI's entire indirect 13,6% interest in Harmony, for a cash consideration which will be applied by ARMI in subscription for new Avmin shares;

·  
ARMI's 41,5% effective interest in the Modikwa Joint Venture, in exchange for the issue to ARMI of new ordinary shares in ARM Platinum;

-  
Avmin will acquire Kalplats from Kalgold for a cash consideration. Kalgold will then apply the cash in the subscription for new Avmin shares in renounceable form and will renounce these shares to Harmony;

- ARMI will vote Harmony's remaining shares in Avmin, post the above transactions, through the ARM voting agreement.

The acquisition, by Harmony, of Avmin's stake in Avgold constitutes an affected transaction in terms of the SRP Code and, as a result, Harmony would be required to extend a mandatory offer to the Avgold shareholders on the same terms and conditions, *mutatis mutandis*, as those offered to Avmin. Harmony wishes to acquire 100% of Avgold and has therefore extended an offer to Avgold





shareholders by way of the scheme, subject to the Avgold offer conditions precedent, prior to triggering a mandatory offer in terms of the SRP Code.

If the scheme does not become operative due to the non-fulfilment of the conditions to which it is subject and the Avgold share exchange agreement becomes unconditional, Harmony will be obliged to make a mandatory offer to the Avgold shareholders in terms of Rule 8.1 of the SRP Code on the same terms and conditions offered to Avmin. The Harmony shares comprising the consideration under such offer will first have to be registered under the U.S. Securities Act of 1933, as amended. Harmony has undertaken to the SRP to use its best endeavours to procure registration of the Harmony shares comprising the offer consideration with the SEC as a matter of urgency to enable it to make such mandatory offer without undue delay.

It was announced on 31 March 2004 that Harmony intends to issue convertible bonds to international investors to the value of up to R1,700 million. The proceeds of the specific issue will be used primarily to refinance Harmony's existing South African Rand debt, benefiting from the attractive financing opportunities currently available in the convertible bond market. Details of the specific issue are reflected in paragraph 9.

The convertible bonds will be issued pursuant to a specific issue for cash in terms of Rule 5.51 of the Listings Requirements of the JSE. Attached to this circular is a notice convening a general meeting of shareholders at which the ordinary resolutions necessary to implement the specific issue will be proposed.

The purpose of this circular is to provide shareholders with information regarding the Transaction, the Avgold offer and the specific issue. Shareholders should note that details regarding the Transaction are included for information purposes only and that the only action they are required to take is in respect of the specific issue.

**2.**

## **THE TRANSACTION**

### **2.1**

#### **Description of the Transaction**

Following the implementation of the Transaction, ARMI will become the effective controlling shareholder of a larger diversified and empowered Avmin, which will have significant holdings in gold, PGMs, nickel and ferrous metal assets. Avmin's gold interests will be held through its resultant 22% interest in Harmony. Pursuant to the Transaction, Avmin will change its name to African Rainbow Minerals Limited and will be well-positioned to secure adequate funding for its existing projects and to participate in further growth opportunities that the South African mining sector offers, taking advantage of its black economic empowerment controlled status.

The current structure of Harmony and Avmin is as follows:

6

**Avgold**

**(listed)**

**Assmang**

**(listed)**

**Avmin**

**(listed)**

**Harmony**

**(listed)**

**Two Rivers**

**Nkomati**

**Other assets**

- Iron ore

- Manganese

- Chrome

- Assore (8,5%)

- AvAlloys (100,0%)

- Other (including exploration activities)

33,9%

42,1%

11,4%

50,3%  
55,0%  
100,0%





Following the implementation of the Transaction, the structure of Harmony, Avmin and ARMI will be as follows:

\*Prior to implementation of Avgold offer.

The Transaction is subject to the fulfilment of the Transaction conditions precedent and is expected to be implemented by no later than 30 April 2004.

## **2.2**

### **Transaction conditions precedent**

The Transaction is subject to the fulfilment of the following conditions precedent:

- the requisite legal agreements necessary to implement the Transaction becoming unconditional;

-

the passing of the ordinary and special resolutions necessary to implement the Transaction by the Avmin shareholders in general meeting; and

- the approval of contractual third parties to the proposed change of control of Avgold.

## **2.3**

### **The ARM voting agreement**

In terms of the ARM voting agreement, ARMI will exercise the votes attaching to Harmony's entire holding of 40 789 761 Avmin shares (approximately 20% of Avmin) following implementation of the Transaction.

## **3.**

### **RATIONALE FOR THE AVGOLD SHARE EXCHANGE AND AVGOLD OFFER**

Avgold operates the Target Mine in the Free State which, at full production, is expected to produce 350 000 gold ounces per annum, at a cash cost below US\$180 per ounce. In addition, an extensive exploration programme in an area known as Target North, which has a resource base of approximately 80 million ounces, is currently underway. In July 2003, Harmony acquired 11,4% of the issued share capital of Avgold from Anglo South Africa in exchange for the issue to Anglo South Africa of renounceable letters of allocation representing the right to the issue of 6 960 964 new Harmony shares. The Avgold share exchange and the Avgold offer represent the final steps in the transaction in terms of which Harmony will acquire full control of the Target Mine. The acquisition of the Target Mine is expected to further enhance the overall quality of Harmony's production base.

## **4.**

### **THE AVGOLD SHARE EXCHANGE**

#### **4.1**

##### **Terms and consideration**

In terms of the Avgold share exchange agreement, subject to the fulfilment of the Avgold share exchange conditions precedent, Avmin will exchange its entire holding of 286 305 263 Avgold shares, comprising 42,1% of Avgold's issued share capital, for 28 630 526 new Harmony shares with effect from the date upon which all the Avgold share exchange conditions precedent are fulfilled, which date is expected to be on or before 30 April 2004.

This represents a ratio of 1 Harmony share for every 10 Avgold shares. The value attributable to the new Harmony shares is R2 893 687 263.

7

##### **Harmony**

(listed)

##### **Avgold**

(listed)

##### **Assmang**

(listed)

##### **Avmin**

(listed)

##### **Public and institutional shareholders**

##### **ARM Platinum**

(unlisted)

##### **Other assets**



- Assore (8,5%)
- AvAlloys (100,0%)
- Other (including exploration activities)
- Nkomati (100,0%)
- Two Rivers (55,0%)
- Modikwa JV (41,5%)
- Kalplats (100,0%)

- Iron ore

- Manganese

- Chrome

37,0%

63,0%

22,0%

53,6%\*

50,3%

20,0% of Avmin

**ARM Control**

**Structure**

**ARMI**

43,0% of

Avmin





## 4.2

### Warranties

In terms of the Avgold share exchange agreement, Avmin has given Harmony limited warranties as to ownership and title to the Avgold shares sold by it and Harmony has given Avmin limited warranties as to its ability to allot and issue Harmony shares, which are normal in transactions of this nature.

## 4.3

### Conditions precedent

The Avgold share exchange is subject to:

- the requisite legal agreements necessary to implement the Transaction becoming unconditional;

-

the passing of the requisite ordinary and special resolutions necessary to give effect to the Transaction by the shareholders of Avmin in general meeting (excluding the increase in authorised share capital and change of name of Avmin);

- the approval of the JSE to the listing of the Harmony shares comprising the Avgold offer consideration on the JSE; and

- the approval of contractual third parties to the proposed change of control of Avgold.

## 5.

### THE AVGOLD OFFER

#### 5.1

##### Terms of the Avgold offer

The acquisition by Harmony of Avmin's stake in Avgold constitutes an affected transaction in terms of the SRP Code and, as a result, Harmony would be required to extend a mandatory offer to the Avgold shareholders on the same terms and conditions, *mutatis mutandis*, as those offered to Avmin. Harmony wishes to acquire 100% of Avgold and has therefore extended an offer to Avgold shareholders by way of the scheme, subject to the Avgold conditions precedent, prior to triggering a mandatory offer in terms of the SRP Code.

If the scheme does not become operative due to the non-fulfilment of the conditions to which it is subject and the Avgold share exchange agreement becomes unconditional, Harmony will be obliged to make a mandatory offer to the Avgold shareholders in terms of Rule 8.1 of the SRP Code on the same terms and conditions offered to Avmin. The Harmony shares comprising the consideration under such offer will first have to be registered under the U.S. Securities Act of 1933 as amended. Harmony has undertaken to the SRP to use its best endeavours to procure registration of the Harmony shares comprising the offer consideration with the SEC as a matter of urgency to enable it to make such mandatory offer without undue delay.

#### 5.2

##### Consideration paid pursuant to the Avgold offer

Pursuant to the Avgold offer, Avgold shareholders will receive a consideration equivalent to 1 Harmony share for every 10 Avgold shares held.

If successfully implemented, an aggregate amount of R3 239 286 577 will be paid in the form of Harmony shares, to the Avgold shareholders.

The aggregate number of new Harmony shares to be issued in terms of the Avgold offer is 32 049 932, representing approximately 11% of the Harmony issued share capital post the Avgold share exchange and prior to the implementation of the Avgold offer. The new Harmony shares issued will rank *pari passu* in all respects with the existing ordinary shares in Harmony.

It is expected that the listing of Avgold shares on the JSE will terminate on Tuesday 18 May 2004.

#### 5.3

##### Avgold offer conditions precedent

The Avgold offer is subject to the fulfilment of the following conditions precedent:

##### 5.3.1

the Avgold share exchange agreement becoming unconditional;

##### 5.3.2

the approval of the scheme by a majority representing not less than 75% of the votes exercisable by the scheme members present and voting, either in person or by proxy, at the scheme meeting;

5.3.3

the High Court of South Africa (Transvaal Provincial Division) sanctioning the scheme;

5.3.4

a certified copy of the Order of Court sanctioning the scheme being registered by the Registrar of Companies in terms of the Act.

8





**6.  
FINANCIAL EFFECTS OF THE ACQUISITION ON HARMONY**

**6.1**

**Pro forma financial effects for the Transaction and the Avgold offer**

The table below sets out the illustrative pro forma financial effects of the Avgold share exchange and the Avgold offer based on the published consolidated financial results of Harmony for the six months ended 31 December 2003, and assumes that the Avgold share exchange and the Avgold offer were implemented for income statement purposes on 1 July 2003 and for balance sheet purposes on 31 December 2003:

**Pro forma**

**Pro forma**

**after the**

**after the**

**Transaction**

**Transaction**

**(excluding**

**(including**

**Cents per Harmony share**

**Before**

(1)

**Avgold offer)**

**Change**

**Avgold offer)**

**Change**

Basic earnings

(2)

50

34

(32%)

(1)

(102%)

Headline earnings

(2)

(129)

(129)

0%

(131)

2%

Net asset value

(3)

6 350

7 352

16%

7 326

15%

Net tangible asset value

(3)

5 265

5 850

11%

5 566

6%



Weighted average number of  
Harmony shares  
231 707 291  
262 023 354  
293 715 856  
Number of Harmony shares issued  
258 350 934  
288 666 997  
320 359 499

**Notes to table:**

(1)

Extracted from the quarterly published unaudited financial results of Harmony for the six months ended 31 December 2003.

(2)

The pro forma effects on earnings and headline earnings per share after the Transaction excluding and including the Avgold offer have been prepared on the following assumptions:

-

the Transaction was effective 1 July 2003;

-

the Harmony share price for determining the purchase consideration was the share price at close of business on 19 March 2004, being R101,60 per share; and

-

for purposes of illustrating the pro forma effects after the Transaction including the Avgold offer, it has been assumed that all minorities accept the Avgold offer.

(3)

The pro forma effects on net asset and intangible asset value per Harmony share after the Transaction excluding and including the Avgold offer have been prepared on the following assumptions:

-

the Transaction was effective 31 December 2003;

-

the Harmony share price for determining the purchase consideration was the share price at close of business on 19 March 2004, being R101,60 per share; and

-

for purposes of illustrating the pro forma effects after the Transaction including the Avgold offer, it has been assumed that all minorities accept the Avgold offer.

**6.2**

**Pro forma balance sheet and income statement of Harmony**

The pro forma balance sheet and income statement of Harmony, before and after the acquisition, are set out in Annexure 2.

**6.3**

**Independent reporting accountants' report**

The independent reporting accountants' report on the pro forma financial information relating to the acquisition and on the pro forma balance sheet and income statement of Harmony, before and after the acquisition, is set out in Annexure 3. The interim financial results of Harmony are attached as Annexure 4.

The pro forma financial information reflected herein is the responsibility of the directors.

**7.**

**INFORMATION IN RESPECT OF AVGOLD**

**7.1**

**Background**

Avgold was incorporated in South Africa on 23 November 1990. Avgold has its primary listing on the JSE, with listings on Euronext Brussels in the form of International Depository Receipts and on the New York Stock Exchange,

Inc. in the form of American Depositary Receipts.

Avgold's registered address is:

56 Main Street

Johannesburg

2001

9





## 7.2

### **Nature of business**

The business of Avgold is to explore for, develop and operate gold mines. Following the sale of the ETC division, situated in the Mpumalanga province, on 15 June 2003, Avgold's assets comprise the Target Gold Mine situated in the Free State province and a significant unexploited resource north of the Target Mine.

## 7.3

### **Historical financial information**

Historical financial information of Avgold and the interim financial information of Avgold is set out in Annexure 5 and Annexure 6, respectively.

A competent person's report containing information on the mining assets of Harmony including Avgold is set out in Annexure 7.

## 7.4

### **Material loans**

The loans raised from a syndicate of banks to fund the completion of the Target Gold Mine were repaid in full on 30 June 2003. This was achieved by utilising existing cash resources, which included the proceeds from the sale of the ETC division. The balance of the funds were sourced by drawing down on a R200 million unsecured general term banking facility concluded with Standard Corporate and Merchant Bank.

## 7.5

### **Material contracts**

Save for the Avgold share exchange agreement and the agreement in respect of the sale of the ETC division to Barberton Mines Limited on 15 June 2003, Avgold has not entered into any material contracts, other than in the ordinary course of business, during the two-year period immediately preceding the date of this circular.

The loans that were repaid on 30 June 2003 were secured in part by Rand gold hedges. On repayment of this loan, the Rand gold hedge book was restructured into Dollar gold commodity hedges by the purchase of Rand/Dollar forward exchange contracts.

## 7.6

### **Material changes**

There have been no material changes in the financial or trading position of Avgold, other than as disclosed in this circular, between the date of the last audited financial statements of Avgold, being 30 June 2003, and the date of this circular.

## 7.7

### **Litigation statement**

There are no legal or arbitration proceedings that are pending or threatened of which Avgold is aware which may have, or have had during the 12-month period preceding the date of this circular, a material effect on the financial position of Avgold.

## 8.

### **THE KALPLATS DISPOSAL**

On 7 November 2003, prior to the announcement of the terms of the Transaction on 13 November 2003, Harmony announced that it had agreed to sell the entire issued share capital of Kalgold to Afrikander Lease for a purchase consideration of R275 million. However, on 17 March 2004, Harmony announced the cancellation of the sale agreement in respect of Kalgold. Consequently Kalgold remains a wholly-owned subsidiary of Harmony. As previously announced, Kalgold will sell Kalplats to ARM Platinum, which will become an Avmin subsidiary following implementation of the Transaction, for a consideration based on the weighted average traded price of an Avmin share for the seven trading days prior to the closing date of the sale, subject to a maximum of R100 000 000. The purchase consideration will be credited to a loan account in the books of Kalgold which loan account will be sold to Avmin for cash. Kalgold will use the cash to subscribe for renounceable letters of allocation in respect of 2 million new Avmin shares. Kalgold intends to renounce such letters of allocation in favour of Harmony so that the 2 million new Avmin shares will be held in Harmony.

## 9.

### **THE SPECIFIC ISSUE**

## 9.1

**Terms of the convertible bonds**

Harmony intends to raise up to R1,700 million by way of a specific issue of convertible bonds for cash to international investors. The convertible bonds will be denominated in Rand and will be issued at 100% of their principal amount. Interest will be payable on the convertible bonds semi-annually in arrears at the rate of 4,875% per annum.

The convertible bonds may be converted into ordinary shares at the election of the holders at any time from the 41st day after their issue, expected to be on or about 21 May 2004, until the 7th day prior to the maturity date which is expected to be on or about 21 May 2009.

The convertible bonds may be converted into new Harmony shares issued as fully paid at a price, including premium, of R121,00 representing a premium of 22,7% to the closing price of Harmony shares on the JSE on 31 March 2004, the date of the launch of the offer for the convertible bonds.

10







As the discount to current market price of Harmony shares will not be known at the time of their issue following conversion, the issue of the convertible bonds will be subject to the issue of a favourable fair and reasonable opinion regarding their terms from an independent professional expert acceptable to the JSE. Investec Bank Limited has been appointed and their opinion in this regard is expected by no later than 5 May 2004 so that it is available at the general meeting of shareholders on 7 May 2004.

To the extent that the convertible bonds are not converted, or redeemed early at the option of the company, they will be redeemed at the end of the five-year period following their issue, at their issue price.

Application will be made to list the convertible bonds on the LSE.

A summary of the terms and conditions of the convertible bonds is reflected in Annexure 1.

## 9.2

### Pro forma financial effects for the specific issue

The table below sets out the illustrative pro forma financial effects of the specific issue on the published consolidated financial results of Harmony for the six months ended 31 December 2003, and assumes that the Avgold share exchange, the Avgold offer and the specific issue were implemented for income statement purposes on 1 July 2003 and for balance sheet purposes on 31 December 2003:

#### Pro forma

#### after the

#### specific

#### Cents per Harmony share

#### Before

(1)

#### issue

#### Change

Basic earnings

(2)

(1)

2

300%

Headline earnings

(2)

(131)

(126)

2%

Net asset value

(3)

7 326

7 400

1%

Net tangible asset value

(3)

5 566

5 639

1%

Weighted average number of Harmony shares

293 715 856

293 715 856

Number of Harmony shares issued

320 359 499

320 359 499

#### Notes to table:

1.

Extracted from the unaudited pro forma financial effects of Harmony for the six months ended 31 December 2003, assuming implementation of the Transaction and the Avgold offer, as set out in the "Pro forma after the Transaction (including the Avgold offer)" column presented in paragraph 6.1 above.

2.

The unaudited pro forma effects on earnings and headline earnings per Harmony share after the specific issue have been prepared on the assumption that the specific issue was effective on 1 July 2003.

3.

The unaudited pro forma effects on net asset and intangible asset value per Harmony share after the specific issue have been prepared on the following assumptions:

- the specific issue was effective 31 December 2003; and

the specific issue amount was allocated between long-term liabilities and equity, based on a market-related interest rate of 10%.

-

The pro forma financial information reflected herein is the responsibility of the directors. The independent reporting accountants' report on the pro forma financial information relating to the specific issue is set out in Annexure 8.

### **9.3**

#### **Shareholder approval**

Attached hereto is a notice of general meeting convening a general meeting of Harmony shareholders to be held at Harmony's Corporate Office, Randfontein Office Park, Corner Main Reef Road and Ward Avenue, Randfontein, at 10:00 on Friday, 7 May 2004. At the general meeting, ordinary resolutions will be proposed regarding the specific issue.

The issue of the convertible bonds and new Harmony shares following their conversion does not constitute an affected transaction as defined in the SRP Code.

The convertible bonds will not be issued to non-public shareholders.

### **9.4**

#### **Use of proceeds**

The proceeds of the specific issue will be used primarily to refinance Harmony's existing South African Rand debt, hence benefiting from the attractive financing opportunities currently available in the convertible bond market.

11





## **10. INFORMATION ON HARMONY**

### **10.1**

#### **Background**

Harmony was incorporated in South Africa on 25 August 1950. The primary listing of Harmony's shares is on the JSE. The Harmony shares are also listed on the LSE and Euronext Paris and are quoted on Euronext Brussels in the form of International Depository Receipts and on the New York Stock Exchange, Inc. in the form of American Depository Receipts.

Harmony's registered address is:

Remaining extent of portion 3 of the farm Harmony Farm 222

Private Road

Glen Harmony

Virginia

Free State Province.

### **10.2**

#### **Nature of business**

Harmony is a gold miner and producer with an international diversified portfolio of gold mining projects in South Africa, Australia and Papua New Guinea. Harmony adopts focused operational and management philosophies throughout the organisation. Its growth strategy is focused on building a leading international gold mining company through acquisitions, organic growth and focused exploration. The bulk of its assets are located in the Witwatersrand Basin of South Africa. The deep level gold mines located in this basin include those in the Free State province, the Evander gold mine in Mpumalanga province, the Randfontein and Elandskraal mines on the West Rand, goldfields in Gauteng province and the Orkney operations in North West province. In May 2003, Harmony and ARMgold, through a Harmony/ARMgold joint venture company, acquired 38 789 761 Avmin shares, in July 2003, Harmony acquired 77 540 830 Avgold shares, representing 11,4% of Avgold's issued share capital, from Anglo South Africa and in September 2003 Harmony acquired the entire issued share capital of ARMgold.

Harmony's international operations are held under Harmony Gold (Australia) (Proprietary) Limited and comprise the wholly-owned New Hampton Goldfields Limited and Hill 50 Limited, a 31,8% interest in the Bendigo Mining NL operation and an 83,2% shareholding in Abelle Limited.

On 15 March 2003, Harmony announced its intention to propose an off market cash offer to acquire all the ordinary shares and listed and unlisted options in Abelle Limited that it does not already own. The offer is subject to the fulfilment of certain conditions precedent and is valued at R620 million or A\$125 million.

### **10.3**

#### **Prospects**

Harmony is a growth oriented company in the gold production business and is distinguished by the focused operational and management philosophies which it employs throughout the organisation. Its growth strategy is focused on building a leading international gold mining company through acquisitions, organic growth and focused exploration.

Since undergoing a change in management in 1995, Harmony has employed a successful strategy of growth through a series of acquisitions and through the evolution and implementation of a simple set of management systems and philosophies, which Harmony refers to as the "Harmony Way" and which it believes is unique in the South African gold mining industry. A significant component of the success of Harmony's strategy to date has been its ability to acquire underperforming mining assets, mainly in South Africa, and within a relatively short time frame, to transform these mines into cost-effective production units.

Harmony is managed according to the philosophy that Harmony shareholders have invested in Harmony in order to hold a growth stock that will also participate in movements in the gold price. Accordingly, Harmony has consistently maintained a policy of not hedging its future gold production.

### **10.4**

#### **Material loans**

The details of material loans to the Harmony group are reflected in Annexure 9.

### **10.5**

#### **Material contracts**

Save for the merger agreement, dated 22 July 2003, entered into between Harmony, ARMgold and ARMI, whereby the parties undertook to merge their gold producing assets, the agreements relating to the acquisitions and disposals of companies, businesses and properties set out in Annexure 10 and the agreements referred to in this circular, Harmony has not entered into any material contracts, other than in the ordinary course of business, during the two-year period immediately preceding the date of this circular.

**10.6**

**Material changes**

The details of material changes in the financial or trading position of Harmony are reflected in Annexure 11.

12







## 10.7

### **Litigation statement**

There are no legal or arbitration proceedings that are pending or threatened of which Harmony is aware that may have, or have had during the 12-month period preceding the date of this circular, a material effect on the financial position of Harmony.

A claim has been instituted against Harmony by Wadethru Security Company (Proprietary) Limited (in liquidation) in respect of alleged damages arising out of the termination of a sale of business agreement in relation to Brand No. 2 Shaft. Even if successful, this is not expected to have a material effect on the financial position of Harmony.

## 10.8

### **Share capital**

Harmony's authorised and issued share capital, at the last practicable date, was as follows:

#### **BEFORE THE TRANSACTION AND THE AVGOLD OFFER**

##### **ZAR'm**

##### *Authorised*

350 000 000 ordinary shares of 50 cents each

175

##### *Issued*

258 469 684 ordinary shares of 50 cents each

129

Following implementation of the Transaction and the Avgold offer, Harmony's authorised and issued share capital is expected to be as follows:

#### **AFTER THE TRANSACTION, THE AVGOLD OFFER AND THE SPECIFIC ISSUE**

##### **ZAR'm**

##### *Authorised*

350 000 000 ordinary shares of 50 cents each

175

##### *Issued*

320 805 079 ordinary shares of 50 cents each

160

Assuming full conversion of the convertible bonds into Harmony shares, Harmony's authorised and issued share capital is expected to be as follows:

#### **AFTER THE TRANSACTION, THE AVGOLD OFFER AND THE SPECIFIC ISSUE**

##### **ZAR'm**

##### *Authorised*

350 000 000 ordinary shares of 50 cents each

175

##### *Issued*

334 805 079 ordinary shares of 50 cents each

167

## 10.9

### **Price history of Harmony shares**

The price history of Harmony shares is reflected in Annexure 12.

## 10.10 Major shareholders

At the last practicable date, the following shareholders beneficially held more than 5% of the issued ordinary share capital of Harmony:

##### **Name of shareholder**

##### **Number of shares**

##### **Percentage**

**(million)**

##### **shareholding**

The Bank of New York

113,5

43,9

ARMI

35,0

13,5

JPMorgan Chase Bank

15,3

5,9

Harmony has no controlling shareholder, as the shares held by The Bank of New York are held on behalf of shareholders who participate in Harmony's American Depositary Receipt program.

13





## 10.11 Directors

### 10.11.1 Directors and management

The full names, business address and function of the directors are as follows:

**Name**

**Function**

**Address**

P T Motsepe

Non-executive Chairman

Harmony Corporate Office, Randfontein Office Park,

(South African)

Corner Main Reef Road and Ward Avenue, Randfontein, PO Box 2, Randfontein, 1760, South Africa

Z B Swanepoel

Chief Executive

Harmony Corporate Office, Randfontein Office Park,

(South African)

Corner Main Reef Road and Ward Avenue, Randfontein, PO Box 2, Randfontein, 1760, South Africa

F Abbott

Financial Director

Harmony Corporate Office, Randfontein Office Park,

(South African)

Corner Main Reef Road and Ward Avenue, Randfontein, PO Box 2, Randfontein, 1760, South Africa

Dr M M M M Bakane-Tuoane

Non-executive Director

Harmony Corporate Office, Randfontein Office Park,

(South African)

Corner Main Reef Road and Ward Avenue, Randfontein, PO Box 2, Randfontein, 1760, South Africa

F Dippenaar

Marketing Director

Harmony Corporate Office, Randfontein Office Park,

(South African)

Corner Main Reef Road and Ward Avenue, Randfontein, PO Box 2, Randfontein, 1760, South Africa

V N Fakude

Non-executive Director

1st Floor Block C, Sandhurst Office Park, corner Katherine

(South African)

Street and Rivonia Road, Sandton, PO Box 781220, Sandton, 2146

T S A Grobicki

Executive Director

Harmony Corporate Office, Level 1, 10 Ord Street, West

(South African)

Perth, WA, 6005

W M Gule

Executive Director

Harmony Corporate Office, Randfontein Office Park,

(South African)

Corner Main Reef Road and Ward Avenue, Randfontein, PO Box 2, Randfontein, 1760, South Africa

M W King

Non-executive Director

Harmony Corporate Office, Randfontein Office Park,

(South African)

Corner Main Reef Road and Ward Avenue, Randfontein, PO Box 2, Randfontein, 1760, South Africa

D S Lushaba

Non-executive Director

522 Impala Road, Glenvista, 2058, PO Box 1127,

(South African)

Johannesburg, 2000

M F Fleming

Non-executive Director

30 Hydewoods, Townshend Road, Hyde Park, 2196

(South African)

Lord Renwick of Clifton KCMG

Non-executive Director

JPMorgan plc., 125 London Wall, London EC2Y 6AJ,

(British)

United Kingdom

C M L Savage

Non-executive Director

Harmony Corporate Office, Randfontein Office Park,

(South African)

Corner Main Reef Road and Ward Avenue, Randfontein, PO Box 2, Randfontein, 1760, South Africa

Dr S P Sibisi

Non-executive Director

Harmony Corporate Office, Randfontein Office Park,

(South African)

Corner Main Reef Road and Ward Avenue, Randfontein, PO Box 2, Randfontein, 1760, South Africa

D V Simelane

Executive Director

Harmony Corporate Office, Randfontein Office Park,

(South African)

Corner Main Reef Road and Ward Avenue, Randfontein, PO Box 2, Randfontein, 1760, South Africa

Dr R V Simelane

Non-executive Director

Harmony Corporate Office, Randfontein Office Park,

(South African)

Corner Main Reef Road and Ward Avenue, Randfontein, PO Box 2, Randfontein, 1760, South Africa

M V Sisulu

Non-executive Director

Harmony Corporate Office, Randfontein Office Park,

(South African)

Corner Main Reef Road and Ward Avenue, Randfontein, PO Box 2, Randfontein, 1760, South Africa

14







**Further details on the executive directors of Harmony are as follows:**

**Bernard Swanepoel** (42) BSc (Mining Engineering), B Com (Hons), Chief Executive Officer and an Executive Director. Bernard has over 20 years' experience in the gold mining industry. He started his career in gold mining at Grootvlei in 1983. As part of his training he spent time on various Gengold operations including Kinross (Evander) and Barberton. He then moved into senior management with the Gengold group, culminating in his appointment as general manager and a director of Beatrix Mines in 1993. He joined Randgold in 1995 as Managing Director of Harmony and has been the driving force in making the company the fifth largest independent gold producer in the world and the largest in South Africa.

**Frank Abbott** (48), BCom, CA(SA), MBL, Chief Financial Officer and an Executive Director. Frank joined the Rand Mines/Barlow Rand Group in 1981, where he obtained broad financial management experience at operational level. He was appointed as financial controller to the newly formed Randgold in 1992 and was promoted to financial director of that group in October 1994. Until 1997, he was also a director of the gold mining companies Blyvooruitzicht, Buffelsfontein, Durban Roodepoort Deep and East Rand Proprietary Mines and a non-executive director of Harmony, which culminated in his appointment as financial director of Harmony in the same year.

**Ferdinand Dippenaar** (42), BCom, BProc, MBA, Marketing Director and an Executive Director. Ferdi started his career at the Buffelsfontein gold mine in 1983 and completed his degrees through part-time studies while employed in various financial and administrative capacities at the Gengold mines. In 1996, he became managing director of Grootvlei and of East Rand Proprietary Mines. Following Harmony's acquisition of Grootvlei and Cons Modder, he was appointed Marketing Director of Harmony in 1997. He oversees Harmony's refinery and direct marketing activities, as well as the company's investor relations programme.

**Ted Grobicki** (54), BSc (Hons) (Geology) MSc (Minerals Exploration) PrSciNat, FIMM, Executive Officer for Harmony's Australian operations and an Executive Director. After fulfilling various roles within mining and exploration companies in South Africa, Namibia and Zimbabwe, Ted was appointed chief executive of Texas Gulf Inc South Africa in 1979. He has since served at a senior executive level in a wide range of public and private companies in the mining sector and was appointed as non-executive director of Harmony in 1994. With Harmony's merger with Kalgold and West Rand Cons in 1999, he was appointed as executive director focusing on new business. Ted has 30 years' experience in all aspects of the mining industry, including exploration, evaluation, development, mine management and financial and corporate management.

**Mangisi Gule** (51), BA (Hons) and an Executive Director. Mangisi has 23 years' experience in training and human resources and is a member of the Association of Mine Human Resource Practitioners. Mangisi joined the company on 23 September 2003, following the ARMgold merger. He oversees the company's human resources and communication activities.

**Dan Simelane** (41) BA, LLB, LLM and an Executive Director. Dan Simelane has seven years' legal experience and acted as legal advisor to Avmin Limited and the Swaziland Electricity Board. He has extensive tax experience and was a senior tax consultant with Arthur Andersen. Dan joined Harmony on 23 September 2003 following the ARMgold merger.

**Further details on the non-executive directors of Harmony are set out below:**

**Patrice Motsepe** (41) BA (Legal), LLB, Non-executive Director. Founder and former Executive Chairman of ARMgold which merged with Harmony in 2003. Patrice is now Harmony's non-executive Chairman. In 2002 he was voted South Africa's Entrepreneur of the year. In the same year, he was voted by the CEO's of the top 100 companies in South Africa as South Africa's Business Leader of the Year. Patrice has significant entrepreneurial expertise and knowledge of the new business environment in South Africa and will be central in helping to steer Harmony to grow and be competitive. Patrice was a partner specialising in mining and business law at Bowman Gilfillan Inc, a leading South African law firm. He was employed for approximately four years by McGuire Woods LLP, a law firm in Richmond, Virginia, USA. He was initially based in Richmond and thereafter moved to South Africa where he was their legal consultant for their southern African legal practice. In 1994, he founded Future Mining (Proprietary) Limited which grew rapidly to become a competitive contract mining company. In 1998 he founded African Rainbow Minerals (Proprietary) Limited which in 2000 became ARMgold which was successfully listed on the JSE in 2002. In 2001, he founded African Rainbow Minerals Platinum (Proprietary) Limited and ARM Mining Consortium Limited which entered into a 50/50 joint venture with Anglo American Platinum Corporation Limited for the establishment of a new platinum mine. He was Senior Vice President of the Chamber of Mines and is a "Global Leader of Tomorrow"

of the World Economic Forum (WEF). He is a member of National Economic Development and Labour Council (NEDLAC), which is South Africa's primary institution for social dialogue between organised business, Government, labour and community on issues of social and economic policy. He is currently the President of the first non-racial, united and recognised business organisation in South Africa, namely Business Unity South Africa (BUSA), which is the "voice of business" in South Africa as well as President of the first non-racial, united and recognised organisation representing the various chambers of commerce and industry in South Africa, namely Chamber of Commerce and Industry South Africa (CHAMSA).

**Dr Manana Bakane-Tuoane** (55) PhD, BA, MA and independent non-executive Director. Dr Bakane-Tuoane has extensive experience in the economic disciplines as lecturer and professor at the University of Fort Hare, Eastern Cape. She has held various senior management positions in the public service and currently holds the post of Director General in the North West Provincial Government. Dr Bakane-Tuoane was appointed to the advisory Board of the African Economic Research Consortium, Nairobi, Kenya in 2000. Dr Bakane-Tuoane was appointed a non-executive director of the company on 23 September 2003 following the ARMgold merger.

**Nolitha Fakude** (39) BA (Hons) (Psychology, Education and English) and an independent non-executive director. Nolitha has been a director of Harmony since September 2002. Nolitha Fakude is the Managing Director of the Black Management Forum





(BMF). Her role involves stakeholder management, policy formulation and advocacy work on issues of Black Economic Empowerment and organisational transformation. Nolitha was a Group Human Resources Manager for Retail at Woolworths, as well as head of Corporate Affairs, which included, amongst others, Communication and Community Affairs. She serves on various boards, including BMF Investment Company, The People's Bank, Business Partners as well as Wheat Trust. Nolitha was recently appointed by the Gauteng MEC for Economic Affairs as one for the Rainmakers for the Blue IQ project.

**Simo Lushaba** (37) BSc (Advanced Biochemistry), MBA, non-executive Director and an independent non-executive Director. Simo has been a director of Harmony since October 2002. Simo started his career at the University of Zululand in 1988 as a research technician. In 1990, he joined South African Breweries and two years later National Sorghum Breweries where he served as Divisional Executive of the Khangela Division nine coastal depots. In 1995, Simo was appointed by SpoorNet, where he worked for seven years in various managerial positions and ultimately as the General Manager for Rail and Terminal Services. In April 2002, Simo was brought into Rand Water to drive both business and social transformation in the organisation which included internal restructuring, focusing on creating a customer-driven organisation, as well as new business opportunities, both in South Africa and internationally. Simo also serves as non-executive Chairman of PIKITUP Johannesburg (Pty) Limited and as a non-executive director of Trans-Caledon Tunnel Agency (TCTA). He is currently the Chief Executive of Rand Water.

**Lord Renwick of Clifton** KCMG (66), an independent non-executive director. Lord Renwick has been a director of Harmony since December 1999. Having formerly served as British Ambassador to South Africa and the United States, Lord Renwick is Vice Chairman, Investment Banking, of JPMorgan plc. He is also Chairman of Flour Limited and serves on the boards of a number of other public companies including British Airways, SABMiller plc and Richemont.

**Mike Fleming** (68), Pr Eng, FIMM and an independent non-executive director. Mr Fleming has been a director of Harmony since September 1998. Mike started his career in mining engineering on the Zambian Copperbelt. He joined TransNatal (now Ingwe) in 1975 as general manager, Optimum Collieries and was later appointed project manager and consulting engineer. He joined Liberty Asset Management in 1982 where he was responsible for mining investment research. He retired in 1995 and has since undertaken a series of mining investment-related assignments. Following Harmony's acquisition of Evander in 1998, he joined the company as a non-executive director. He is also a director of Impala Platinum Holdings Limited. Mike also serves as a non-executive director of Highlands Gold Limited. Mike has approximately 31 years' mining and approximately 15 years' mining investment experience.

**Michael King** (66) CA(SA), FCA, Non-executive director. Michael King served articles with Deloitte, Plender, Griffiths, Annan & Co. (now Deloitte & Touche) and qualified as a Chartered Accountant (SA). He later became a Fellow of the Institute of Chartered Accountants in England and Wales (FCA). He joined Anglo American Corporation of South Africa as a manager in the finance division. In 1979, he became director of Anglo American Corporation and in 1980 an executive director and head of its finance division. In 1997, he was appointed executive deputy chairman of Anglo American Corporation. He was the executive vice-chairman of Anglo American plc, in May 1999, until his retirement in May 2001. Michael was appointed a non-executive director of Harmony on 23 September 2003 following the ARMgold merger.

**Cedric Savage** (64) BSc Eng, MBA, ISMP, an independent non-executive director. Cedric commenced his career in the United Kingdom in 1960 as a graduate engineer with Fairey Aviation and in 1963 returned to South Africa where he worked in the oil (Mobil), textile (Felt & Textiles) and the chicken (Rainbow Chickens Limited) industries. In 1993/1994, he was appointed President of the South African Chamber of Business. He has also served as Chairman of the Board of Governors on the Natal University Development Foundation and as a member of Council of the University of Natal. He joined the Tongaat- Hulett Group in 1977 as Managing Director of Tongaat Foods and thereafter progressed to Executive Chairman of the Building Materials Division, Chief Executive Officer of The Tongaat-Hulett Group Limited in 1991 and in May 2000, he assumed the dual roles of Chief Executive Officer and Executive Chairman. Cedric was appointed a non-executive director of Harmony on 23 September 2003 following the ARMgold merger.

**Dr Sibusiso Sibisi** (48) BSc (Hons), PhD, Non-executive Director. Dr Sibusiso Sibisi's working career commenced in 1983 in the software development industry with MEDC Limited, Cambridge, UK. His career developed to that of Systems Engineer at IBM (SA), lecturer and senior lecturer (Wits) and deputy vice-chancellor for research (University of Cape Town). He spent 1988 as a Fulbright Fellow at the California Institute of Technology where he collaborated with eminent researchers in computational chemistry and the development of associated medical diagnosis tools. In

1989, he took up a research position at Cambridge where he consolidated his academic research in mathematical modelling and computational simulations to environmental, geophysical and biomedical problems to develop solutions. This evolved to the formation of a start-up company dedicated to providing consulting services to Glaxo, Wellcome, Fisons, Shell and Mobil. He entered the corporate world in 1997 as executive director of Plessey (SA), with the responsibility of managing and directing research and development in telecommunication technologies. As chairperson of the National Advisory Council on Innovations, he is involved in making recommendations on research and innovation policy to the Government. Dr Sibisi was appointed a non-executive director of the company on 23 September 2003 following the ARMgold merger.

**Dr Rejoice Simelane** (51) BCom, MCom, PhD and an independent non-executive director. Dr Rejoice Simelane's career commenced as a lecturer at the University of Swaziland where she lectured from 1978 to 1997 on Development Economics, Micro-economics and Macro-economics Theory, Research Methods, Mathematical Economics, Econometrics, Economic Planning and Economic Integration. She then joined the Department of Trade and Industry as a macro-economist and later joined the National Treasury as a micro-economist (public utility regulation and pricing) before joining the Premiers Office in the Mpumalanga Province as an Economic Adviser. Dr Simelane was appointed a non-executive director of the company on 23 September 2003 following the ARMgold merger.

16







**Max Sisulu** (58) MPA, MSc and an independent non-executive director. Max was appointed as director of Harmony in August 2003. Max is currently the General Manager at Sasol and prior to that held the position of deputy chief executive officer at Denel, a post he held since November 1998. From 2001 to 2003 he was the chairperson of the South African Aerospace, Maritime and Defence Industries. He is also a council member of the Human Sciences Research Council and a member of the Premier of the Free State's Economic Advisory Council. From 1977 to 1981 Max served as the ANC representative in Hungary and was South Africa's representative in the "World Federation of Democratic Youth". In January 1995 he was elected to the National Executive Committee and National Working Committee of the ANC. From 1986, he helped establish the ANC economics department and was instrumental in developing the ANC's economic policy. In 1990 he spearheaded the drafting of the ANC's first policy statement on the environment. From 1992 to 1993 Max completed a Masters degree in Public Administration at the Kennedy School of Government at Harvard University in the United States. He returned to South Africa in September 1993 and took up the post of Director of the National Institute of Economic Policy until he became a Member of Parliament in 1994.

**10.11.2 Directors' remuneration to 30 June 2003**

**Directors'**

**Salaries and**

**Retirement**

**Bonuses paid**

**fees**

**benefits**

**contributions**

**during year**

**Total**

**R'000**

**R'000**

**R'000**

**R'000**

**R'000**

**Executive**

F Abbott

-

1 001

110

2 000

3 111

F Dippenaar

-

927

119

2 000

3 046

T S A Grobicki

-

1 770

121

2 000

3 891

Z B Swanepoel

-

1 640

196

3 000

4 836

M Gule

-

-

-

-

-

D V Simelane

-

-

-

-

-

**Total executive**

**5 338**

**546**

**9 000**

**14 884**

**Non-executive**

P T Motsepe

-

-

-

-

-

Dr M M M M Bakane-Tuoane

-

-

-

-

-

V N Fakude

75

-

-

-

75

M W King

-

-

-

-

-

D S Lushaba

75

-

-

-

75

Dr R V Simelane

-

-	
-	
-	
-	
C M L Savage	
-	
-	
-	
-	
-	
M F Fleming	
100	
-	
-	
-	
100	
Lord Renwick of Clifton KCMG	
100	
-	
-	
-	
100	
Dr S P Sibisi	
-	
-	
-	
-	
-	
M V Sisulu	
-	
-	
-	
-	
-	
<b>Total non-executive</b>	
<b>350</b>	
-	
-	
-	
<b>350</b>	
<b>Total directors' remuneration</b>	
<b>350</b>	
<b>5 338</b>	
<b>546</b>	
<b>9 000</b>	
<b>15 234</b>	

The directors' remuneration will not change after the Transaction.

**10.11.3 Directors' service contracts**

Harmony's executive directors have standard service contracts, details of which are reflected in paragraph 11. None of the non-executive directors have service contracts.





**10.11.4 Directors' interests in Harmony shares**

On the last practicable date, Harmony held 77 540 880 Avgold shares representing 11,4% of Avgold's issued share capital.

On the last practicable date, the directors held the following interests in Harmony shares:

**Percentage of**

**Director**

**Direct**

**Indirect**

**Harmony shares**

**Non-executive**

P T Motsepe

-

35 002 396

13,5

Dr M M M M Bakane-Tuoane

-

-

-

V N Fakude

-

-

-

M King

33 333

-

\*

D S Lushaba

-

-

-

M F Fleming

-

-

-

Lord Renwick of Clifton KCMG

-

5 105

\*

C M L Savage

-

-

-

Dr S P Sibisi

-

-

-

Dr R V Simelane

-

-

-

M V Sisulu

-  
 -  
 -  
**Executive**  
 Z B Swanepoel

-  
 -  
 -  
 F Abbott

-  
 -  
 -  
 F Dippenaar

-  
 T Grobicki  
 10 000  
 30 000  
 \*

W M Gule

-  
 -  
 -  
 D V Simelane

\* Indicates beneficial ownership of less than 1%.

On the last practicable date, the directors held the following interests in Harmony options:

**Percentage  
of total  
Number of  
options  
Expiry  
Director  
options  
in issue  
Issue date  
Issue price  
date  
(Rand)**

F Abbott  
 73 400  
 0,35  
 20/11/2001  
 49,60  
 20/11/2011  
 F Dippenaar  
 36 700  
 0,18

20/11/2001

49,60

20/11/2011

T S A Grobicki

20 000

0,50

21/09/1999

22,90

21/09/2010

87 400

20/01/2001

49,60

20/11/2011

Z B Swanepoel

128 800

0,60

20/11/2001

49,60

20/11/2011

P T Motsepe

-

-

-

-

-

Dr M M M M Bakane-Tuoane

-

-

-

-

-

M F Fleming

-

-

-

-

-

Lord Renwick of Clifton KCMG

-

-

-

-

-

V N Fakude

-

-

-

-

-

D S Lushaba

-



-

-

-

-

M W King

-

-

-

-

-

C M L Savage

-

-

-

-

-

W M Gule

-

-

-

-

-

Dr S P Sibisi

-

-

-

-

-

D V Simelane

-

-

-

-

-

Dr R V Simelane

-

-

-

-

-

M V Sisulu

-

-

-

-

-

**10.12 Directors' interests in the acquisition**

On the last practicable date none of the directors of Harmony held any shares in Avgold.

Save as disclosed above, none of the directors have any material beneficial interests, whether direct or indirect, in the acquisition or in any other transactions entered into by Harmony during the current or immediately preceding financial year or during any previous financial year which remain outstanding or unperformed.







## **11. CORPORATE GOVERNANCE**

### **Introduction**

The King II Report ("King II") became operative in March 2002 and goes beyond financial and regulatory aspects of Corporate Governance in that it advocates an integrated approach by including principles of sound social, ethical and environmental practice. This includes a shift in focus from the "single bottom line", i.e. financial, towards the "triple bottom line" approach, namely economic, social and environmental reporting. Furthermore, King II places major emphasis on enterprise risk management as the cornerstone of internal controls and, in directing its focus thereon, states that risk goes to the very essence of an organisation's ability to meet its objectives and sustain its existence. The Harmony board of directors ("the board") are aware of all the onerous duties, responsibilities and personal liabilities which are imposed on them as directors under both common and statutory law, not only in South Africa, but also in the US, Australia and the UK, due to its operations in these countries and its listings in South Africa, London, Paris, Brussels, Berlin and New York. In addition to King II, the Sarbanes Oxley Act of 2002 ("SOx"), applicable to non-US companies which trade securities in the US, impose additional prohibitions and responsibilities on all directors within Harmony.

To ensure compliance with the numerous legal requirements and to show Harmony's commitment to Corporate Governance, the company has adopted formal charters for the board and each of its committees to give clear guidance to all board members and employees on how governance should be put into practice. These charters were compiled in a way which enables Harmony to achieve a balance between performance and conformance of Corporate Governance principles. Harmony aims to adhere to the provisions and recommendations of King II and therefore these charters will be reviewed, updated and maintained on an on-going basis.

In addition to acting in good faith and with due diligence and care, the board supervises and monitors management to ensure that good Corporate Governance is part of doing business the Harmony Way.

### ***Board structure***

Harmony has a unitary board structure, comprising 17 directors, with a balance between executive and non-executive directors. Harmony has 11 non-executive directors, of whom 10 are independent. Harmony has six executive directors and no shadow directors. The non-executive and independent directors are of sufficient calibre and number for their views to carry significant weight in the board's decisions. In considering new appointments to the board, Harmony has cognisance of the gender and racial mix and believes that the company has achieved an acceptable balance of members on the board.

### ***Chairman and Chief Executive***

The roles of chairman and chief executive are not vested in the same person and their performances are subject to review by the Remuneration Committee at least once a year.

### ***Board Charter***

The board's fiduciary duties are incorporated in Harmony's Board Charter, which sets out the purpose and role of the board, its responsibilities, its authority, composition, meetings and self-assessment. The Board Charter stipulates that Harmony directors have to exercise leadership, enterprise, integrity and judgement based on fairness, accountability, responsibility and transparency.

The responsibility to ensure that Harmony complies with all the relevant laws, regulations and codes of best business practice vests in the board. For this purpose the board has direct access to the advice and services of the company secretary and they are also entitled to seek independent professional legal advice about Harmony's affairs at the company's expense.

The board is also responsible for identifying the principal risks and key performance indicators of Harmony's businesses and ensuring the implementation and regular evaluation of systems to manage those risks through the Audit Committee. Strategies are developed in such a way that the purpose is achieved, the company's values implemented and shareholders and other stakeholders are satisfied. The board also accepts responsibility for monitoring and supervising executive management and the induction of new or inexperienced directors. Harmony's non-executive directors also have access to management should they wish to discuss any matter separate from the executive directors. Harmony is dedicated to ensuring that the directors are familiar with Harmony's operations, its business environment and their fiduciary duties and responsibilities.

### ***Internal control***

The board is ultimately responsible for ensuring that Harmony remains a going concern and that it thrives. The board retains full and effective control over Harmony by monitoring and supervising its executive management, being involved in all material decisions affecting Harmony and ensuring that adequate systems of financial and operational internal controls are monitored. The procedures and systems which act as checks and balances on the information are reviewed by the board from time to time. An adequate budgeting and planning process exists and performance is monitored against these budgets and plans.

19







### ***Self-assessment***

The board conducts a self-assessment or self-evaluation annually. The chairman assesses the performance of the individual board members and the members evaluate the chairman, based on several factors, which include expertise, inquiring attitude, objectivity and independence, judgement, understanding of Harmony's business, understanding and commitment to the board's duties and responsibilities, willingness to devote the time needed to prepare for and participate in committee deliberations, timely responses and attendance at meetings.

In keeping with good Corporate Governance, the board has agreed that a Nomination Committee should assist in the evaluation of the board members.

### ***Meetings***

The board meets at least four times a year. The number of meetings held during a period is sufficient to ensure that the board meets its objectives and all members are required to attend all meetings. Dates of meeting are planned annually in advance.

### **Directors' terms of employment**

#### ***Executive directors***

Harmony's executive directors have standard employee service agreements and none may give notice of less than one month. Their employment letters also do not make provision for pre-determining compensation on termination of an amount which equals or exceeds one year's salary and benefits in kind. The executive directors have waived their rights to directors' fees. Executive directors participate in the company's share scheme and a discretionary Executive Profit Share Scheme, provided that in respect of the latter, certain profit targets (set by the Remuneration Committee) are achieved. The executive directors also benefit from pension contributions, life insurance and medical aid.

#### ***Non-executive directors***

None of the non-executive directors have service contracts with Harmony. The non-executive directors are entitled to fees as agreed at Harmony's annual general meeting, reimbursement of out-of-pocket expenses incurred on the company's behalf, and remuneration for other services, such as serving on committees. Currently, each non-executive director is entitled to R20 000 per quarter, plus R5 000 per quarter for each committee on which he or she serves.

#### ***Rotation***

The articles of association of Harmony provide that the longest serving one-third of directors retire from office at each annual general meeting. Retiring directors making themselves available for re-election are re-elected at the annual general meeting at which they retire.

### **Board committees**

To enable the board to properly discharge its onerous responsibilities and duties, certain responsibilities have been delegated to board committees. The creation of committees does not, however, reduce the board's overall responsibility and therefore all committees must report and make recommendations to the board. All the board committees are chaired by an independent non-executive director.

The various board committees are as follows:

#### **Audit Committee**

Harmony's Audit Committee provides additional assurance to the board regarding the quality and reliability of financial information used by the board and the financial statement issued by the company. The committee assists the board in the discharge of its responsibilities with regard to safeguarding our assets, maintenance of accounting records and maintenance of an effective system of control. An Audit Committee Charter has been established which sets out the role, responsibilities, duties, authority, membership and meetings of the Audit Committee. All non-audit services provided by our external auditors must be, and are, pre-approved by the Audit Committee.

The Audit Committee meets periodically with Harmony's external and independent internal auditors and executive management to review accounting, auditing and financial reporting matters so as to ensure that an effective control environment is maintained. The committee also monitors proposed changes in accounting policy, reviews the internal audit function and discusses the accounting implications of major transactions. In terms of SOx the Audit Committee is directly responsible for the appointment, compensation and oversight of any auditor employed by the company.

All members of the committee are knowledgeable about company affairs and have a working familiarity with finance and accounting practices. Certain members of management also attend the Audit Committee meetings to answer any questions posed by members. The Audit Committee always has at least one financial expert present during meetings.





The members of the committee are:

M W King (*Chairman*)

D S Lushaba

C M L Savage

M F Fleming

Dr R V Simelane

#### **Nomination Committee**

In terms of the requirements of King II, a Nomination Committee was formed to ensure that the procedures for appointments to the board are formal and transparent, by making recommendations to the board on all new appointments. The Nomination Committee Charter which sets out the role and responsibilities of the Nomination Committee, has been adopted and implemented.

The members of the Nomination Committee are:

P T Motsepe (*Chairman*)

Dr R V Simelane

Lord Renwick of Clifton KCMG

M V Sisulu

V N Fakude.

#### **Remuneration Committee**

The Remuneration Committee meets at least once a year and comprises three independent non-executive directors. The primary purposes of the Remuneration Committee are to ensure that the group's directors and senior executives are fairly rewarded for their individual contributions to Harmony's overall performance, to demonstrate to all stakeholders that the remuneration of senior executive members are set by a committee of board members who have no personal interest in the outcomes of their decisions, and who will give due regard to the interests of the shareholders as well as the financial and commercial health of Harmony. The Remuneration Committee's primary objectives are to serve as a party to monitor and strengthen the objectivity and credibility of Harmony directors' and senior executives' remuneration system and to make recommendations to the board on remuneration packages and policies applicable to directors.

The committee meets whenever it is necessary to make recommendations relating to the remuneration of senior executives and executive directors. A Remuneration Committee Charter has been adopted which sets out the objectives, role, responsibilities, authority, membership and meeting requirements of the committee.

The members of the committee are:

P T Motsepe (*Chairman*)

M F Fleming

C M L Savage

Dr R V Simelane

Dr M M M M Bakane-Tuoane

#### **Health, Safety and the Environmental Audit Committee**

The Health, Safety and Environmental Audit Committee ("HSE") monitors health, safety and environmental performance and makes recommendations to the board where it deems particular attention is required. The committee operates in accordance with specific terms of reference confirmed by the board. The committee meets periodically.

The members of the committee are:

M F Fleming (*Chairman*)

V N Fakude

Dr S P Sibisi

Dr M M M M Bakane-Tuoane

#### **Investment Committee**

The Investment Committee was formed in January 2004 and will focus on major capital projects and acquisitions or mergers. The board is in the process of approving an Investment Committee Charter.

The members of the committee are:

Dr S P Sibisi (*Chairman*)

M F Fleming

C M L Savage

Dr M M M M Bakane-Tuoane

D S Lushaba

M W King

21





### **Empowerment Committee**

The Empowerment Committee was formed in January 2004 and will focus on ensuring that the company meets its empowerment targets. The board is in the process of approving an Empowerment Committee Charter.

The members of the committee are:

V N Fakue (*Chairwoman*)

M V Sisulu

M F Fleming

P T Motsepe (*Ex Officio*)

### **Company secretary**

Harmony's company secretary, M P van der Walt, plays a pivotal role in the achievement of good Corporate Governance and the board has empowered her accordingly. The company secretary supports the chairman in ensuring the effective functioning of the board, provides guidance to the chairman and the board and the directors of Harmony's subsidiaries on their responsibilities and duties within the prevailing regulatory and statutory environment, provides the board with guidance as to how they can, in the best interest of the company, discharge these responsibilities and duties, and is expected to and does raise matters that may warrant the attention of the board.

### **12. SIGNIFICANT CONTRACTS**

Save as set out in paragraph 10.5, the company has not entered into any contract, other than in the ordinary course of business, within the period of two years immediately preceding the date of this circular which is or may be material to the company nor has it entered into any other contract, other than in the ordinary course of business, and the company has not entered into any contract which contains provisions, in terms of which there are any obligations or entitlements, which are material to the company.

### **13. WORKING CAPITAL**

The directors are of the opinion that the working capital available to the Harmony group, including Avgold, is sufficient for its present requirements, that is for the next 12 months from date of issue of this circular.

### **14. EXPENSES**

The costs of the scheme, including fees payable to professional advisers, the JSE, the SRP and printing and advertising costs will be borne and paid by Avgold. The cost of this circular, printing and posting will be borne and paid by Harmony and is estimated to be in the region of R1 450 000. Other costs to be paid by Harmony in connection with the Transaction include: R350 000 to the Reporting Accountants (PricewaterhouseCoopers Inc.); R1 970 000 to the Attorneys (Cliffe Dekker Inc.) and a success-based completion fee, still to be agreed, to the Financial Advisers (JP Morgan Chase Bank, Johannesburg Branch).

### **15. CONSENTS**

PricewaterhouseCoopers Inc. and SRK have given, and have not withdrawn, their consents to the inclusion of their names and reports in this circular in the form and context in which they appear.

### **16. OPINION OF THE DIRECTORS OF HARMONY**

The directors are of the opinion that the terms and conditions of the acquisition are fair and reasonable to shareholders.

### **17. DIRECTORS' RESPONSIBILITY STATEMENT**

The directors, whose names appear on page 5 of this circular, collectively and individually, accept full responsibility for the accuracy of the information given in this circular and certify that, to the best of their knowledge and belief there are no facts that have been omitted which would make any statement in this circular false or misleading, and that all reasonable enquiries to ascertain such facts have been made and that this circular contains all information required by the JSE Listings Requirements.







23

**18. DOCUMENTS AVAILABLE FOR INSPECTION**

Copies of the following documents will be available for inspection during normal business hours on any weekday (Saturdays, Sundays and public holidays excepted) from 15 April 2004 (the date of issue of this circular) up to and including 7 May 2004, at the registered office of Harmony and the company's United Kingdom Secretaries:

- a signed copy of this circular;
- the memorandum and the articles of association of Avgold;
- 
- the written consents of advisers to Harmony to the publication of their names in this circular in the form and context in which they appear;
- a copy of the Avgold share exchange agreement;
- a copy of the ARM voting agreement;
- a summary of the terms and conditions of the convertible bonds;
- the audited annual reports of Harmony for the three financial years ended 31 December 2003; and
- the report of PricewaterhouseCoopers Inc. on the pro forma financial information of Harmony.

By order of the board

**Marian van der Walt**

*Secretary*

Virginia

15 April 2004





24

**Annexure 1**

**Summary of the terms and conditions of convertible bonds  
ZAR1,700 million Harmony Gold Mining Company Limited  
Convertible Bonds due 2009**

**Issuer:**

Harmony Gold Mining Company Limited.

**Underlying shares:**

New ordinary shares of Harmony.

**Issue size:**

Up to ZAR1,700,000,000.

**Over allotment option:**

None.

**Status:**

Direct, unconditional, unsubordinated and unsecured obligations of the Issuer.

**Maturity date:**

21 May 2009.

**Issue price:**

100%.

**Coupon:**

4.875% payable semi-annually in arrear on 21 November and 21 May of each year, commencing 21 November 2004.

**Yield to maturity:**

4.875% at the closing date, which is expected to be 21 May 2004 (the "Closing Date").

**Redemption price:**

100%.

**Conversion price:**

ZAR121.00.

**Conversion ratio:**

8,264.4628.

**Conversion period:**

From the 41st day after the Closing Date until the 7th day prior to the Maturity Date.

**Early redemption:**

Callable on or after 5 June 2007 at par plus accrued interest, subject to the daily VWAP of Harmony shares exceeding 130% of the Conversion Price for a period of 20 out of 30 consecutive trading days.

Callable at any time if less than 15% of the Bonds remain outstanding.

**Tax call:**

Gross-up and tax call at higher of (a) par plus accrued or (b) parity plus make-whole, unless investors opt for Bonds to remain outstanding and receive coupons net of withholding tax. Make-whole will be based on a formula aiming to approximate lost premium to parity.

**Anti-dilution protection:**

Standard Euromarket anti-dilution provisions dealing with, *inter alia*, share consolidations, share splits, capital distributions, rights issues and bonus issues.

**Extraordinary dividend protection:**

Dividend in any given year exceeds higher of (a) 110% of previous year's dividend and (b) 4% of the average share price over the 180-day period preceding the payment. Adjustment to the Conversion Price by the amount of the excess.

**Change of control protection:**

Investors will be entitled to convert the Bonds for a period of 60 days at a price that may be adjusted downward in accordance with a ratcheting mechanism.

**Negative Pledge:**

Yes, in line with Euromarket standard (covering Issuer and Material Subsidiaries).

**Events of default:**

Yes, in line with outstanding ZAR1,200,000,000 13% Bonds 2001 - 2006 (covering Issuer and Material Subsidiaries and including higher cross-default threshold of ZAR[100,000,000]).

**Lock-up:**

For 90 days following the Closing Date subject to carve-outs including the announced transaction with Avgold Limited.

**Form:**

Registered.

The Convertible Bonds are not for distribution into or in the United States, Canada, Australia, Italy or Japan or to U.S., Canadian, Australian, Italian or Japanese persons.







25

**Annexure 2****Pro forma balance sheet and income statement of Harmony****Pro forma financial information**

The unaudited pro forma balance sheet of Harmony at 31 December 2003 and income statement for the six months then ended, are set out below and have been prepared to illustrate the effect of the Transaction. The unaudited pro forma balance sheet and income statement have been prepared for illustrative purposes only and, because of their nature, may not give a fair view of Harmony's financial position or the effect on earnings going forward.

**Excluding offer to minorities****Harmony****Pro forma****Before the****After the****Income statements****Transaction****Avgold****Avmin****Transaction****R' million****Note 1****Note 2****Note 3****Note 4****Revenue**

4 454

447

-

-

4 901

Cash operating costs

(3 966)

(268)

-

-

(4 234)

**Cash operating profit**

488

179

-

-

667

Other income - net

54

-

-

60

114

Employment termination and

restructuring costs

(32)

-

-  
 -  
 (32)  
 Corporate, marketing and  
 new business expenditure  
 (74)  
 -  
 -  
 -  
 (74)  
 Exploration expenditure  
 (49)  
 -  
 -  
 -  
 (49)  
 Profit on sale of listed investments  
 522  
 5  
 (2)  
 -  
 525  
 Interest paid  
 (162)  
 (4)  
 -  
 -  
 (166)  
**Cash profit**  
**747**  
**180**  
**(2)**  
**60**  
**985**  
 Depreciation and amortisation  
 (388)  
 (127)  
 (69)  
 -  
 (584)  
 Provision for rehabilitation costs  
 (28)  
 -  
 -  
 -  
 (28)  
 Mark-to-market of financial instruments  
 (161)  
 (183)  
 46  
 -

(298)  
Income from associates  
(41)  
-  
-  
15  
(26)  
**Income before tax**  
**129**  
**(130)**  
**(25)**  
**75**  
**49**  
Taxation expense  
(6)  
(4)  
(7)  
-  
(17)  
Net income before minority interests  
123  
(134)  
(32)  
75  
32  
Minority interests  
(6)  
62  
-  
-  
56  
**Net income**  
**117**  
**(72)**  
**(32)**  
**75**  
**88**  
Weighted average issued shares  
231 707 291  
-  
-  
-  
262 023 354  
Basic earnings per share (cents)  
50  
-  
-  
-  
34  
Basic headline earnings per share (cents)  
(129)

-  
-  
-

(129)

**Notes:**

(1) Extracted from the quarterly published unaudited financial results of Harmony for the six months ended 31 December 2003.

(2) Extracted from the quarterly published unaudited financial results of Avgold for the six months ended 31 December 2003.

(3)

Amortisation on fair value adjustments and consolidation adjustments relating to the acquisition of Avgold. For purposes of determining the purchase consideration the Harmony share price at close of business on 19 March 2003 was used, being R101,60.

(4)

Adjustments relating to the acquisition by Avmin of ARMI's 41,5% effective interest in the Modikwa Joint Venture, the disposal of Kalplats to Avmin and the resulting dilution in the equity accounted loss from Avmin.

(5) The pro forma income statement has been prepared on the assumption that the Transaction was effective on 1 July 2003.





26

**Harmony  
Pro forma  
Before the  
After the  
Balance sheets  
Transaction  
Avgold  
Avmin  
Transaction  
R' million**

**Note 1**

**Note 2**

**Note 3**

**Note 4**

**ASSETS**

**Non-current assets**

21 376

2 480

2 843

60

26 759

Tangible assets

14 911

2 455

1 310

(40)

18 636

Intangible assets

2 803

-

1 532

-

4 335

Investments

3 662

25

-

100

3 787

**Current assets**

1 964

(1)

-

-

1 963

Net current liabilities - excluding cash

(924)

(2)

-

-



(926)  
 Cash and cash equivalents  
 2 888  
 1  
 -  
 -  
 2 889  
**Total assets**  
 23 340  
 2 479  
 2 843  
 60  
 28 722  
**EQUITY AND LIABILITIES**  
 Ordinary shareholders' interest  
 16 251  
 2 154  
 1 604  
 60  
 20 069  
 Outside shareholders' interest  
 155  
 -  
 999  
 -  
 1 154  
**Total shareholders' interest**  
 16 406  
 2 154  
 2 603  
 60  
 21 223  
**Long-term borrowings**  
 2 863  
 -  
 -  
 -  
 2 863  
**Deferred taxation**  
 2 779  
 -  
 232  
 -  
 3 011  
**Deferred financial liabilities**  
 432  
 286  
 8  
 -  
 726  
**Long-term provisions**

860
39
-
-
899
<b>Total equity and liabilities</b>
23 340
2 479
2 843
60
28 722
Shares in issue
258 350 934
-
-
-
288 666 997
Net asset value per share (cents)
6 350
-
-
-
7 352
Net tangible asset value per share (cents)
5 265
-
-
-
5 850

**Notes:**

- (1) Extracted from the quarterly published unaudited financial results of Harmony for the six months ended 31 December 2003.
- (2) Extracted from the quarterly published unaudited financial results of Avgold for the six months ended 31 December 2003.
- (3) Fair value and consolidation adjustments relating to the acquisition of Avgold. For purposes of determining the purchase consideration the Harmony share price at close of business on 19 March 2003 was used, being R101,60 per share.
- (4) Adjustments relating to the acquisition by Avmin of ARMI's 41,5% effective interest in the Modikwa Joint Venture and the disposal of Kalplats to Avmin.
- (5) The pro forma balance sheet has been prepared on the assumption that the Transaction was effective on 31 December 2003.





27

**Including offer to minorities**

**Harmony**

**Pro forma**

**Before the**

**After the**

**Income statements**

**Transaction**

**Avgold**

**Avmin**

**Transaction**

**R' million**

**Note 1**

**Note 2**

**Note 3**

**Note 4**

**Revenue**

4 454

447

-

-

4 901

Cash operating costs

(3 966)

(268)

-

-

(4 234)

**Cash operating profit**

**488**

**179**

-

-

**667**

Other income - net

54

-

-

60

114

Employment termination and

restructuring costs

(32)

-

-

-

(32)

Corporate, marketing and

new business expenditure

(74)

-

-  
-  
(74)  
Exploration expenditure  
(49)  
-  
-  
-  
(49)  
Profit on sale of listed investments  
522  
5  
(5)  
-  
522  
Interest paid  
(162)  
(4)  
-  
-  
(166)  
**Cash profit**  
**747**  
**180**  
**(5)**  
**60**  
**982**  
Depreciation and amortisation  
(388)  
(127)  
(129)  
-  
(644)  
Provision for rehabilitation costs  
(28)  
-  
-  
-  
(28)  
Mark-to-market of financial instruments  
(161)  
(183)  
86  
-  
(258)  
Income from associates  
(41)  
-  
-  
15  
(26)

**Income before tax**

**129**

**(130)**

**(48)**

**75**

**26**

Taxation expense

(6)

(4)

(12)

-

(22)

Net income before minority interests

123

(134)

(60)

75

4

Minority interests

(6)

-

-

-

(6)

**Net income**

**117**

**(134)**

**(60)**

**75**

**(2)**

Weighted average issued shares

231 707 291

-

-

-

293 715 856

Basic earnings per share (cents)

50

-

-

-

(1)

Basic headline earnings per share (cents)

(129)

-

-

-

(131)

**Notes:**

(1) Extracted from the quarterly published unaudited financial results of Harmony for the six months ended 31 December 2003.

(2) Extracted from the quarterly published unaudited financial results of Avgold for the six months ended 31 December 2003.

(3)

Amortisation on fair value adjustments and consolidation adjustments relating to the acquisition of Avgold. For purposes of determining the purchase consideration the Harmony share price at close of business on 19 March 2003 was used, being R101,60.

(4)

Adjustments relating to the acquisition by Avmin of ARMI's 41,5% effective interest in the Modikwa Joint Venture, the disposal of Kalplats to Avmin and the resulting dilution in the equity accounted loss from Avmin.

(5) The pro forma income statement has been prepared on the assumption that the Transaction was effective on 1 July 2003.

(6)

For purposes of illustrating the pro forma effects, After the Transaction, including the offer to minorities, it has been assumed that all minorities accept the offer.







28

**Harmony  
Pro forma  
Before the  
After the  
Balance sheets  
Transaction  
Avgold  
Avmin  
Transaction  
R' million**

**Note 1**

**Note 2**

**Note 3**

**Note 4**

**ASSETS**

**Non-current assets**

21 376

2 480

5 289

60

29 205

Tangible assets

14 911

2 455

2 451

(40)

19 777

Intangible assets

2 803

-

2 838

-

5 641

Investments

3 662

25

-

100

3 787

**Current assets**

1 964

(1)

-

-

1 963

Net current liabilities - excluding cash

(924)

(2)

-

-

(926)

Cash and cash equivalents

2 888

1

-

-

2 889

**Total assets**

23 340

2 479

5 289

60

31 168

**EQUITY AND LIABILITIES**

Ordinary shareholders' interest

16 251

2 154

4 851

60

23 316

Outside shareholders' interest

155

-

-

-

155

**Total shareholders' interest**

16 406

2 154

4 851

60

23 471

**Long-term borrowings**

2 863

-

-

-

2 863

**Deferred taxation**

2 779

-

419

-

3 198

**Deferred financial liabilities**

432

286

19

-

737

**Long-term provisions**

860
39
-
-
899
<b>Total equity and liabilities</b>
23 340
2 479
5 289
60
31 168
Shares in issue
258 350 934
-
-
-
320 359 499
Net asset value per share (cents)
6 350
-
-
-
7 326
Net tangible asset value per share (cents)
5 265
-
-
-
5 566

**Notes:**

- (1) Extracted from the quarterly published unaudited financial results of Harmony for the six months ended 31 December 2003.
- (2) Extracted from the quarterly published unaudited financial results of Avgold for the six months ended 31 December 2003.
- (3) Fair value and consolidation adjustments relating to the acquisition of Avgold. For purposes of determining the purchase consideration the Harmony share price at close of business on 19 March 2003 was used, being R101,60 per share.
- (4) Adjustments relating to the acquisition by Avmin of ARMI's 41,5% effective interest in the Modikwa Joint Venture and the disposal of Kalplats to Avmin.
- (5) The pro forma balance sheet has been prepared on the assumption that the Transaction was effective on 31 December 2003.
- (6) For purposes of illustrating the pro forma effects, After the Transaction, including the offer to minorities, it has been assumed that all minorities accept the offer.





29

**Annexure 3**

**Independent reporting accountants' report on the pro forma financial information of Harmony**

"The Directors

Harmony Gold Mining Company Limited

PO Box 2

Randfontein

1760

7 April 2004

Dear Sirs

**INDEPENDENT REPORTING ACCOUNTANTS' REPORT ON THE UNAUDITED PRO FORMA FINANCIAL INFORMATION OF HARMONY GOLD MINING COMPANY LIMITED ("Harmony")**

**Introduction**

Harmony has reached agreement for the following transactions:

- the acquisition of 42,1% of the issued share capital of Avgold Limited ("Avgold") from Anglovaal Mining Limited ("Avmin"); and
- the disposal of its Kalplats platinum discovery project and associated mineral rights (collectively, "the Transactions").

In addition, Harmony is making an offer for the balance of Avgold's issued share capital, to be implemented by way of a scheme of arrangement in terms of section 311 of the Companies Act, 1973 (Act 61 of 1973), as amended, proposed by Harmony between Avgold and its shareholders, other than Harmony ("the Avgold Offer").

We report on the unaudited pro forma balance sheets, income statements and financial effects of Harmony after the Transactions and Avgold Offer ("the pro forma financial information"), included in paragraph 6.1 and as Annexure 2 to the circular to shareholders to be dated on or about 15 April 2004 (the "Circular").

The unaudited pro forma financial information has been prepared for illustrative purposes only and to provide information as to how the Transactions and the Avgold Offer will impact on the financial position and results of Harmony. Because of its nature, the unaudited pro forma financial information may not give a fair reflection of Harmony's financial position nor the effect on future earnings.

At your request, and for purposes of the Transactions and the Avgold Offer, we present our report on the pro forma financial information of Harmony in compliance with the Listings Requirements of the JSE Securities Exchange South Africa ("JSE").

**Responsibilities**

The directors of Harmony are solely responsible for the preparation of the pro forma financial information to which this independent reporting accountants' report relates, and for the financial statements and financial information from which it has been prepared.

It is our responsibility to form an opinion on the unaudited pro forma financial information and to report our opinion to you. We do not accept any responsibility for any reports previously given by us on any financial information used in the compilation of the pro forma financial information, beyond that owed to those to whom those reports were addressed at their dates of issue.

**Basis of opinion**

Our work, which did not involve any independent examination of any of the underlying financial information, consisted primarily of comparing the unadjusted financial information to the unaudited published quarterly financial results of Harmony for the six months ended 31 December 2003, considering the evidence supporting the adjustments to the unaudited pro forma financial information, recalculating the amounts based on the information obtained and discussing the pro forma financial information with the directors of Harmony.

Because the above procedures do not constitute an audit or a review in accordance with Statements of South African Auditing Standards, we do not express any assurance on the fair presentation of the unaudited pro forma financial information.

Had we performed additional procedures or had we performed an audit or review of the financial statements in accordance with Statements of South African Auditing Standards, other matters might have come to our attention that would have been reported to you.







30

**Opinion**

In our opinion:

- the unaudited pro forma financial information has been properly compiled on the basis stated;
- such basis is consistent with the accounting policies of Harmony; and
- the adjustments are appropriate for the purposes of the unaudited pro forma financial information in terms of Section 8.29 of the JSE

Listings Requirements.

Yours faithfully

**PricewaterhouseCoopers Inc.**

*Chartered Accountants (SA)*

*Registered Accountants and Auditors*

Sunninghill"





31

**Annexure 4**

**Interim financial results of Harmony**

**1.**

**TOTAL OPERATIONS FINANCIAL RESULTS**

**(Rand/Metric) - unaudited**

**Quarter ended**

**Quarter ended**

**Six**

**Six**

**31 December**

**30 September**

**months**

**months**

**2003**

**2003**

**ended**

**ended**

**(including**

**(excluding**

**31 December**

**31 December**

**ARMgold)**

**ARMgold)**

**2002**

**2003**

Ore milled

t'000

**8 183**

6 854

13 941

15 037

Gold produced

kg

**29 294**

22 725

48 852

52 019

Gold price received

R/kg

**85 139**

86 258

103 362

85 623

Cash operating costs

R/kg

**75 888**

76 693

68 302

76 241

**R'm**

<b>R'm</b>
<b>R'm</b>
<b>R'm</b>
Gold sales
<b>2 494</b>
1 960
5 049
4 484
Cash operating costs
<b>2 223</b>
1 743
3 337
3 966
Cash operating profit
<b>271</b>
217
1 713
488
Income from associates
<b>(34)</b>
(7)
-
(41)
Amortisation
<b>(246)</b>
(142)
(271)
(388)
Profit on sale of Highland & High River
<b>522</b>
-
-
522
Profit on sale of Aurion Gold shares
-
-
469
-
Mark-to-market of financial instruments
<b>11</b>
(172)
77
(161)
Rehabilitation cost provision
<b>(18)</b>
(10)
(21)
(28)
Employment termination costs
<b>(20)</b>
(12)

(27)  
 (32)  
 Other income net  
**65**  
 70  
 101  
 135  
 Minority interest  
**(6)**  
 -  
 -  
 (6)  
 Interest paid  
**(107)**  
 (55)  
 (119)  
 (162)  
 Corporate, marketing and new business expenditure  
**(43)**  
 (31)  
 (58)  
 (74)  
 Exploration expenditure  
**(35)**  
 (14)  
 (57)  
 (48)  
 Foreign exchange losses  
**(50)**  
 (31)  
 -  
 (81)  
 Mark-to-market of listed investments  
 -  
 -  
 (506)  
 -  
 Profit before taxation  
**310**  
 (187)  
 1 301  
 123  
 South African normal taxation - Current tax  
**(84)**  
 (18)  
 (245)  
 (102)  
 - Deferred tax  
**10**  
 86  
 (173)



96
Net earnings
<b>236</b>
(119)
883
117
Earnings per share (cents)*
- Basic earnings
<b>92</b>
(62)
509
50
- Headline earnings
<b>(66)</b>
(67)
500
(129)
- Fully diluted earnings**
<b>92</b>
(62)
500
51
Dividends per share (cents)
- Proposed interim
<b>40</b>
-
125
40
<b>Reconciliation of headline earnings</b>
Net earnings
<b>236</b>
(119)
883
117
<i>Adjustments:</i>
Profit on sale of assets
<b>(3)</b>
(9)
(16)
(12)
Profit on sale of Highland & High River, net of tax
<b>(444)</b>
-
-
(444)
Amortisation on goodwill
<b>41</b>
-
-
42
Headline earnings

**(170)**

(128)

867

(298)

Prepared in accordance with International Financial Reporting Standards.

\*

Calculated on weighted number of shares in issue at quarter-end December 2003: 257,9 million (September 2003: 192,3 million) (December 2002: 173,6 million).

\*\*

Calculated on weighted average number of diluted shares in issue at quarter-end December 2003: 256,5 million (September 2003: 190,9 million) (December 2002: 176,5 million).





32

2.

**ABRIDGED BALANCE SHEETS**

**(Rand) - unaudited**

At

At

At

**31 December**

**30 September**

**31 December**

**2003**

**2003**

**2002**

**R'm**

**R'm**

**R'm**

**EMPLOYMENT OF CAPITAL**

Mining assets after amortisation

**14 911**

14 729

8 945

Intangible assets

**2 803**

2 843

-

Investments

**1 098**

1 260

1 409

Investments in associates

**2 564**

2 896

-

Short-term investments - Placer Dome

-

-

723

Net current liabilities, excluding cash

**(924)**

(1 300)

(431)

Cash

**2 888**

2 561

1 439

**Total assets**

**23 340**

22 989

12 085

**CAPITAL EMPLOYED**

Shareholders' equity

<b>16 251</b>
15 937
7 863
Loans
<b>2 863</b>
2 881
2 009
Long-term provisions
<b>860</b>
840
698
Minority interest
<b>155</b>
139
-
Unrealised hedging loss
<b>432</b>
450
736
Deferred tax
<b>2 779</b>
2 742
779
<b>Total equity and liabilities</b>
<b>23 340</b>
22 989
12 085

**Basis of accounting**

The unaudited results for the quarter have been prepared on the International Financial Reporting Standards ("IFRS") basis. These consolidated quarterly statements are prepared in accordance with IFRS 34, Interim Financial Reporting. The accounting policies are consistent with those applied in the previous financial year.

Issued share capital: 258,4 million ordinary shares of 50 cents each (September 2003: 257,9 million shares) (December 2002: 174,6 million).

**3.**  
**CONDENSED STATEMENT OF CHANGES IN SHAREHOLDERS' EQUITY - unaudited**

<b>At</b>
<b>At</b>
<b>31 December</b>
<b>31 December</b>
<b>2003</b>
<b>2002</b>
<b>R'm</b>
<b>R'm</b>
Balance at beginning of financial year
8 628
7 963
Currency translation adjustment and other
-
(455)
Issue of share capital
7 798

213

Net earnings

117

883

Dividends paid

(292)

(741)

Balance at end of December

16 251

7 863

Prepared in accordance with IFRS.







33

**4.**

**ABRIDGED CASH FLOW STATEMENTS - unaudited**

**Six months**

**Six months**

**ended**

**ended**

**31 December 2003**

**31 December 2002**

**R'000**

**R'000**

Cash flow from operating activities

**133**

1 251

Cash utilised in investing activities

**1 350**

(618)

Cash utilised in financing activities

**(282)**

(635)

Increase/(Decrease) in cash and equivalents

**1 201**

(2)

Opening cash and equivalents

**1 687**

1 441

Closing cash and equivalents

**2 888**

1 439

Prepared in accordance with IFRS.

**Hedging**

Maturity schedule of the Harmony group's commodity contracts by type at 31 December 2003:

**30 June 2005**

**30 June 2006**

**30 June 2007**

**30 June 2008**

**30 June 2009**

**Total**

Forward sales agreements

Ounces

175 000

108 000

147 000

100 000

100 000

630 000

A\$/ounce

513

510

515

518

518  
 514,27  
 Calls contracts sold Ounces  
 127 100  
 40 000  
 -  
 -  
 -  
 167 100  
 A\$/ounce  
 513  
 552  
 -  
 -  
 -  
 522  
 302 100  
 148 000  
 147 000  
 100 000  
 100 000  
 797 100

These contracts are classified as speculative and the marked-to-market movement is reflected in the income statement. During the quarter 62 900 ounces of the hedge books were closed out at a cost of R5 million (US\$1 million). The market-to-market of the remaining contracts was a negative R380 million (US\$57 million) at 31 December 2003. These values were based on a gold price of US\$414 (A\$552) per ounce, exchange rates of US\$/R6.70 and A\$/US\$0.75 and prevailing market interest rates at the time. These valuations were provided by independent risk and treasury management experts.

#### **Gold lease rates**

Harmony holds certain gold lease rate swaps which were acquired through its acquisitions of New Hampton and Hill 50. These instruments are all treated as speculative. The mark-to-market of the above contracts was a negative R10 million (US\$1.5 million) at 31 December 2003, based on valuations provided by independent treasury and risk management experts.

#### **Interest rate swaps**

The group has interest rate swap agreements to convert R600 million of its R1, 2 billion fixed rate bond to variable rate debt. The interest rate swap runs over the term of the bond, interest is received at a fixed rate of 13% and the company pays floating rate based on JIBAR plus a spread ranging from 1,8% to 2,2%. These transactions which mature in June 2006 are designated as fair value hedges. The marked-to-market value of the transactions was a negative R42 million (US\$6 million) at 31 December 2003, based on the prevailing interest rates and volatilities at the time.

#### **Dividend**

A dividend No. 78 of 40 cents per ordinary share being the interim dividend for the six-month period ended 31 December 2003, has been declared payable on 8 March 2004 to those shareholders registered as such in the books of the company at the close of business on 5 March 2004.





34

**Annexure 5**

**Historical financial information of Avgold**

The salient financial information set out below has been extracted without adjustment from the audited annual financial statements of Avgold for the three financial years ended 30 June 2003:

**FINANCIAL INFORMATION FOR THE YEARS ENDED 30 JUNE 2003, 2002 AND 2001**

**1.**

**INCOME STATEMENTS**

Notes

**2003**

**2002**

**2001**

**R'000**

**R'000**

**R'000**

**Revenue**

1 and 2

**999 480**

363 802

217 864

**Costs and expenses**

**889 560**

346 468

189 614

- operating

**673 344**

265 137

163 394

- amortisation and depreciation

**186 900**

57 389

19 737

- retrenchments

-

4 747

165

- general and administration

**29 316**

19 195

5 981

- exploration

-

-

337

**Operating profit**

3

**109 920**

17 334

28 250

Investment income

4

	<b>12 987</b>
	2 147
	10 654
Finance cost	
	5
	<b>57 946</b>
	8 419
	-
Foreign exchange gain	
	6
	<b>66 745</b>
	30 335
	-
Unrealised non-hedge derivatives	
	7
	<b>(102 715)</b>
	-
	-
<b>Income before exceptional item</b>	
	<b>28 991</b>
	41 397
	38 904
Exceptional items	
	8
	<b>7 085</b>
	-
	-
<b>Income before taxation</b>	
	<b>36 076</b>
	41 397
	38 904
Taxation	
	9
	<b>9 207</b>
	5 000
	-
Net earnings for year	
	<b>26 869</b>
	36 397
	38 904
<b>Additional information:</b>	
<b>Net earnings for year excluding unrealised non-hedge derivatives</b>	
	<b>129 584</b>
	36 397
	38 904
Headline earnings	
	<b>25 385</b>
	36 397
	38 904
<b>Headline earnings before unrealised non-hedge derivatives</b>	
	<b>128 100</b>

36 397  
38 904  
Earnings per share (cents)  
10  
**4,0**  
5,4  
6,5  
Headline earnings per share (cents)  
**3,8**  
5,4  
6,5  
**Headline earnings per share before unrealised  
non-hedged derivatives (cents)**  
**19,0**  
5,4  
6,5  
Weighted number of shares in issue (million)  
**674,0**  
670,2  
595,4  
Reconciliation of earnings and headline earnings:  
Earnings per income statement  
**26 869**  
36 397  
38 904  
Exceptional items:  
- Profit on sale of ETC  
**(7 085)**  
-  
-  
- Recoupments tax on sale of ETC  
**5 601**  
-  
-  
Headline earnings  
**25 385**  
36 397  
38 904







35

2.

**BALANCE SHEETS**

Notes

**2003**

**2002**

**2001**

**R'000**

**R'000**

**R'000**

**ASSETS**

**Non-current assets**

**2 569 795**

2 931 207

2 551 085

Property, plant and equipment

11

**2 543 841**

2 883 336

2 506 592

Investments

12

**25 954**

47 871

44 493

**Current assets**

**84 382**

208 742

137 021

Inventories

13

**46 407**

44 761

33 247

Trade and other receivables

**37 214**

55 171

47 867

Deposits and cash

**761**

108 810

55 907

**Total assets**

**2 654 177**

3 139 949

2 688 106

**EQUITY AND LIABILITIES**

**Capital and reserves**

Share capital

**6 765**

6 729

6 658  
 Share premium  
**2 219 900**  
 2 206 385  
 2 183 589  
 Retained income/(accumulated loss)  
**43 827**  
 16 958  
 (19 439)  
**Total shareholders' equity**  
**2 270 492**  
 2 230 072  
 2 170 808  
**Non-current liabilities**  
**144 639**  
 630 105  
 378 594  
 Long-term loans  
 14  
 -  
 548 072  
 302 453  
 Non-hedge derivatives  
 7  
**102 715**  
 -  
 -  
 Long-term provisions  
 15  
**41 924**  
 82 033  
 76 141  
**Current liabilities**  
**239 046**  
 279 772  
 138 704  
 Trade and other payables  
 16  
**104 126**  
 153 343  
 134 044  
 Overdrafts and short-term borrowings  
 17  
**134 920**  
 126 429  
 4 660  
**Total equity and liabilities**  
**2 654 177**  
 3 139 949  
 2 688 106





36

**3.**

**CASH FLOW STATEMENTS**

Notes

**2003**

**2002**

**2001**

**R'000**

**R'000**

**R'000**

**Cash generated from/(utilised by) operations**

Operating profit

**109 920**

17 334

28 250

Non-cash items and adjustments:

Provisions

**(5 546)**

7 788

8 078

Profit on sale of property, plant and equipment

**(1 519)**

(3 709)

-

Amortisation and depreciation

**186 900**

57 389

19 737

**289 755**

78 802

56 065

Net withdrawals from/(payments to) environmental trust fund

**3 925**

(4 151)

(3 161)

Retrenchment payments

-

(5 873)

(6 587)

Investment income

**12 987**

2 147

10 654

Finance charges

**(57 946)**

(8 419)

-

Taxation

-

-

(2 910)

**248 722**

62 506

54 061

**Cash provided by/(reinvested in) working capital**

Inventories

**(18 351)**

(11 514)

(4 179)

Trade and other receivables

**13 578**

(7 303)

6 476

Trade and other payables

**(30 390)**

10 155

(1 355)

Net cash generated from operating activities

**213 558**

53 844

55 003

**Cash utilised in investment activities**

Property, plant and equipment acquired

18

**(124 364)**

(345 645)

(599 051)

Investments acquired

**(483)**

(1 124)

853

Proceeds on disposal of property, plant and equipment

**3 558**

9 240

1 199

Proceeds on sale of ETC mine

8

**251 817**

-

-

**130 528**

(337 529)

(596 999)

**Cash provided by financing activities**

Net increase in shareholders' funding

**13 551**

22 868

498 200

(Decrease)/Increase in long-term loans

19

**(376 189)**

191 952



300 000  
(Decrease)/Increase in overdrafts and short-term borrowings  
20  
**(77 658)**  
121 768  
(201 829)  
**(440 296)**  
336 588  
596 371  
(Decrease)/Increase in cash and cash equivalents  
**(96 210)**  
52 903  
54 375  
Cash and cash equivalents at beginning of year  
**108 810**  
55 907  
1 532  
Translation adjustment  
**(11 839)**  
-  
-  
**Cash and cash equivalents at end of year**  
**761**  
108 810  
55 907





37

**4.**

**STATEMENTS OF CHANGES IN EQUITY**

**Ordinary  
share capital**

**Retained**

**Total**

**Total**

**Total**

**and premium**

**income**

**2003**

**2002**

**2001**

**R'000**

**R'000**

**R'000**

**R'000**

**R'000**

**Changes in shareholders' equity**

Balance at beginning of year

2 213 114

16 958

**2 230 072**

2 170 808

1 633 704

Shares allotted - rights issue

-

-

-

-

500 355

Share options exercised

13 584

-

**13 584**

22 867

6 507

Expenses written-off against share premium

(33)

-

**(33)**

-

(8 662)

Net earnings for year

-

26 869

**26 869**

36 397

38 904

Balance at end of year

2 226 665

43 827

**2 270 492**

2 230 072

2 170 808

**Details of shares**

**2003**

**2002**

**2001**

**Share capital and premium**

*Authorised*

1 000 000 000 ordinary shares of one cent each

**10 000**

10 000

10 000

(2002: 1 000 000 000 ordinary shares of one cent each)

(2001: 1 000 000 000 ordinary shares of one cent each)

*Issued*

676 453 556 ordinary shares of one cent each

**6 765**

6 729

6 658

(2002: 672 943 402 ordinary shares of one cent each)

(2001: 665 784 171 ordinary shares of one cent each)

Share premium

**2 219 900**

2 206 385

2 183 589

**2 226 665**

2 213 114

2 190 247

The unissued shares of 323 546 444 (2002: 327 056 598, 2001: 334 215 829), of which 33 822 678 (2002: 33 647 170, 2001: 33 289 209) shares are specifically reserved for purposes of the share incentive scheme, are under the control of the directors.

**ACCOUNTING POLICIES**

The annual financial statements are prepared in accordance with the historical cost convention except for financial instruments, which are accounted for at fair value, and in accordance with South African Statements of Generally Accepted Accounting Practice and the requirements of the Companies Act. The principal accounting policies, set out below, have been consistently applied, except those relating to financial instruments following the implementation of AC 133 - "Financial Instruments: Recognition and Measurement" from 1 July 2002.

**Revenue recognition**

Revenue comprises the Rand amount received and receivable in respect of the supply of metals mined. Revenue is recognised when the risks and rewards of ownership transfer.

Other revenues earned are recognised on the following bases:

- Interest income: as it accrues.

- Dividend income from industry-related investments: when received.

**Borrowing costs**

Borrowing costs that are directly attributable to the acquisition or construction of mining assets that require a substantial period of time to prepare for their intended use, are capitalised.

Borrowing costs are expensed from the time that mining production becomes commercially viable.





**Deferred taxation**

Deferred taxation is provided using the balance sheet liability method on all temporary differences between the carrying amounts for financial reporting purposes and the amounts used for taxation purposes, except for differences relating to the initial recognition of assets which affect neither accounting nor taxable profit.

The tax value of losses and unredeemed capital expenditure expected to be available for utilisation against future taxable income are set-off against the deferred tax liability. Deferred tax assets are recognised only when it is probable that the related tax benefit will be realised.

Deferred tax is calculated at the mining cost formula rate. The effect on deferred tax of any changes in tax rates is charged to the income statement.

**Exploration and development**

Exploration costs are expensed as incurred. When it has been established that a mineral property has development potential and following a positive detailed economic evaluation, further development, exploration and other expenditure prior to the commencement of commercial production is capitalised.

Ongoing development expenditure on existing mines is expensed as incurred. Major development and exploration expenditure incurred to expose the ore, increase production or extend the life of an existing mine is capitalised.

**Financial instruments**

Financial instruments recognised on the balance sheet include cash and cash equivalents, non-hedge forward exchange contracts, investments, trade receivables, trade creditors and borrowings. Initial recognition is at cost. Subsequent recognition is at fair value. The recognition methods adopted are disclosed in the individual policy statements associated with each item.

**Non-hedge derivatives**

Non-hedge forward exchange contracts are mark-to-market at financial reporting dates and changes in their fair values are included in the income statement. Gains or losses on contracts maturing between reporting dates are recognised in revenue.

**Hedging**

The company enters into hedging transactions on a portion of its planned gold production to ensure a degree of certainty on future gold sales prices and to provide a guaranteed minimum cash flow for known major capital expenditures and debt servicing.

Gains and losses on derivative instruments that effectively establish the prices for future production are recognised in revenue when the related production is delivered. In the event of early settlement of hedging contracts, gains and losses are taken to revenue at the date of settlement. Any potential loss on hedge positions below the current cost of production is recognised in the period in which it arises.

**Property, plant and equipment**

Mining assets are recorded at cost of acquisition less sales, recoupments and amounts written-off. Interest on borrowings, specifically to finance the establishment of mining assets, are capitalised until commercial levels of production are achieved.

Depreciation and amortisation is provided over the useful life of mine assets from the time that mining production becomes commercially viable, as follows:

-

Where orebodies are well-defined, assets are amortised using the units of production method based on the estimated proved and probable ore reserves.

- Where orebodies are not well-defined, the straight-line method is used based on the estimated life of each mine, limited to

25 years.

- Other assets are depreciated to estimated net realisable values using the straight-line method over their expected useful lives.

Land and mineral rights prior to production are not depreciated.

**Impairment**

The recoverability of the long-term assets is reviewed by management on a continuous basis, based on estimates of future net cash flows. These estimates are subject to risks and uncertainties including future metal prices and exchange



rates. It is therefore possible that changes could occur which may affect the recoverability of the long-term assets. Where the estimated recoverability is less than net book value, the impairment is charged against income to reduce the carrying value of the asset.





39

### **Investments**

- Unlisted investments are stated at cost less amounts written-off where there has been a permanent diminution in value.

-

Environmental trust fund investments are stated at cost. Annual payments are made to the environmental trust fund in accordance with statutory requirements.

### **Cash and cash equivalents**

For the purposes of the cash flow statement, cash and cash equivalents comprise cash in hand and deposits held with banks.

### **Foreign currencies**

Foreign currency transactions are recorded at the exchange rate ruling at the transaction date. Assets and liabilities designated in foreign currencies are translated at exchange rates ruling at the balance sheet date. Both realised and unrealised gains and losses arising from exchange differences are recognised in operating results.

### **Inventories**

Gold inventory is carried at the lower of weighted average cost and net realisable value and includes work-in-progress at the earliest stage of production when reliable estimates of quantities and costs are capable of being made, including the breaking of ore in the stopes.

By-products are carried at the lower of the estimated variable cost associated with their production and net realisable value.

Consumables and stores are carried at weighted average cost with due allowance for obsolete and slow-moving items.

### **Trade receivables**

Trade receivables are carried at anticipated realisable value. An estimate is made for doubtful receivables based on a review of all outstanding amounts at year-end. Bad debts are written-off during the year in which they are identified.

### **Provisions**

Provisions are recognised when the company has a present legal or constructive obligation as a result of past events where it is probable that an outflow of resources embodying economic benefits will be required to settle the obligation and a reliable estimate of the amount of the obligation can be made.

### **Employee post-retirement obligations**

The company participates in defined contribution retirement plans for employees. The pension plans are funded by payments from the employees and by the company and charged to income as incurred. The assets of the different plans are held by independently managed trust funds. These funds are governed by the Pension Funds Act, 1956, as amended. Certain employees and retired employees are entitled to post-retirement medical benefits. The estimated cost of these benefits is charged to income based on actuarial valuations made every three years.

### **Environmental rehabilitation**

The estimated cost of final rehabilitation, comprising liabilities for decommissioning and restoration, is based on current legal requirements, existing technology and costs and is re-assessed annually.

### **Decommissioning costs**

The estimated cost of future decommissioning obligations at the end of the operating life of the mines is included in long-term provisions. These estimated costs are reviewed regularly and adjusted for legal, technological and environmental circumstances that affect the estimates of the decommissioning obligations.

### **Restoration costs**

The estimated cost of restoration at the end of the operating life of the mines is included in long-term provisions. Cost estimates are not reduced by the potential proceeds from the sale of assets.

Expenditure on ongoing rehabilitation is charged to the income statement as incurred.

### **Comparative figures**

Where necessary, comparative figures have been adjusted to conform with changes in presentation in the current year.





40

**NOTES TO THE ANNUAL FINANCIAL STATEMENTS****2003****2002****2001****R'000****R'000****R'000****1.****REVENUE**

Gold sales

**998 217**

362 709

217 647

By-products

**1 263**

1 093

217

**999 480**

363 802

217 864

**2.****GOLD HEDGING**

The company entered into US dollar gold and Rand gold forward sales contracts as a result of the financing of the Target Mine. These contracts are not recognised on the balance sheet as financial assets and liabilities. The revenue is recognised when the related production is delivered. The company purchased Rand/US Dollar forward exchange contracts ("FEC's") to convert the Rand gold forward sales contracts into Dollar gold commodity hedges. The negative mark-to-market value of these non-hedge FEC's of R103 million are included in the income statement (refer note 7). At 30 June 2003 the total hedge book had a negative mark-to-market value of R192 million. This was calculated at a gold price of US\$346,15/oz and an exchange rate of US\$1.00: R7,51.

The hedge book at 30 June 2003, after the restructuring, was as follows:

**2004****2005****2006****2007**

Net dollar forward sales contracts:

Quantity sold

kg

9 162

9 137

4 403

-

oz

294 579

293 762

141 545

-

US\$/oz

313

316

323

-

The company does not use derivative instruments for speculative purposes. All forward sales contracts are unmargined.

**2003**

**2002**

**2001**

**R'000**

**R'000**

**R'000**

**3.**

**OPERATING PROFIT IS STATED AFTER**

Auditors' remuneration

- audit fees

**820**

899

809

Directors' emoluments

- executive directors

**6 184**

5 128

3 307

- non-executive directors

**327**

334

126

Operating lease expenditure

- buildings/equipment

**1 856**

160

187

Amortisation and depreciation

**186 900**

57 389

19 737

Profit on sale of property, plant and equipment

**1 519**

3 709

-

**4.**

**INVESTMENT INCOME**

Interest received

**11 996**

1 973

1 104

Dividends received

**966**

-

207

Surplus on realisation in Rand Refinery Limited

-

-

5 029



Other

**25**

174

4 314

**12 987**

2 147

10 654

**5.**

**FINANCE COST**

Interest paid

**57 946**

47 801

7 741

Capitalised to pre-mining assets

-

(39 382)

(7 741)

**57 946**

8 419

-





41

**2003**

**2002**

**2001**

**R'000**

**R'000**

**R'000**

**6.**

**FOREIGN EXCHANGE GAIN**

Realised foreign exchange gain

**66 745**

-

-

Unrealised foreign exchange gain

-

30 335

-

**66 745**

30 335

-

Foreign exchange gains are recorded on the translation and repayment of the US Dollar denominated loans raised to fund the completion of Target Mine.

**7.**

**UNREALISED NON-HEDGE DERIVATIVES**

Forward exchange contracts

- Cost

-

-

-

- Fair value adjustment at year-end - unrealised

**102 715**

-

-

Forward exchange contracts entered into to convert Rand gold hedges are fair valued in terms of AC 133, based upon the year-end Rand/US Dollar exchange rate of US\$1.00: R7,51.

**8.**

**EXCEPTIONAL ITEMS**

The profit realised on the sale of ETC Mine is calculated as follows:

Assets

**314 479**

-

-

- property, plant and equipment

**274 920**

-

-

- investments

**18 475**

-

-

- inventories

**16 705**

-

-

- receivables

**4 379**

-

-

Liabilities

**69 747**

-

-

- long-term provisions

**34 563**

-

-

- trade and other payables

**28 034**

-

-

- overdrafts and short-term borrowings

**7 150**

-

-

Net assets at date of sale

**244 732**

-

-

Net cash received on sale

**251 817**

-

-

Net profit on sale

**7 085**

-

-

Gross cash received on sale

**255 000**

-

-

*Less:* Attributable expenses

**3 183**

-

-

Attributable expenses include legal and professional fees, bonuses to employees and other administrative costs.

**9.**

## **TAXATION**

**9.1**

**Non-mining tax**

**3 603**

-

-

The South African normal tax rate of 30 per cent (2002: 30 per cent) is applied on the non-mining taxable income which consists primarily of interest received.

**9.2**

**Mining tax**

Income from gold mining is taxable at a rate determined by the following formula:

$y = 37 - 185/x$  where y is the calculated percentage tax rate and x is the ratio of taxable income from mining to total revenue from mining expressed as a percentage. Taxable income is determined after the deduction of mining capital expenditure.

Estimated mining recoupments tax attributable to the sale of Hartebeestfontein Mine

-

5 000

-

Estimated mining recoupments tax attributable to the sale of ETC Mine

**5 601**

-

-

Estimated unredeemed capital expenditure carried forward for deduction from future mining taxable income amounts to

**3 578 100**

3 280 200

2 449 000







42

To date of commencement of commercial production the only temporary difference arising on Target relates to the Section 36(11)(c) allowance on the unredeemed capital expenditure. This deductible temporary difference amounts to R1,3 billion. A deferred tax asset was not recognised due to the fact that the above temporary difference does not affect either accounting profit or taxable profit on initial recognition of the assets.

### 9.3

#### Secondary Taxation on Companies ("STC")

The company did not elect to be exempt from the payment of STC. Currently, the applicable rate for STC is 12,5 per cent of dividends paid.

### 9.4

#### Tax assessments

The company has not been assessed since 1996. All returns of income, including June 2001, have been submitted. The 2002 return has been finalised and will be submitted shortly.

The tax authorities have allocated specific resources to ensure that the outstanding assessments are brought up to date.

**2003**

**2002**

**2001**

**R'000**

**R'000**

**R'000**

## 10. EARNINGS PER SHARE

Earnings per share are calculated by dividing the net income attributable to shareholders by the weighted number of ordinary shares in issue during year.

Net income attributable to shareholders

**26 869**

36 397

38 904

Weighted average number of ordinary shares in issue (millions)

**674,0**

670,2

595,4

Earnings per share (cents)

**4,0**

5,4

6,5

## 11. PROPERTY, PLANT AND EQUIPMENT

**Pre-**

**Mine**

**Plant**

**mining**

**Furniture**

**develop-**

**and**

**Mineral**

**Mine**

**costs**

**and**

**ment machinery**

**rights properties capitalised equipment**

**2003**

**2002**

**2001**

**R'000**

**R'000**

**R'000**

**R'000**

**R'000**

**R'000**

**R'000**

**R'000**

**R'000**

**Cost**

Opening balance

1 772 049

732 065

142 824

31 367

307 602

82 966

**3 068 873**

2 635 880

2 042 708

Additions

50 730

48 344

-

1 277

12 246

11 767

**124 364**

439 664

604 216

Disposals

481

403

-

1 828

-

-

**2 712**

6 671

11 044

Sold with ETC Mine

300 016

104 101

131

4 186

-

8 018

**416 452**

-

-

Reclassification

187 506  
 (30 040)  
 (706)  
 (421)  
 (150 980)  
 (5 359)

-  
 -  
 -

1 709 788  
 645 865  
 141 987  
 26 209  
 168 868  
 81 356

**2 774 073**

3 068 873  
 2 635 880

**Amortisation and depreciation**

Opening balance

126 891  
 43 388  
 53

5 316  
 1 904  
 7 985

**185 537**

129 288  
 119 395

Charge for year

109 342  
 57 510  
 49

1 549  
 9 719  
 8 731

**186 900**

57 389  
 19 737

Disposals

178  
 53

-  
 442  
 -

**673**

1 140  
 9 844

Sold with ETC Mine

99 557  
 35 503  
 50  
 200

-  
 6 222  
**141 532**

-  
 -  
 Reclassification

10 070  
 2 668  
 (52)  
 (14)  
 (11 623)  
 (1 049)

-  
 -  
 -  
 146 568  
 68 010

-  
 6 209

-  
 9 445  
**230 232**

185 537  
 129 288

**Net book value at 30 June 2003**

1 563 220  
 577 855  
 141 987  
 20 000  
 168 868  
 71 911

**2 543 841**  
 2 883 336  
 2 506 592

\*

*A register of land and buildings is available for inspection at the registered office.*

-

R311 million (2002: R283 million, 2001: R2 159 million), capitalised in respect of properties which have not yet commenced production, are included in mineral rights and pre-mining costs capitalised.





43

**2003**

**2002**

**2001**

**R'000**

**R'000**

**R'000**

**12. INVESTMENTS**

Unlisted mining industry investments - cost

**2 374**

1 891

767

Environmental trust fund

The balance in the environmental trust fund is as follows:

Balance at beginning of year

**45 980**

43 726

38 668

Contributions

**2 889**

2 923

954

Interest earned

**5 458**

4 822

4 104

Payments made for work completed

**(12 272)**

(5 491)

-

Sold with ETC Mine

**(18 475)**

-

-

Balance at end of year

**23 580**

45 980

43 726

Total investments

**25 954**

47 871

44 493

**12.1**

Directors' valuation of unlisted mining industry investments

**4 471**

3 926

2 690

**12.2**

The environmental trust fund is recognised separately from the related liability on the balance sheet.

**13. INVENTORIES**

At cost:

Gold in process

**25 435**

29 362

21 523

Consumable stores

**20 972**

15 399

11 724

**46 407**

44 761

33 247

#### **14. LONG-TERM LOANS**

Secured syndicated loan to fund Target completion

- Rand loans

-

250 242

150 000

Long-term loan

-

300 290

150 000

Short-term portion

-

(50 048)

-

- US dollar loan expressed in Rand

-

297 830

152 453

Long-term loan

-

357 396

152 453

Short-term portion

-

(59 566)

-

-

548 072

302 453

#### **15. LONG-TERM PROVISIONS**

Long-term provisions consist of the following:

##### **15.1**

##### **Environmental rehabilitation obligation**

Provision for decommissioning:

Gross liability at beginning of year

**30 253**

34 299

32 055

Revision in estimate



-  
(4 312)  
-  
Sold with ETC Mine  
**(8 014)**  
-  
-  
Net provision for year  
**(5 499)**  
266  
2 244  
Gross liability at end of year  
**16 740**  
30 253  
34 299  
Provision for restoration:  
Gross liability at beginning of year  
**46 162**  
36 224  
27 897  
Sold with ETC Mine  
**(24 304)**  
-  
-  
Additional obligation recognised  
-  
4 312  
-  
Payments made  
**(4 975)**  
(1 702)  
-  
Net provision for year  
**4 917**  
7 328  
8 327  
Gross liability at end of year  
**21 800**  
46 162  
36 224  
Total environmental rehabilitation obligation  
**38 540**  
76 415  
70 523





44

**2003****2002****2001****R'000****R'000****R'000**

The provisions are based on management's best estimates of the cost of all known obligations. It is, however, reasonable to expect that changes will occur in rehabilitation costs as a result of changes in regulations or cost estimates. Cost estimates are not reduced by potential proceeds from the sale of assets or from future revenue from the clean up of gold plants in view of the uncertainty in estimating those proceeds. Environmental liabilities not directly relating to rehabilitation are expensed as incurred.

**15.2****Post-retirement medical benefits**

Balance at beginning of year

**5 618**

5 618

5 618

Sold with ETC Mine

**(2 234)**

-

-

Balance at end of year

**3 384**

5 618

5 618

The company has obligations to provide specific post-retirement medical benefits to certain of its employees and pensioners.

The liability is assessed periodically by an independent actuarial survey which uses assumptions consistent with those adopted in determining pension costs and, in addition, includes long-term estimates of the increases in medical costs at appropriate discount rates.

**15.3****Retrenchment**

Balance at beginning of year

-

-

7 183

Payments made during year

-

-

**(6 422)**

Re-allocation to short-term provisions

-

-

**(761)**

Balance at end of year

-

-

-

**16. TRADE AND OTHER PAYABLES**

Trade payables

**53 934**

87 990

95 797

Accruals

**6 517**

15 915

17 126

Taxation payable

**14 207**

5 000

-

Other payables

**29 468**

44 438

21 121

**104 126**

153 343

134 044

**17. OVERDRAFTS AND SHORT-TERM BORROWINGS**

Overdrafts

**604**

1 404

-

Short-term borrowings

**134 316**

15 411

4 660

Current portion of long-term borrowings:

Foreign

-

59 566

-

Local

-

50 048

-

**134 920**

126 429

4 660

**18. PROPERTY, PLANT AND EQUIPMENT ACQUIRED**

Opening balance

**2 883 336**

2 506 592

1 923 313

Non-cash flow movements:

Depreciation

**(186 900)**

(57 389)

(19 737)

Interest accrued

-

10 017

2 453

Foreign exchange losses capitalised

-

84 002

2 711

Property, plant and equipment sold

**(2 039)**

(5 531)

(1 199)

Assets sold with ETC Mine

**(274 920)**

-

-

Closing balance

**(2 543 841)**

(2 883 336)

(2 506 592)

Property, plant and equipment acquired

**(124 364)**

(345 645)

(599 051)







45

**2003**

**2002**

**2001**

**R'000**

**R'000**

**R'000**

**19. (DECREASE)/INCREASE IN LONG-TERM LOANS**

Opening balance

**(548 072)**

(302 453)

-

Non-cash flow movements:

Foreign exchange loss capitalised

-

(84 002)

-

Foreign exchange gain

**59 891**

30 335

-

Transferred to short-term loans

**111 992**

-

-

Closing balance

-

548 072

300 000

Increase in long-term loans

**(376 189)**

191 952

300 000

**20. (DECREASE)/INCREASE IN OVERDRAFTS AND SHORT-TERM BORROWINGS**

Opening balance

**(126 428)**

(4 660)

(206 489)

Liabilities sold with ETC business

**7 150**

-

-

Transferred from long-term borrowings

**(111 992)**

-

-

Translation adjustments and foreign exchange gains

**18 693**

-

-

Closing balance

**134 919**

126 428

4 660

(Decrease)/Increase in overdrafts and short-term borrowings during year

**(77 658)**

121 768

(201 829)

## **21. COMMITMENTS AND CONTINGENT LIABILITIES**

### **21.1**

#### **Capital expenditure authorised by the directors**

Contracted for - Target

**12 666**

22 242

139 527

- Other

-

3 249

891

Not contracted for

- Target

**30 940**

-

171 791

- Other

-

16 520

20 065

**43 606**

42 011

332 274

Capital commitments will be funded from cash generated by operations.

### **21.2**

#### **Contingent liabilities**

Arising from an agreement with LTA Process Engineering where under the company is liable for the erection costs of a tailings dam, should a dump reclamation project at ETC be cancelled

-

518

1 543

## **22. RETIREMENT FUNDS**

The company participates in two retirement funds for its employees. These funds are defined contribution funds and are governed by the Pension Funds Act, 1956, as amended. Contributions paid for retirement benefits are charged to the income statement as they are incurred

**13 985**

4 793

3 167

## **23. RELATED PARTY TRANSACTIONS**

Related party transactions occurred at arm's length.

The only significant related transaction is:

Anglovaal Mining Limited - provision of services

**2 273**

2 862

1 056





**Annexure 6**

**Interim financial information of Avgold**

**UNAUDITED FINANCIAL RESULTS FOR THE QUARTER AND HALF-YEAR ENDED 31 DECEMBER 2003**

**1.**

**INCOME STATEMENTS**

**Audited**

**Unaudited**

**Unaudited**

**Year**

**Quarter ended**

**Half-year ended**

**ended**

**December**

**December September**

**December**

**December**

**June**

**2003**

**2002\***

**2003**

**2003**

**2002\***

**2003\***

**Revenue**

**202 717**

241 635

244 190

**446 907**

502 363

999 480

- gold revenue

**202 389**

241 170

243 933

**446 322**

501 708

998 217

- by-products

**328**

465

257

**585**

655

1 263

**Costs and expenses**

**193 839**

225 230

201 300

**395 139**

452 784

889 560  
 - gold operating  
**132 486**  
 176 053  
 127 360  
**259 846**  
 348 663  
 673 344  
 - amortisation  
**58 768**  
 42 918  
 68 343  
**127 111**  
 92 030  
 186 900  
 - administration and general  
**2 585**  
 6 259  
 5 597  
**8 182**  
 12 091  
 29 316  
**Operating profit**  
**8 878**  
 16 405  
 42 890  
**51 768**  
 49 579  
 109 920  
 Investment income  
**284**  
 3 469  
 572  
**856**  
 6 582  
 12 987  
 Finance cost  
**972**  
 14 991  
 2 902  
**3 874**  
 29 128  
 57 946  
 Foreign exchange gain  
 -  
 62 573  
 -  
 -  
 52 075  
 66 745  
 Unrealised non-hedge derivatives

**(59 785)**

-

(123 730)

**(183 515)**

-

(102 715)

**Income/(Loss) before exceptional item**

**(51 595)**

67 456

(83 170)

**(134 765)**

79 108

28 991

Exceptional items

-

-

4 661

**4 661**

-

7 085

**Income/(Loss) before taxation**

**(51 595)**

67 456

(78 509)

**(130 104)**

79 108

36 076

Taxation

-

-

3 750

**3 750**

-

9 207

**Net earnings/(loss) for period**

**(51 595)**

67 456

(82 259)

**(133 854)**

79 108

26 869

**Additional information:**

Net earnings for period excluding unrealised  
non-hedge derivatives

**8 190**

67 456

41 471

**49 661**

79 108

129 584

Headline earnings/(loss)



**(51 395)**

67 456

(83 170)

**(134 765)**

79 108

25 385

**Headline earnings before unrealised  
non-hedge derivatives**

**8 190**

67 456

40 560

**48 750**

79 108

128 100

Headline earnings/(loss) per share (cents)

**(8)**

10

(12)

**(20)**

12

4

**Headline earnings per share before unrealised  
non-hedge derivatives (cents)**

**1**

10

6

**7**

12

19

Earnings/(Loss) per share (cents)

**(8)**

10

(12)

**(20)**

12

4

Weighted number of shares in issue (million)

**679**

674

677

**678**

674

674

Reconciliation of earnings and headline earnings:

Net earnings/(loss) per income statement

**(51 595)**

67 456

(82 259)

**(133 854)**

79 108

26 869

Exceptional item:

Profit on sale of ETC Mine

-

-

(4 661)

**(4 661)**

-

(7 085)

Recoupments tax:

On sale of ETC Mine

-

-

3 750

**3 750**

-

5 601

**(51 595)**

67 456

(83 170)

**(134 765)**

79 108

25 385

46





2.

**BALANCE SHEETS**

Unaudited

Audited

31 December

30 June

2003

2003\*

R'000

R'000

**ASSETS**

**Non-current assets**

**2 480 241**

2 569 795

Property, plant and equipment

**2 454 841**

2 543 841

Investments

**25 400**

25 954

**Current assets**

**94 205**

84 382

Inventories

**46 280**

46 407

Trade and other receivables

**47 003**

37 214

Deposits and cash

**922**

761

**Total assets**

**2 574 446**

2 654 177

**EQUITY AND LIABILITIES**

**Capital and reserves**

Share capital

**6 801**

6 765

Share premium

**2 236 766**

2 219 900

Retained income/(Accumulated loss)

**(90 027)**

43 827

**Total shareholders' equity**

**2 153 540**

2 270 492

**Non-current liabilities**

**324 770**

144 639

Non-hedge derivatives

**286 230**

102 715

Long-term provisions

**38 540**

41 924

**Current liabilities**

**96 136**

239 046

Trade and other payables

**92 549**

104 126

Short-term borrowings

**3 587**

134 920

**Total equity and liabilities**

**2 574 446**

2 654 177

\* Comparative figures for December 2002 include ETC. The year ended 30 June 2003 figures include ETC to 15 June 2003.

47







**3.**

**CASH FLOW STATEMENTS**

**Audited**

**Unaudited**

**Year**

**Half-year ended**

**ended**

**December**

**December**

**June**

**2003**

**2002\***

**2003\***

**R'000**

**R'000**

**R'000**

**Cash generated from/(utilised by) operations**

Operating profit

**51 768**

49 579

109 920

Non-cash items and adjustments

Amortisation and depreciation

**127 111**

92 030

186 900

Provisions

**(2 908)**

(808)

(5 546)

Profit on sale of property, plant and equipment

-

-

(1 519)

**175 971**

140 801

289 755

Net withdrawal from environmental trust fund

-

-

3 925

Investment income

**938**

6 582

12 987

Finance charges

**(3 874)**

(29 128)

(57 946)

**173 035**

118 255

248 721

**Cash provided by/(reinvested in) working capital**

Inventories

**127**

(10 740)

(18 351)

Trade and other payables

**(15 327)**

(34 457)

(30 390)

Trade and other receivables

**(9 789)**

1 043

13 578

**Net cash generated from operating activities**

**148 046**

74 101

213 558

Cash utilised in investment activities

Property, plant and equipment acquired

**(50 050)**

58 584

(124 364)

Investments acquired

**(2)**

-

(483)

Property, plant and equipment sold

**16 598**

1 777

3 558

Proceeds on sale of ETC Mine

-

-

251 817

**(33 454)**

(56 807)

130 528

**Cash provided by financing activities**

Net increase in shareholders' funding

**16 902**

7 910

13 551

Leased assets

-

(691)

(1 434)

Decrease in long-term loans

-

-

(376 189)

(Decrease)/Increase in overdrafts and short-term borrowings

**(131 333)**

3 776

(76 224)

**(114 431)**

10 995

(440 296)

Increase/(Decrease) in cash balances

**161**

28 289

(96 210)

Cash and cash equivalents at beginning of period

**761**

108 810

108 810

Translation adjustment

-

(3 712)

(11 839)

Cash and cash equivalents at end of period

**922**

133 387

761

**4.**

**STATEMENTS OF SHAREHOLDERS' EQUITY**

**Retained**

**Unaudited**

**Audited**

**Ordinary**

**income/**

**Half-year ended**

**Year ended**

**share capital (Accumulated**

**December**

**December**

**June**

**and premium**

**loss)**

**2003**

**2002**

**2003**

**R'000**

**R'000**

**R'000**

**R'000**

**R'000**

**Changes in shareholders' equity**

Balance at beginning of period

2 226 665

43 827

**2 270 492**

2 230 072  
 2 230 072  
 Share options exercised  
 16 932  
 -  
**16 932**  
 7 936  
 13 584  
 Derivative instruments  
 (30)  
 -  
**(30)**  
 -  
 -  
 Expenses written-off against share premium  
 -  
 -  
 -  
 (26)  
 (33)  
 Transfer to equity reserves  
 -  
 -  
 -  
 (3 301)  
 -  
 Net earnings/(loss) for period  
 -  
 (133 854)  
**(133 854)**  
 79 108  
 26 869  
 Balance at end of period  
 2 243 567  
 (90 027)  
**2 153 540**  
 2 313 789  
 2 270 492

\* Comparative figures for December 2002 include ETC. The year ended 30 June 2003 figures include ETC to 15 June 2003.

48





**Hedging**

At 31 December 2003, Avgold's hedge book represented 72 per cent of forecast gold production to June 2006 and had a mark-to market value of a negative R394 million. This was calculated at a gold price of US\$414.82/oz and an exchange rate of US\$1.00:ZAR6, 65. This mark-to-market valuation is inclusive of a negative R286 million pertaining to the Rand/US\$ forward exchange contracts utilised to convert the Rand gold hedges into Dollar gold hedges. The fair value adjustment on these FEC's has been included in the income statement. The hedges are unmarginated and Avgold is maintaining its policy of not using derivatives instruments for speculative purposes.

Earnings are significantly distorted as a result and do not present an accurate economic picture of the company's results during the reporting period.

Subsequent changes to exchange rates will result in adjustments to the income statement thereby creating further variability in earnings.

**Borrowings**

Net borrowings reduced significantly during the quarter to R3 million (R46 million) following continuing positive cash flows from Target.

**Prospects**

We remain confident about achieving our production objective of 350 000 oz for the year to 30 June 2004 and are committed to maintain the critical path and optimise the orebody extraction. We are fully focused on achieving cost efficiencies and will minimise our cash costs. Earnings will, however, continue to be affected by future fluctuations in the Rand/US\$ exchange rate.

**Dividend policy**

The dividend policy will be reviewed pending the outcome of the Harmony offer referred to below.

**Accounting policies**

The accounting policies used are in accordance with South African Statements of Generally Accepted Accounting Practice and are consistent with those applied in the previous financial year.







50

50

**Annexure 7**

**A COMPETENT PERSON'S REPORT CONTAINING INFORMATION ON THE MINING ASSETS OF HARMONY INCLUDING AVGOLD**

**AN INDEPENDENT COMPETENT PERSON'S REPORT ON CERTAIN MINING ASSETS OF HARMONY GOLD MINING COMPANY LIMITED AND AVGOLD LIMITED**

*Prepared for:*

**HARMONY GOLD MINING COMPANY LIMITED**

**AND**

**AVGOLD LIMITED**

*Prepared by:*

**Steffen, Robertson and Kirsten**

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51

51

**Annexure 7**

**CONTENTS**

**Section**

**Description**

**Page**

1.

INTRODUCTION

59

1.1

Background

59

1.2

Requirement for the CPR

60

1.3

Structure of the CPR

60

1.4

Valuation Date and Base Technical Information

61

1.5

Verification, Validation and Reliance

61

1.5.1

Technical Reliance

62

1.5.2

Financial Reliance - the Companies

62

1.5.3

Financial Reliance - Deutsche Bank (South Africa)

62

1.5.4

Legal Reliance

63

1.6

Valuation Techniques

63

1.7

JSE Compliance

64

1.8

Warranties and Limitations

64

1.9

Disclaimers and Cautionary Statements for US Investors

65

1.10

Qualifications of Consultants

65	
1.11	
Valuation Summary	
66	
2.	
MINING ASSETS	
67	
2.1	
Introduction	
67	
2.2	
The Companies and Operating Structures	
67	
2.2.1	
Avgold	
67	
2.2.2	
Harmony	
68	
2.3	
Overview of the Mining Assets	
70	
2.3.1	
Target Operations	
70	
2.3.2	
Free Gold Operations	
71	
2.3.3	
Harmony Free State Operations	
73	
2.3.4	
Welkom Operations	
74	
2.3.5	
West Wits Operations	
75	
2.3.6	
Evander Operations	
77	
2.3.7	
Orkney Operations	
78	
2.3.8	
Kalgold Operation	
79	
2.3.9	
Harmony Australian Operations	
80	
2.3.10	
Harmony Canadian Operations	

81

2.4

Significant Exploration Properties

81

2.4.1

Avgold

81

2.4.2

Harmony

82

2.5

Mining Authorisations and Mining Leases

82

2.5.1

South African Law: Current Status

83

2.5.2

South African Law: The Minerals and Petroleum Resources Development Act

83

2.5.3

South African Law: Prospecting Permits

83

2.5.4

South African Law: Mining Authorisations

84

2.5.5

South African Law: The Royalty Bill

84

2.5.6

Australian Law

84

2.5.7

Avgold: Current Status

85

2.5.8

Harmony: Current Status

85







52

52

**Annexure 7**

**Section**

**Description**

**Page**

3.

**GEOLOGY**

94

3.1

**Introduction**

94

3.2

**South African Goldfields**

94

3.2.1

**Free State Goldfield**

94

3.2.2

**West Rand Goldfield**

95

3.2.3

**Far West Rand Goldfield**

95

3.2.4

**Evander Goldfield**

96

3.2.5

**Klerksdorp Goldfield**

96

3.3

**Deposit Geology**

96

3.3.1

**Target Operations**

97

3.3.2

**Free Gold Operations**

98

3.3.3

**Harmony Free State Operations**

100

3.3.4

**Welkom Operations**

101

3.3.5

**West Wits Operations**

101

3.3.6

**Evander Operations**

103

3.3.7	
Orkney Operations	
103	
3.3.8	
Kalgold Operations	
104	
3.3.9	
Harmony Australian Operations	
104	
3.3.10	
Harmony Canadian Operations	
105	
3.4	
Exploration Potential	
105	
4.	
MINERAL RESOURCES AND MINERAL RESERVES	
106	
4.1	
Introduction	
106	
4.2	
Review Procedures	
106	
4.3	
South African Deposits: Mineral Resource and Mineral Reserve Estimation Methodologies	
107	
4.3.1	
Quality and Quantity of Data	
107	
4.3.2	
Orebody and Block Definition	
109	
4.3.3	
Grade and Tonnage Estimation	
109	
4.3.4	
Classification	
111	
4.3.5	
Selective Mining Units	
112	
4.3.6	
Grade Control and Reconciliation	
113	
4.3.7	
Reserve Estimation	
113	
4.4	
International Deposits: Mineral Resource and Mineral Reserve Estimation Methodologies	
115	

4.4.1	Quality and Quantity of Data	115
4.4.2	Orebody Definition	116
4.4.3	Grade and Tonnage Estimation	116
4.4.4	Grade Control and Reconciliation	116
4.4.5	Reserve Estimation	116
4.5	Mineral Resource and Mineral Reserve Statements	116
4.5.1	Target Operations	118
4.5.2	Free Gold Operations	119
4.5.3	Harmony Free State Operations	120
4.5.4	Welkom Operations	121
4.5.5	West Wits Operations	122
4.5.6	Evander Operations	123
4.5.7	Orkney Operations	124
4.5.8	Kalgold Operation	125
4.5.9	Harmony Australian Operations	125
4.5.10	Harmony Canadian Operations	126
4.5.11	Avgold	127

4.5.12

Harmony

127

4.6

Mineral Resource and Mineral Reserve Potential

128





53

53

**Annexure 7**

**Section**

**Description**

**Page**

5.

MINING

128

5.1

Introduction

128

5.2

Mine Planning

128

5.3

Overview of Mining Operations

129

5.3.1

Target Operations - Target Mine

129

5.3.2

Free Gold Operations

132

5.3.3

Harmony Free State Operations

134

5.3.4

Welkom Operations

135

5.3.5

West Wits Operations

136

5.3.6

Evander Operations

137

5.3.7

Orkney Operations

138

5.3.8

Kalgold Operation

139

5.3.9

Harmony Australian Operations

140

5.4

Contribution to LoM Production

141

6.

METALLURGY

142



6.1	
Introduction	
142	
6.2	
Processing Facilities	
142	
6.2.1	
Target Operations - Target Mine	
142	
6.2.2	
Free Gold Operations	
143	
6.2.3	
Harmony Free State Operations	
144	
6.2.4	
Welkom Operations	
145	
6.2.5	
West Wits Operations	
145	
6.2.6	
Evander Operations	
146	
6.2.7	
Orkney Operations	
146	
6.2.8	
Kalgold Operations	
146	
6.2.9	
Harmony Australian Operations	
147	
6.2.10	
Harmony Canadian Operations	
147	
6.3	
Sampling, Analysis, Gold Accounting and Security	
148	
6.3.1	
Avgold	
148	
6.3.2	
Harmony	
148	
6.4	
Plant Clean-Up	
149	
7.	
TAILINGS	
153	

7.1	
Introduction	
153	
7.2	
Target Operations - Target Mine	
153	
7.3	
Free Gold Operations	
153	
7.4	
Harmony Free State Operations	
154	
7.5	
Welkom Operations	
154	
7.6	
West Wits Operations	
154	
7.7	
Evander Operations	
154	
7.8	
Orkney Operations	
154	
7.9	
Kalgold Operation	
155	
7.10	
Harmony Australian Operations	
155	
7.11	
Harmony Canadian Operations	
155	
7.12	
LoM Tailings Deposition Assessment	
155	
8.	
ENGINEERING INFRASTRUCTURE AND CAPITAL PROJECTS	
146	
8.1	
Introduction	
156	
8.2	
Engineering Infrastructure of the Mining Assets	
156	
8.3	
LoM Capital Expenditures Programmes	
157	





54

54

**Annexure 7**

**Section**

**Description**

**Page**

9.

HUMAN RESOURCES

158

9.1

Introduction

158

9.2

Legislation

158

9.3

Organisational Structures and Operational Management

159

9.4

Recruitment, Training, Productivity Initiatives and Remuneration Policies

159

9.5

Industrial Relations

160

9.6

Productivity Assumptions

160

9.7

Separation Liability

161

10.

HEALTH AND SAFETY

161

10.1

Introduction

161

10.2

Legislation

161

10.3

Statistics

162

10.4

Health and Safety Management

163

10.5

Future Considerations

163

11.

ENVIRONMENTAL

164

11.1	
Introduction	
164	
11.2	
South African Legislation and Compliance	
164	
11.2.1	
Legislation and Environment	
164	
11.2.2	
Compliance	
165	
11.3	
International Legislation and Compliance	
166	
11.3.1	
Harmony Australian Operations	
166	
11.3.2	
Harmony Canadian Operations	
166	
11.4	
Environmental Policy and Management	
166	
11.4.1	
Avgold	
166	
11.4.2	
Harmony	
167	
11.5	
Environmental Issues	
167	
11.5.1	
Target Operations	
167	
11.5.2	
Free Gold Operations	
168	
11.5.3	
Harmony Free State Operations	
169	
11.5.4	
Welkom Operations	
169	
11.5.5	
West Wits Operations	
169	
11.5.6	
Evander Operations	
170	

11.5.7	
Orkney Operations	
170	
11.5.8	
Kalgold Operation	
170	
11.5.9	
Harmony Australian Operations	
170	
11.5.10	
Harmony Canadian Operations	
171	
11.6	
Liabilities and Risks	
171	
11.7	
Environmental Liabilities	
171	
12.	
TECHNICAL-ECONOMIC INPUT PARAMETERS	
172	
12.1	
Introduction	
172	
12.2	
Basis of Valuation and Technical-Economic Parameters	
172	
12.3	
Technical-Economic Parameters	
173	
12.4	
Avgold	
178	
12.5	
Harmony	
179	
12.6	
Special Factors	
181	
12.6.1	
General Risks and Opportunities	
181	
12.6.2	
Operational Specific Risks and Opportunities	
181	







55

55

**Annexure 7**

**Section**

**Description**

**Page**

13.

MINING ASSETS VALUATION

183

13.1

Introduction

183

13.2

Basis of Valuation of the Mining Assets

183

13.3

Limitations and Reliance on Information

184

13.4

Valuation Methodology

184

13.5

Post-Tax Pre-Finance Cash Flows

186

13.6

Net Present Values and Sensitivities

200

13.6.1

Target Tax Entity

200

13.6.2

Free Gold Tax Entity

201

13.6.3

Joel Tax Entity

202

13.6.4

Harmony Free State Tax Entity

203

13.6.5

Welkom Tax Entity

204

13.6.6

Randfontein Tax Entity

205

13.6.7

Orkney Tax Entity

206

13.6.8

Evander Tax Entity

207

13.6.9

Kalgold Tax Entity

208

13.6.10 Mt. Magnet & Cue Tax Entity

209

13.6.11 South Kalgoorlie Tax Entity

210

13.7

Avgold's Tax Entities

211

13.8

Harmony's Tax Entities

212

14.

SUMMARY EQUITY VALUATION AND CONCLUDING REMARKS

213

14.1

Summary Equity Valuation

213

14.2

Hedge Books

214

14.2.1

Avgold

214

14.2.2

Harmony

215

14.3

Precedent Transactions

216

14.4

Concluding Remarks

218

GLOSSARY, ABBREVIATIONS AND UNITS

219

Appendage 1 OTHER INVESTMENTS

233

**Table No.**

**Description**

**TABLES**

Table

1.1

Base Case Macro-Economic Parameters

63

Table

1.2

JSE Compliance Cross-reference

64

Table

2.1

Avgold: Company Development

67

Table

2.2

Avgold: Salient Historical Operating Statistics

68

Table

2.3

Harmony: Company Development

69

Table

2.4

Harmony: Salient Historical Operating Statistics

70

Table

2.5

Target Operations - Target Mine: Salient Operating Statistics

71

Table

2.6

Target Operations - Target Mine: Salient Historical Operating Statistics

71

Table

2.7

Free Gold Operations: Salient Operating Statistics

72

Table

2.8

Free Gold Operations: Salient Historical Operating Statistics

72

Table

2.9

Harmony Free State Operations: Salient Operating Statistics

73

Table

2.10

Harmony Free State Operations: Salient Historical Operating Statistics

74

Table

2.11

Welkom Operations: Salient Operating Statistics

74

Table

2.12

Welkom Operations: Salient Historical Operating Statistics

75

Table

2.13

West Wits Operations: Salient Operating Statistics

76

Table

2.14

West Wits Operations: Salient Historical Operating Statistics

76

Table

2.15

Evander Operations: Salient Operating Statistics

77





56

56

**Annexure 7**

**Table No.**

**Description**

**Page**

Table

2.16

Evander Operations: Salient Historical Operating Statistics

77

Table

2.17

Orkney Operations: Salient Operating Statistics

78

Table

2.18

Orkney Operations: Salient Historical Operating Statistics

78

Table

2.19

Kalgold Operation: Salient Operating Statistics

79

Table

2.20

Kalgold Operation: Salient Historical Operating Statistics

79

Table

2.21

Harmony Australian Operations: Salient Operating Statistics

80

Table

2.22

Harmony Australian Operations: Salient Historical Operating Statistics

80

Table

2.23

Harmony Canadian Operations: Salient Historical Operating Statistics

81

Table

2.24

Avgold: Land Holdings

85

Table

2.25

Harmony: South African Operations Land Holdings

85

Table

2.26

Harmony: Australian Operations Land Holdings

86

Table



4.1	
Target Operations - Target Mine: Assumed Modifying Factors	
114	
Table	
4.2	
Free Gold Operations: Assumed Modifying Factors	
114	
Table	
4.3	
Harmony Free State Operations: Assumed Modifying Factors	
114	
Table	
4.4	
Welkom Operations: Assumed Modifying Factors	
115	
Table	
4.5	
West Wits Operations: Assumed Modifying Factors	
115	
Table	
4.6	
Evander Operations: Assumed Modifying Factors	
115	
Table	
4.7	
Orkney Operations: Assumed Modifying Factors	
115	
Table	
4.8	
Target Operations: Target Mine - Mineral Resource and Mineral Reserve Statement	
118	
Table	
4.9	
Target Operations: NFSEC - Mineral Resource and Mineral Reserve Statement	
118	
Table	
4.10	
Free Gold Operations: Mineral Resource and Mineral Reserve Statement	
119	
Table	
4.11	
Free Gold Operations: Mineral Resource, Mineral Reserve and LoM plan Sensitivity	
119	
Table	
4.12	
Harmony Free State Operations: Mineral Resource and Mineral Reserve Statement	
120	
Table	
4.13	
Harmony Free State Operations: Mineral Resource, Mineral Reserve and LoM plan Sensitivity	120
Table	

4.14	Welkom Operations: Mineral Resource and Mineral Reserve Statement
121	Table
4.15	Welkom Operations: Mineral Resource, Mineral Reserve and LoM plan Sensitivity
121	Table
4.16	West Wits Operations: Mineral Resource and Mineral Reserve Statement
122	Table
4.17	West Wits Operations: Mineral Resource, Mineral Reserve and LoM plan Sensitivity
122	Table
4.18	Evander Operations: Mineral Resource and Mineral Reserve Statement
123	Table
4.19	Evander Operations: Mineral Resource, Mineral Reserve and LoM plan Sensitivity
123	Table
4.20	Orkney Operations: Mineral Resource and Mineral Reserve Statement
124	Table
4.21	Orkney Operations: Mineral Resource, Mineral Reserve and LoM plan Sensitivity
124	Table
4.22	Kalgold Operations: Mineral Resource and Mineral Reserve Statement
125	Table
4.23	Harmony Australia Operations - Mt. Magnet & Cue: Mineral Resource and Mineral Reserve Statement
125	Table
4.24	Harmony Australian Operations - South Kalgoorlie: Mineral Resource and Mineral Reserve Statement
126	Table
4.25	Harmony Canadian Operations: Mineral Resource and Mineral Reserve Statement
126	Table
4.26	Avgold: Mineral Resource and Mineral Reserve Statement
127	

Table	
4.27	
Harmony: Mineral Resource and Mineral Reserve Statement	
127	
Table	
5.1	
Mining Assets: Production Contribution to LoM Plans	
141	
Table	
6.1	
Mining Assets: Clean-up Gold Estimates	
149	
Table	
7.1	
Mining Assets: Assessments of Tailings Storage Capacity for LoM Plans	
156	
Table	
8.1	
Mining Assets: Estimated Capital Expenditures	
158	
Table	
9.1	
Mining Assets: Historical TECs	
159	
Table	
9.2	
Mining Assets: Historical Productivity Initiatives	
160	
Table	
9.3	
Tax Entities: Separation Costs	
161	
Table	
10.1	
Mining Assets: Historical Safety Statistics	
162	
Table	
11.1	
Tax Entities: Environmental Liabilities	
172	
Table	
12.1	
Target Tax Entity: Total Assumed TEPs	
174	
Table	
12.2	
Free Gold Tax Entity: Total Assumed TEPs	
174	
Table	
12.3	
Joel Tax Entity: Total Assumed TEPs	

175

Table

12.4

Harmony Free State Tax Entity: Total Assumed TEPs

175





57

57

**Annexure 7**

**Table No.**

**Description**

**Page**

Table

12.5

Welkom Tax Entity: Total Assumed TEPs

175

Table

12.6

Randfontein Tax Entity: Total Assumed TEPs

176

Table

12.7

Evander Tax Entity: Total Assumed TEPs

176

Table

12.8

Orkney Tax Entity: Total Assumed TEPs

177

Table

12.9

Kalgold Tax Entity: Total Assumed TEPs

177

Table

12.10 Mt. Magnet & Cue Tax Entity: Total Assumed TEPs

177

Table

12.11

South Kalgoorlie Tax Entity: Total Assumed TEPs

177

Table

12.12 Avgold: Total Assumed TEPs

178

Table

12.13 Harmony: Total Assumed TEPs

179

Table

13.1

Assessed Losses and Unredeemed Capital at 31 December 2003

184

Table

13.2

Working Capital Opening Balances at 31 December 2003

185

Table

13.3

Target Tax Entity: TEM in ZAR (nominal terms)

187

Table	
13.4	
Free Gold Tax Entity: TEM in ZAR (nominal terms)	
188	
Table	
13.5	
Joel Tax Entity: TEM in ZAR (nominal terms)	
189	
Table	
13.6	
Harmony Free State Tax Entity: TEM in ZAR (nominal terms)	
190	
Table	
13.7	
Welkom Tax Entity: TEM in ZAR (nominal terms)	
191	
Table	
13.8	
Randfontein Tax Entity: TEM in ZAR (nominal terms)	
192	
Table	
13.9	
Evander Tax Entity: TEM in ZAR (nominal terms)	
193	
Table	
13.10 Orkney Tax Entity: TEM in ZAR (nominal terms)	
194	
Table	
13.11	
Kalgold Tax Entity: TEM in ZAR (nominal terms)	
195	
Table	
13.12 Mt. Magnet & Cue Tax Entity: TEM in ZAR (nominal terms)	
196	
Table	
13.13 South Kalgoorlie: TEM in ZAR (nominal terms)	
197	
Table	
13.14 Avgold: TEM in ZAR (nominal terms)	
198	
Table	
13.15 Harmony: TEM in ZAR (nominal terms)	
199	
Table	
13.16 Target Tax Entity: NPV at a Range of Discount Factors	
200	
Table	
13.17 Target Tax Entity: NPV Sensitivity - Varying Single Parameter	
200	
Table	
13.18 Target Tax Entity: NPV Sensitivity - Varying Twin Parameter at 12.0% Discount	



200
Table
13.19 Free Gold Tax Entity: NPV at a Range of Discount Factors
201
Table
13.20 Free Gold Tax Entity: NPV Sensitivity - Varying Single Parameter
201
Table
13.21 Free Gold Tax Entity: NPV Sensitivity - Varying Twin Parameter at 12.0% Discount
210
Table
13.22 Joel Tax Entity: NPV at a Range of Discount Factors
202
Table
13.23 Joel Tax Entity: NPV Sensitivity - Varying Single Parameter
202
Table
13.24 Joel Tax Entity: NPV Sensitivity - Varying Twin Parameter at 12.0% Discount
202
Table
13.25 Harmony Free State Tax Entity: NPV at a Range of Discount Factors
203
Table
13.26 Harmony Free State Tax Entity: NPV Sensitivity - Varying Single Parameter
203
Table
13.27 Harmony Free State Tax Entity: NPV Sensitivity - Varying Twin Parameter at 12.0% Discount
203
Table
13.28 Welkom Tax Entity: NPV at a Range of Discount Factors
204
Table
13.29 Welkom Tax Entity: NPV Sensitivity - Varying Single Parameter
204
Table
13.30 Welkom Tax Entity: NPV Sensitivity - Varying Twin Parameter at 12.0% Discount
204
Table
13.31 Randfontein Tax Entity: NPV at a Range of Discount Factors
205
Table
13.32 Randfontein Tax Entity: NPV Sensitivity - Varying Single Parameter
205
Table
13.33 Randfontein Tax Entity: NPV Sensitivity - Varying Twin Parameter at 12.0% Discount
205
Table
13.34 Orkney Tax Entity: NPV at a Range of Discount Factors
206
Table
13.35 Orkney Tax Entity: NPV Sensitivity - Varying Single Parameter

206

Table

13.36 Orkney Tax Entity: NPV Sensitivity - Varying Twin Parameter at 12.0% Discount

206

Table

13.37 Evander Tax Entity: NPV at a Range of Discount Factors

207

Table

13.38 Evander Tax Entity: NPV Sensitivity - Varying Single Parameter

207

Table

13.39 Evander Tax Entity: NPV Sensitivity - Varying Twin Parameter at 12.0% Discount

207

Table

13.40 Kalgold Tax Entity: NPV at a Range of Discount Factors

208

Table

13.41 Kalgold Tax Entity: NPV Sensitivity - Varying Single Parameter

208

Table

13.42 Kalgold Tax Entity: NPV Sensitivity - Varying Twin Parameter at 12.0% Discount

208

Table

13.43 Mt. Magnet & Cue Tax Entity: NPV at a Range of Discount Factors

209

Table

13.44 Mt. Magnet & Cue Tax Entity: NPV Sensitivity - Varying Single Parameter

209





58	
58	
<b>Annexure 7</b>	
<b>Table No.</b>	<b>Description</b>
<b>Page</b>	
Table	
13.45	Mt. Magnet & Cue Tax Entity: NPV Sensitivity - Varying Twin Parameter at 12.0% Discount
209	
Table	
13.46	South Kalgoorlie Tax Entity: NPV at a Range of Discount Factors
210	
Table	
13.47	South Kalgoorlie Tax Entity: NPV Sensitivity - Varying Single Parameter
210	
Table	
13.48	South Kalgoorlie Tax Entity: NPV Sensitivity - Varying Twin Parameter at 12.0% Discount
210	
Table	
13.49	Summations of Avgold Tax Entities: NPV at a Range of Discount Factors
211	
Table	
13.50	Summations of Avgold Tax Entities: NPV Sensitivity - Varying Single Parameter
211	
Table	
13.51	Summations of Avgold Tax Entities: NPV Sensitivity - Varying Twin Parameter at 12.0% Discount
211	
Table	
13.52	Summations of Harmony Tax Entities: NPV at a Range of Discount Factors
212	
Table	
13.53	Summations of Harmony Tax Entities: NPV Sensitivity - Varying Single Parameter
212	
Table	
13.54	Summations of Harmony Tax Entities: NPV Sensitivity - Varying Twin Parameter at 12.0% Discount
212	
Table	
14.1	
	Avgold: Summary Equity Valuation
213	
Table	
14.2	
	Harmony: Summary Equity Valuation
214	
Table	
14.3	
	Avgold: Net Hedge Book
215	
Table	

14.4

Harmony: Net Hedge Book

215

Table

14.5

Recent Gold Transactions in Africa

216

**Figure No.**

**Description**

**FIGURES**

Figure

2.1

Mining Assets: General Location Map

87

Figure

2.2

Avgold: Location Map and Lease Area for Target Operations

88

Figure

2.3

Harmony: Location Map and Lease Area Harmony Free Gold Operations, Free State Operations and Welkom Operations

89

Figure

2.4

Harmony: Location Map and Lease Area for Evander Operations

90

Figure

2.5

Harmony: Location Map and Lease Area for Orkney Operations

91

Figure

2.6

Harmony: Location Map and Lease Area for West Wits Operations, Elandsrand and Deelkraal

92

Figure

2.7

Harmony: Location Map and Lease Area for West Wits Operations, Randfontein Estates

93

Figure

6.1

Avgold/Harmony: Schematic Flow Diagram of a Typical Carbon in Pulp Plant

150

Figure

6.2

Avgold/Harmony: Schematic Flow Diagram of a Typical Carbon in Leach Plant

151

Figure

6.3

Avgold/Harmony: Schematic Flow Diagram of a Typical Filtration and Zinc Precipitation Plant

152

Figure

12.1

Avgold: Projected LoM Recovered Gold

178

Figure

12.2

Avgold: Projected LoM Tonnes Milled

179

Figure

12.3

Harmony: Projected LoM Recovered Gold

180

Figure

12.4

Harmony: Projected LoM Tonnes Milled

180







59

59

## **Annexure 7**

### **AN INDEPENDENT COMPETENT PERSON'S REPORT ON CERTAIN MINING ASSETS OF AVGOLD LIMITED AND HARMONY GOLD MINING COMPANY LIMITED**

#### **1.**

#### **INTRODUCTION**

##### **1.1**

##### **Background**

Steffen, Robertson and Kirsten (South Africa) (Pty) Limited ("SRK") is a subsidiary of the international Group holding company, SRK Global Limited (the "SRK Group"). SRK has been commissioned by the Directors of Avgold Limited ("Avgold") and Harmony Gold Mining Company Limited ("Harmony") to prepare an independent competent person's report ("CPR") on certain mining assets (the "Mining Assets") of Avgold and Harmony (the "Companies"). The Mining Assets of Avgold include:

.  
a 100% interest in the Target Gold Mine ("Target Mine") located in the Free State Province, South Africa; and

.  
a 100% interest in Target North, Oribi and Sun South deposits to the north of the existing Target Mine.

The Mining Assets of Harmony include:

.  
a 100% interest in Free Gold Joint Venture Company (Proprietary) Limited ("Free Gold");

.  
a 100% interest in Joel Mine situated in the Free State Goldfield, South Africa, hereinafter defined as ("Joel"). Ownership of this assets is held at the Harmony level;

.  
a 100% interest in Randfontein Estates Limited ("Randfontein");

.  
a 100% interest in Evander Gold Mining Company Limited ("Evander");

.  
a 100% interest in Kalahari Goldridge Mining Company Limited ("Kalgold"). Harmony is in the process of disposing of its entire interest in Kalgold to Afrikander Lease Limited ("Afllease"). The sale will be effective after all the legal conditions of the transaction have been met, which is anticipated by the end of February 2004. Conditional to the sale is that Harmony retains its interests in the company's Kalplats platinum discovery and associated mineral rights;

.  
a 100% interest in Harmony Gold (Australia) Proprietary Limited ("Harmony Australia");

.  
a 100% interest in Harmony Gold (Canada) Inc ("Harmony Canada");

.  
a 100% interest in various mining operations situated in the Free State Goldfield, South Africa, hereinafter defined as ("Harmony Free State"). Ownership of these assets is held at the Harmony level;

.  
a 100% interest in various significant exploration properties, notably the Rolspruit gold project ("Rolspruit"), the Poplar gold project ("Poplar") and the Kalplats PGM project ("Kalplats");

.  
a 100% interest in the mining operations situated in Orkney, South Africa, previously owned and operated by African Rainbow Minerals Gold Limited ("ARMgold") herein defined as ("Harmony Orkney"). Ownership of these assets is currently held at Harmony level; and

.  
a 100% interest in the mining operations situated in Welkom, South Africa, previously owned and operated by ARMgold herein defined as ("Harmony Welkom"). Ownership of these assets is currently held at Harmony level.

In addition, Harmony holds interests in wholly-owned, joint venture and associate companies via direct and indirect subsidiaries. These interests comprise dormant companies, exploration companies, investment holding companies, management service companies, marketing companies, beneficiation companies, mineral rights holding companies and property holding companies.

All assets incorporating operating mines and exploration properties, for which Harmony holds less than 100% and/or does not have legal rights to disclose information, other than that already reported in the public domain, have therefore been excluded from the collective term Mining Assets and do not form part of this CPR. Specifically, Harmony's material interests that are not reported upon in this CPR, include:

- .
- a 33.9% interest in Anglovaal Mining Limited ("Avmin") which was recently acquired through an ARMgold/Harmony joint venture. The principal assets in Avmin include:
  - 
  - 50.3% of Assmang Limited which operates various manganese ore, iron ore and chrome ore operations located in the Republic of South Africa ("South Africa");
  - 
  - 55.0% of Two Rivers Platinum (Proprietary) Limited ("Two Rivers") which is currently developing a platinum mining operation located in Mpumalanga Province, South Africa;
  - 100% of the Nkomati nickel mine ("Nkomati") located in Mpumalanga Province, South Africa;





60

60

## **Annexure 7**

Harmony's 87% interest in Abelle Limited ("Abelle") a company listed on the Australian Stock Exchange Limited ("ASX"), which operates a gold mining operation in Australia and has various interests in exploration properties in Australia and Papua New Guinea; and

Harmony's 31.8% interest in Bendigo Mining NL ("Bendigo") a company listed on the ASX which owns a single gold development project in Australia.

Appendage 1 to this report includes brief technical summaries of these assets, which have been reproduced from information lawfully contained in the public domain. SRK has not had access to either the underlying information or supporting data, therefore no opinion has been provided herein.

### **1.2**

#### **Requirement for the CPR**

SRK has been informed that Avgold and Harmony have reached an agreement, in terms of a merger agreement (the "Merger"). It is intended that the Merger will be implemented by means of a Scheme of Arrangement (the "Scheme") to be proposed by Avgold, between Harmony and its shareholders.

This CPR principally comprises a technical-economic appraisal of the Mining Assets and has been prepared in compliance with the Listings Requirements of the JSE Securities Exchange, South Africa (the "JSE"), specifically Sections 12.3, 12.8, 12.9 and 12.14.

A copy of this CPR will be included in the Scheme document and circular to be dispatched to the Companies' shareholders. In this CPR, SRK provides assurances to the directors of the Companies that the technical- economic projections ("TEPs"), including production profiles, operating expenditures and capital expenditures, of the Mining Assets as provided to SRK by the Companies and reviewed by SRK are reasonable, given the information currently available.

### **1.3**

#### **Structure of the CPR**

For reporting purposes SRK note that the valuations of the Mining Assets have been grouped in accordance with the following Tax Entities, herein referred to as ("the Tax Entities") and that all entries (including text, tables and other data) are quoted assuming 100% ownership and not on an attributable basis according to the respective shareholdings:

the tax entity within which Target Mine is assessed ("Target Tax Entity");

the tax entity within which Free Gold is assessed ("Free Gold Tax Entity");

the tax entity within which Joel is assessed ("Joel Tax Entity");

the tax entity within which Harmony Free State is assessed ("Harmony Free State Tax Entity");

the tax entity within which Harmony Welkom is assessed ("Harmony Welkom Tax Entity");

the tax entity within which Randfontein Estates Limited is assessed ("Randfontein Tax Entity");

the tax entity within which Evander Gold Mines Limited is assessed ("Evander Tax Entity");

the tax entity within which Harmony Orkney is assessed ("Harmony Orkney Tax Entity");

the tax entity within which Kalahari Goldridge Mining Company Limited is assessed ("Kalgold Tax Entity"); and

Harmony Australia comprising:

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- the tax entity within which Mt. Magnet & Cue is assessed ("Mt. Magnet & Cue Tax Entity"); and
- the tax entity within which South Kalgoorlie is assessed ("South Kalgoorlie Tax Entity").

Technical descriptions of the Mining Assets have been grouped into operations that broadly reflect the management structures and/or common geographical location. The Mining Assets are grouped into the following operations:

.  
Target Operations: Includes Target Mine, Target North and Extensions and Oribi;

.  
Free Gold Operations;

.  
Harmony Free State Operations;

.  
Welkom Operations;

.  
West Wits Operations includes Randfontein, Elandsrand and Deelkraal;

.  
Evander Operations;

.  
Orkney Operations;

.  
Kalgold Operation; and

.  
International Operations, sub-divided into Harmony Australian Operations and Harmony Canadian Operations.







61

61

#### **Annexure 7**

In accordance with the Listings Requirements of the JSE and the SAMREC Code, this CPR has been prepared under the direction of the Competent Person (the "CP") which assumes overall professional responsibility for the document (Section 1.4). The CPR, however is published by SRK, the commissioned entity, and accordingly SRK assumes responsibility for the views expressed herein. On this basis, all references to SRK mean the CP and *vice versa*.

#### **1.4**

##### **Valuation Date and Base Technical Information**

The Mining Assets have been valued based on cash flow projections commencing 1 January 2004 which is dependent upon the following:

.  
technical information as generated by the Companies in accordance with their annual planning process defined as the Base Information Date ("BID"): 1 July 2003; and

.  
adjustments to all technical information to reflect depletion and historical performance from the respective BIDs to 31 December 2003.

The LoM plans and associated Mineral Reserve statements for the Mining Assets have been derived as follows:

**Avgold:** The LoM plans and associated Mineral Reserve statements for Target Mine have been derived using a gold price of ZAR107,000/kg. No sensitivity is currently available to assess the impact on the Mineral Reserves at current (approximately ZAR80,000/kg in December 2003) gold price; which represents a 25% reduction. This aspect is discussed further in Section 4 of this CPR; and

**Harmony:** The LoM plans and associated Mineral Reserve statements for the Mining Assets have been derived using a gold price of ZAR93,000/kg for the Mining Assets located in South Africa and AUS\$522/oz for the Mining Assets located in Australia.

The post-tax pre-finance cash flows from each Tax Entity have been developed on the basis of a US\$ gold price increasing in constant money terms from US\$366/oz in 2004 to US\$382/oz in 2005 and macro-economic factors as defined in Table 1.1.

#### **1.5**

##### **Verification, Validation and Reliance**

The valuation as reported herein is dependent upon technical, financial and legal aspects. The technical information as provided to and taken in good faith by SRK has not been independently verified by means of recalculation. SRK has however conducted:

.  
inspection visits to surface and underground operations, processing facilities, surface structures and associated infrastructure at each of the Mining Assets during November 2003 for the Avgold Assets and between May and June 2003 for the Harmony Assets;

.  
discussion and enquiry following access to key personnel based at the individual Business Units ("BUs") and head office;

.  
a review and, where considered appropriate by SRK, modification of the Companies' estimates and their classification of Mineral Resources and Mineral Reserves;

.  
a review of the Companies' plans and supporting documentation and, where considered appropriate by SRK, modification of the Companies' LoM plans and the associated TEPs, including assumptions regarding future operating costs, capital expenditures and gold production of the Mining Assets;

.  
an examination of historical information and results made available by the Companies in respect of the Mining Assets the forecasts contained in the LoM plans and one-year budgets; and

an update undertaken in January 2004 to reflect the latest opinion of the Financial Advisors on the macro- economic parameters including commodity prices, exchange rates and inflation factors as presented in Table 1.1. In addition SRK has considered any material departures from the projections provided to and reviewed by SRK during the inspection visits to the Harmony Assets completed during May and June 2003. In addition SRK has accounted for depletion that has taken place during the six-month period that has elapsed between June 2003 and December 2003. SRK's approach in undertaking a review of the Mineral Resource and Mineral Reserve estimations and classifications is detailed in Section 4 of this CPR. In summary, SRK has reported Mineral Resource and Mineral Reserve statements based on a review of the LoM plans and the methodologies applied for estimation and classification of both Mineral Resources and Mineral Reserves.

SRK consider that with respect to all material technical-economic matters it has undertaken all necessary investigations to ensure SAMREC compliance, both in terms of level of investigation and level of disclosure. In doing so SRK has not reproduced the information provided to it by the Companies without due consideration or appropriate modification. Notwithstanding this comment, SRK has not recalculated the base





62

62

### **Annexure 7**

information supporting the Mineral Resource estimates as derived from bore-hole and assay data, this given the generally extensive history of the Mining Assets and geological investigations undertaken by the Companies, however has undertaken sufficient checks through the course of its investigations to enable an appropriate level of reliance to be placed on such data, as provided.

Where fundamental base data has been provided (LoM plans, capital expenditures, operating budgets etc) for the purposes of review, SRK recognise the requirements of 12.3(e) and accordingly state that SRK has performed all necessary validation and verification procedures deemed appropriate in order to to place an appropriate level of reliance on such information.

#### **1.5.1**

##### ***Technical Reliance***

SRK places reliance on the Companies CPs that all technical information provided to SRK at the time of writing is both valid and accurate for the purpose of compiling this CPR.

The information with respect to Mineral Resources and Mineral Reserves as defined by the Companies has been prepared under the direction of the following individuals:

.

*Avgold:* Dr F Camisani-Calzolari, PrSciNat (SACNASP), FSAIMM, MAuIMM, FGSSA, CRIRSCO (Combined Reserve International Report Standards Committee of CMMI). Dr Camisani-Calzolari has over 30 years' experience in the mining industry and was responsible for Mineral Resource and Mineral Reserve reporting at Avmin for a number of years until recently, and is currently retained as a consultant to Avmin on a part-time basis; and

.

*Harmony:* Mr Graham Briggs, Pr. Sci. Nat, BSc (Hons) Geology. Mr Briggs is responsible for ore reserve management, organic growth and capital projects on the executive committee of Harmony. He has 29 years' experience in the gold mining industry and is a registered geological scientist.

#### **1.5.2**

##### ***Financial Reliance - the Companies***

In consideration of all financial aspects relating to the valuation of the Mining Assets and the Summary equity valuation of the Companies, SRK has placed reliance of the Financial Officers of the Companies that the following information for the Tax Entities and the Companies is accurate at 1 January 2004:

.

unredeemed capital balances;

.

assessed losses;

.

opening balances for debtors, creditors and stores;

.

working capital and taxation logic;

.

values ascribed to interests in unlisted and listed entities; and

.

balance sheet items, specifically cash on hand, debt and mark-to-market value of derivative instruments (currency and commodity hedges).

The information with respect to the above financial data as defined by the Companies has been prepared under the direction of the following individuals:

.

*Avgold:* Mr Michael Arnold, BSc Eng (Mining Geology), CA(SA). Mr Arnold is the Chief Financial Officer for Avgold; and

.

*Harmony:* Mr Frank Abbot, BCom, CA(SA). MBL is the chief financial officer for Harmony and has 22 years' experience in financial management, 22 years of which has been within the mining industry.

**1.5.3**

***Financial Reliance - Deutsche Bank (South Africa)***

In generating the valuation of the Mining Assets, SRK has relied upon the commodity price and macro- economic forecasts as included in Table 1.1 below, which have been generated by Deutsche Bank South Africa. In respect of compliance with 12.3(e) of the Listings Requirements of the JSE, SRK has secured the JSE's dispensation from providing details of the individuals responsible for the generation of the information as presented in Table 1.1.







63

63

**Annexure 7****Table 1.1 Base Case Macro-Economic Parameters****Parameter****Units****2004****2005****2006****2007****2008**

Gold Price - Nominal

(US\$/oz)

366

386

390

394

398

(ZAR/kg)

91,659

111,797

125,823

134,929

143,309

(AUS\$/oz)

487

499

499

492

485

RSA CPI

(%)

2.55%

4.10%

4.77%

4.50%

4.50%

AUS CPI

(%)

2.40%

2.40%

2.40%

2.40%

2.40%

US CPI

(%)

1.38%

1.03%

1.00%

1.00%

1.00%

Nominal Exchange Rate

(US\$:ZAR)

7.80

9.01

10.04

10.66

11.21

(US\$:AUS\$)

1.33

1.32

1.34

1.34

1.34

(AUS\$:ZAR)

5.85

5.95

6.08

6.21

6.34

Table 1.1 summaries the base-case macro-economic projections as generated by Deutsche Bank (South Africa), Financial Advisors to Avgold. Taking cognisance of the volatile nature of both the gold price (US\$/ozt) and the exchange rate between the US\$ and both the ZAR and AU\$, SRK has run sensitivities on revenue ranging between -30% and +30% to these macro-economic projections as discussed in the risks and opportunities in Section 12 of this CPR.

**1.5.4**

***Legal Reliance***

In consideration of all legal aspects relating to the valuation of the Mining Assets SRK has placed reliance on the following representatives of the Companies that the following legal aspects are correct at 1 January 2004:

.  
in respect of 12.8(e) and 12.10(g) that "a statement by the Directors of any legal proceedings that may have an influence on the rights to explore for minerals, or an appropriate negative statement" has been included in the body of the various circulars relating to the Transactions;

.  
in respect of 12.10(e) that the legal ownership and of all mineral and surface rights has been verified;

.  
in respect of 12.14(a)(xii) that no significant legal issue exists which would effect the "likely viability of a project and/or on the estimation and classification of the Mineral Reserves and Mineral Resources" as reported herein; and

.  
The information with respect to the above legal data as defined by the Companies has been prepared under the direction of the following individuals:

.  
*Avgold:* Mr Pieter Coetzee, BProc. Mr Coetzee is the general manager legal services for Avmin and has 20 years' experience in the mining industry,

.  
*Harmony:* Mr Mike Wasserfall B.Com (Hons) LL.M is legal advisor to Harmony and has 20 years experience, all of which is in the mining industry. Mr Wasserfall is assisted by Mr George Edward Warren de Wit who is the Group Surveyor for Harmony.

**1.6**

**Valuation Techniques**

The summary equity valuation for the Companies is based on a sum-of-the-parts approach comprising net asset values ("NAV") for the Mining Assets and supplemental information as provided by the Companies (Balance sheet items and

interests in listed and unlisted companies).

The NAVs for the Mining Assets have been derived using discounted cash flow ("DCF") techniques applied on a post-tax pre-finance basis for the individual Tax Entities. These are based on the various LoM plans and where appropriate are sub-divided into valuations based on Mineral Reserves alone and Mineral Reserves and Mineral Resources where such LoM plans have been generated accordingly.

In respect of non-LoM Mineral Resources, these have not been valued separately and commentary is limited to technical disclosure requirements in accordance with the Listings Requirements of the JSE.

The post-tax pre-finance cash flows from each Tax Entity have been developed on the basis of the commodity price and macro-economic projections as presented in Table 1.1. For each Tax Entity SRK has developed Financial Models ("FM"), the results of which are presented in Section 13 and Section 14 of this CPR. The FMs are based on annual cash flow projections ending 30 June and technical-economic input parameters ("TEP") stated in 1 January 2004 money terms. As the valuation date is 1 January 2004, the cash flow projections for the first period present a six-month forecast to 30 June 2004.





64

64

**Annexure 7**

**1.7**

**JSE Compliance**

This CPR principally comprises a technical-economic appraisal of the Mining Assets and has been prepared in compliance with the Listings Requirements of the JSE, specifically Sections 12.3, 12.8, 12.9 and 12.14. In addition to the Mining Assets, technical information on a number of exploration properties has also been included.

In compliance with 12.6, Table 1.2 presents a cross-reference between the Listings Requirements of the JSE and the primary sections as included in this CPR.

**Table 1.2 JSE Compliance cross-reference**

**CPR Section**

**Listings Requirements**

1	12.3(a), 12.3(b), 12.3(c), 12.3(e); 12.6, 12.8(a), 12.9(a), 12.9(b), 12.9(c), 12.9(d), 12.9(e), 12.9(f); 12.11(a), 12.11(b) 12.14(a) - (viii), (xi), (xii), (xvi), (xvii), (xviii); 12.14(b) - (iv), (xvii)
2	12.10(d), 12.10(g), 12.10 (h) - (i), (ii), (iii); 12.10(i), 12.10(j) 12.11(a), 12.11(b) 12.14(a) - (ix), (x), (xii), (xvii)
3	12.10(a) - (xi); 12.10(b) - (i); 12.10(d)
4	12.10(a) - (i), (ii), (iii), (iv), (v), (vi), (vii), (viii), (ix), (x), (xii), (xiii), (xv), (xvi), 12.10(b) - (ii), (iii), (iv); 12.10(b) - (vi) - (1), (2), (3), (4), (5), (6), (7), (8), (9); 12.10(d); 12.10(f) - (i), (ii); 12.14(a) - (ii), (iii), (iv), (xii), (xiv), (xv); 12.14(b) - (ii)
5	12.10(b) - (v); 12.10(d); 12.14(a) - (iv), (x), (xii)
6	12.10(b) - (v); 12.14(a) - (v), (vi), (vii), (x), (xii); 12.14(b) - (iii)
7	12.14(a) - (xii)
8	12.14(a) - (viii); 12.14(b)(vi)
9	12.14(a) - (xii)
10	12.14(a) - (xii)
11	12.10(c), 12.14(a) - (i), (viii), (xii)
12	12.14(a) - (viii); 12.14(b) - (v), (vi)
13	12.10(b) - (v); 12(b) - (i), (iii), (iv), (vi), (viii), (ix), (xi), (xiv), (xv), (xvi), (xvii)
14	12.14(a) - (ii), (xiii), (xviii), (xix); 12.14(b) - (vi), (x), (xii), (xiii), (xvi), (xviii)
Glossary	
12.10(k)	

In respect of specific compliance items SRK note the following:

12.10(e) - (i), (ii): A detailed list of the Companies mineral and surface rights will be made available at the corporate offices of each of the respective companies. Dispensation has been granted in this regard from inclusion in the CPR for practical purposes of volume;

.  
12.8(e); 12.10(g): A detailed statement of all legal proceedings which may have an influence on the rights to explore for minerals or an appropriate negative statement has been included in the body of the circulars;  
.

12.14(a)(xvi): The Companies are in effect mature operating companies with a track record of operating history and accordingly, other than brief summaries of Directors (as included in the body of the Circular), details relating to qualifications of key technical and managerial staff have been excluded from this CPR. Dispensation has been granted in this regard from inclusion into this CPR for practical purposes relating to volume of information; and  
.

12.10(x)(i), 12.10(d): SRK has, during the course of its investigations, reviewed technical plans in order to support its opinions on the geology, Mineral Resource and Mineral Reserves, mining plans and processing facilities, these together with land holdings, lease areas and surface infrastructure. Due to pure volume and scale of these plans it is not appropriate to include copies into this CPR for the 75 business units operated by Avgold and Harmony. Dispensation has been granted in this regard from inclusion into this CPR; however these plans are available for inspection at various company operating offices where they remain due to the fact that many are working plans required for the continual management of the respective business units.

## **1.8**

### **Warranties and Limitations**

SRK's opinion is effective 1 January 2004 and is based on information provided by the Companies throughout the course of SRK's investigations, which in turn reflect various technical-economic conditions prevailing at the time of writing. These conditions can change significantly over relatively short periods of time and as such the information and opinions contained in this report may be subject to change.







65

65

**Annexure 7**

In this CPR, SRK provides assurances to the Directors of the Companies that the technical-economic projections ("TEPs"), including production profiles, operating expenditures and capital expenditures, of the Mining Assets as provided to SRK by the Companies and reviewed by SRK are reasonable, given the information currently available. The achievability of LoM plans, budgets and forecasts are neither warranted nor guaranteed by SRK. The forecasts as presented and discussed herein have been proposed by the Companies' management and cannot be assured; they are necessarily based on economic assumptions, many of which are beyond the control of the Companies. Future cash flows and profits derived from such forecasts are inherently uncertain and actual results may be significantly more or less favourable.

This report includes technical information, which requires subsequent calculations to derive subtotals, totals and weighted averages. Such calculations may involve a degree of rounding and consequently introduce an error. Where such errors occur, SRK does not consider them to be material.

**1.9****Disclaimers and Cautionary Statements for US Investors**

In considering the following statements SRK notes that the term "Mineral Reserve" for all practical purposes is synonymous with the term "ore reserve".

The United States Securities and Exchange Commission (the "SEC") permits mining companies, in their filings with the SEC, to disclose only those mineral deposits that a company can economically and legally extract or produce from. Certain terms are used in this report, such as "resources", that the SEC guidelines strictly prohibit companies from including in filings.

Mineral Reserve estimates are based on many factors, including, in this case, data with respect to drilling and sampling. Mineral Reserves are determined from estimates of future technical factors, future production costs, future capital expenditure, future product prices and the exchange rate between the South African Rand ("ZAR") and the United States Dollar ("US\$"). The Mineral Reserve estimates contained in this report should not be interpreted as assurances of the economic life of the Mining Assets or the future profitability of operations. Because Mineral Reserves are only estimates based on the factors and assumptions described herein, future Mineral Reserve estimates may need to be revised. For example, if production costs increase or product prices decrease, a portion of the Mineral Resources, from which the Mineral Reserves are derived, may become uneconomical to recover and would therefore result in lower estimated Mineral Reserves.

The LoM plans and the TEPs include forward-looking statements that are required in compliance with the JSE Listings Requirements. These forward-looking statements are necessarily estimates and involve a number of risks and uncertainties that could cause actual results to differ materially.

**1.10 Qualifications of Consultants**

The SRK Group comprises 500 staff, offering expertise in a wide range of resource engineering disciplines. The SRK Group's independence is ensured by the fact that it holds no equity in any project. This permits the SRK Group to provide its clients with conflict-free and objective recommendations on crucial judgment issues. The SRK Group has a demonstrated track record in undertaking independent assessments of resources and reserves, project evaluations and audits, CPRs and independent feasibility evaluations to bankable standards on behalf of exploration and mining companies and financial institutions worldwide. The SRK Group has also worked with a large number of major international mining companies and their projects, providing mining industry consultancy service inputs. SRK also has specific experience in commissions of this nature.

This CPR has been prepared based on a technical and economic review by a team of 30 consultants sourced from the SRK Group's offices in South Africa, the United Kingdom and Australia over a two-month period. These consultants are specialists in the fields of geology, resource and reserve estimation and classification, underground and open pit mining, rock engineering, metallurgical processing, hydrogeology and hydrology, tailings management, infrastructure, environmental management and mineral economics.

Neither SRK nor any of its employees and associates employed in the preparation of this report has any significant beneficial interest in the Companies or in the assets of the Companies. SRK will be paid a fee for this work in accordance with normal professional consulting practice.

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The individuals who have provided input to this CPR, who are listed below, have extensive experience in the mining industry and are members in good standing of appropriate professional institutions:

.  
Andrew Pooley, Pr. Eng, MSAIMM, AMIMM, B.Eng (Mining);

.  
Andrew Smithen, Pr. Eng., MBL, MSAICE, MSAIAE, MSAIMM, MSc;

.  
Andrew Vigar, FAusIMM, BSc (Applied Geology);

.  
Awie Swart, MSAIMM, MSANIRE, COM Adv. Rock Eng. Cert. B.Eng.;

.  
Boet van der Vyfer, FMVS, Adv. Cert. Mine Env. Control;





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**Annexure 7**

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Dawood Wepener, BSc Eng., MSAIME, Govt. Cert of Comp.;

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Iestyn Humphreys, AM.I.Min.E, AIME, PhD;

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Louie Human, COM Adv. Rock Eng. Cert., NHD (Geology);

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Mark Campadonic, FGS, AIQ, Msc;

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Michael Armitage, C. Eng., C. Geol., MIMM, PhD;

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Richard Clayton, C.Geol, FGS, Msc;

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Robert Wilson, Pr. Eng, FSAIMM, B.Sc.Eng.(Mech.);

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Roger Dixon, Pr. Eng, FSAIMM, BSc (Mining);

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Victor Hills, Pr.Eng., MSAIMM, B.Eng.;

.

Wally Waldeck, Pr. Eng (reg. ECSA), MSAIMM, BSc (Mining), MBA; and

.

William Schoeman, Pr. Eng, MSAIME, BSc.Eng (Mech).

In compliance with Section 12.3 of the JSE Listings Requirements, the following CPs are presented:

.  
the Competent Person with overall responsibility for the compilation of this CPR is Mr H G Waldeck, Pr. Eng registered with the Engineering Council of South Africa ("ECSA") who is an employee of SRK. Mr Waldeck is a mining engineer with 28 years' experience in the mining industry and has supervised numerous due-diligence reviews and various technical studies on the Witwatersrand Basin during the past five years. In compliance with the SAMREC requirements, Mr. Waldeck also assumes responsibility for the reporting of Mineral Reserves as included in this CPR; and

.  
in compliance with the SAMREC requirements and definitions, the Competent Person with overall responsibility for Mineral Resources is Dr Michael Harley, Pr. Sci Nat., MSAIMM, MAusIMM, PhD who is an employee of SRK. Dr Michael Harley is a mining geologist with 14 years' experience in the mining industry and has been responsible for the reporting of Mineral Resources on various properties in South Africa and internationally during the past five years.

### **1.11 Valuation Summary**

The summary equity valuation for the Companies is presented in Section 14 of this CPR, specifically Table 14.1 for Avgold, Table 14.2 for Harmony. In respect of the Kalgold Tax Entity, a DCF valuation is included; however reference is made to the circular which details the terms and associated proceeds relating to the disposal of Kalgold by Harmony.

In addition SRK has been informed by Harmony that it has recently disposed of its interests in the following companies:

.  
Harmony's 31.7% interest in Highland Gold Mining Limited ("Highland Gold"). In October 2003, Harmony disposed of its 31.7% shareholding in Highland Gold in a placing arranged by City Capital Corporation Limited in London; and

.  
Harmony's 17.0% interest in High River Gold Mines Limited ("High River"). In October 2003 Harmony disposed of its 17% shareholding in High River in a placing arranged by BMO Nesbitt Burns in Canada.

No summary equity valuation has been included and any proceeds have been incorporated into the net cash position of Harmony at 31 December 2003.







67

67

**Annexure 7**

**2.**

**MINING ASSETS**

**2.1**

**Introduction**

This section gives a brief overview of the Companies and their respective Mining Assets including, location and historical company development, property description, mining methods and operating results. Specifically where reference is made to legal compliance within the regulatory environment in which the Companies operate, SRK has placed reliance on the Companies and their respective legal advisers.

**2.2**

**The Companies and Operating Structures**

**2.2.1**

***Avgold***

Avgold is a South African-based mining, development and exploration company, publicly listed on the JSE (primary listing), with International Depositary Receipts ("IDR") traded on the Brussels Bourse. Table 2.1 gives the recent historical company development of Avgold to date. By measure of annual gold production attributable to the company, Avgold is ranked 22nd in terms of the world's gold mining companies. Avgold states its core business as that directly associated with a gold mining and gold exploration whose activities include operating the recently commissioned Target Mine (May 2002) and the continued exploration in an area known as Target North.

Avgold's executive office is located at 56 Main Street, Johannesburg 2001, Gauteng Province South Africa. In addition Avgold has an operations office located at Target Mine situated between the towns of Bothaville and Welkom.

**Table 2.1 Avgold: Company Development**

**Date**

**Activity**

Late 1980s

Surface exploration intersected payable reef horizons in the Target area.

November, 1990

Target Exploration Company Limited ("Target Exploration") incorporated.

February, 1991

Target Exploration listed on the JSE.

January, 1993

23 surface boreholes completed at the Target area.

April, 1995

Commenced an underground exploration decline at Target from the Lorraine u/g workings.

July, 1996

106,000m of u/g exploration drilling completed and scope of Target Project increased to a 105ktpm mine.

November, 1996

Target Exploration changed its name to Avgold Limited and acquired the gold assets of Avmin, namely ETC Operations, Hartebeestfontein Mine and Lorraine Mine.

January, 1998

Acquired the Fairview Mine from Goldfields.

August, 1998

Mining operations at Lorraine ceased and No.1 Shaft became the principal access for the Target Project.

April, 1999

Mining Licence obtained for Target.

August, 1999

Disposed of the Hartebeestfontein Mine.

May, 2002

Target Mine commissioned.

February, 2003

Entered into an agreement to sell the assets of ETC.

June, 2003

Announcement of completion of surface drilling of Target North.

June, 2003

Disposal of ETC division to Metorex.

September, 2003

Announcement of completion of pre-feasibility study on Northern Free State.

November, 2003

Announcement that: Anglovaal Mining Limited ("Avmin") will dispose of its entire 42.2% interest in Avgold to Harmony.

Table 2.2 gives the historical operating statistics attributable to Avgold from 2001 through to 31 December 2003, inclusive.





68

68

**Annexure 7**

**Table 2.2 Avgold: Salient Historical Operating Statistics**

**Statistic**

**(2)**

**Units**

**2001**

**2002**

**2003**

**2004**

(1)

**Production**

Tonnes Milled

(kt)

492

782

1,389

540

Yield

(g/t)

3.0

6.6

8.6

11.1

Gold Production

(koz)

47

165

383

192

Development

(m)

5,144

6,022

14,677

4,226

**Productivity TEC**

(No.)

1,177

1,355

2,907

1,088

Milling

(t/TEC/month)

35

48

40

83

Gold Production

(g/TEC/month)

105  
316  
341  
917

**Health and Safety**

Fatalities

(No.)

2  
0  
0  
0

Fatality Rate

(per mmhrs)

0.35  
0  
0  
0

LTIFR

(per mmhrs)

9  
9  
11  
6

**Expenditures**

Cash Operating Costs

(ZARm)

290  
523  
673  
260

Capital Expenditure

(ZARm)

521  
102  
123  
50

**Cost Performance**

Cash Operating Costs

(ZAR/t)

589  
669  
485  
481

(ZAR/kg)

189,949  
98,496  
56,588  
43,409

Capital Expenditure

(ZAR/t)

1,059



130

88

93

(ZAR/kg)

341,252

19,181

10,329

8,361

(1)

2004 reports six-month actual results to December 2003.

(2)

Production from ETC mines is included, however those assets were sold during 2003.

### 2.2.2

#### *Harmony*

Harmony is a public listed company. Its primary listing is on the JSE and secondary listings are on the LSE, the Paris Bourse, with IDRs traded on the Brussels Bourse and an American Depositary Shares ("ADS") programme on the New York Stock Exchange, Inc. ("NYSE").

Harmony, through wholly-owned subsidiaries or joint venture agreements, manages and operates BUs, comprising operating and developing underground, open pit and surface reclamation operations in three countries. In addition, Harmony's exploration programme, targeting gold and PGEs, extends its country presence (through direct and indirect subsidiaries) into a total of five countries.

Harmony's company ownership comprises holdings in direct subsidiaries, indirect subsidiaries, direct and indirect joint venture companies and indirect associate companies. These comprise dormant companies, exploration companies, gold mining companies, investment holding companies, management service companies, marketing companies, beneficiation companies, mineral rights holding companies and property holding companies.

Harmony's operating structure principally comprises two reporting entities represented by South African Operations and International Operations. South African Operations are sub-divided into nine reporting entities: Free Gold Operations, Harmony Free State Operations, Welkom Operations, West Wits Operations (including Randfontein, Elandsrand and Deelkraal), Evander Operations, Orkney Operations, Kalgold Operations and International Operations (sub-divided into two operations, namely the Australian Operations and Canadian Operations).

Harmony's principal executive offices are located at 4 High Street, First Floor, Melrose Arch, Melrose North 2196, Johannesburg, Gauteng Province, South Africa.

Table 2.3 gives the historical company development of Harmony to date. By measure of attributable annual gold production Harmony is ranked 6th and by attributable total cash costs ranked 6th in terms of the world's gold mining companies. Harmony's core business is gold mining whose activities include the exploration, development and operation of gold mines, including direct interests in the marketing of gold and indirect interests in the manufacturing and retailing of gold jewellery.

Table 2.4 gives historical operating statistics attributable to Harmony from 2001 through to 31 December 2003, inclusive, with figures reported on a financial year basis.





69

69

**Annexure 7**

**Table 2.3 Harmony: Company Development**

**Date**

**Activity**

August, 1950

Harmony Gold Mining Company Limited incorporated and registered as a public company in South Africa.

1994

Management agreement between Randgold & Exploration Company Limited ("Randgold") and Harmony cancelled and replaced with service agreement.

1997

Service agreement between Randgold and Harmony cancelled resulting in Harmony operating as a completely independent gold mining company.

1997

Acquisition of Lydenburg Exploration Limited ("Lydex") for a consideration of ZAR204m.

June, 1998

Acquisition of Bissett gold mine from the liquidators of Rea Gold corporation for a consideration of ZAR26m.

July, 1998

The acquisition of Evander Gold Mines Limited for a consideration of ZAR545m.

October, 1999

Acquisition of Kalahari Goldridge Mining Company Limited and West Rand Consolidated Mines Limited for a consideration of ZAR321m.

March, 2000

Acquisition of Randfontein Estates Limited for a consideration of ZAR931m.

April, 2001

Acquisition of the Elandskraal mining operations from AngloGold Limited for a consideration of ZAR1,053m.

April, 2001

Acquisition of New Hampton Goldfields Limited for a consideration of ZAR229m.

September, 2001

Acquisition of 31.8% of the issued share capital of Bendigo Mining NL for a consideration of ZAR292m.

December, 2001

Acquisition of 50% of the issued share capital of Free Gold which purchased

(effective date 3 January 2002)

the Free Gold operations and certain other assets for approximately ZAR1,4bn.

April, 2002

Acquisition of Hill 50 Limited for a consideration of ZAR1,419m.

May, 2002

Acquisition of 32.5% of the ordinary share capital of Highland Gold Limited for a consideration of ZAR188m.

October, 2002

Joint acquisition by Free Gold of St. Helena BUs from Gold Fields Limited for a gross sale consideration of ZAR127m.

November, 2002

Harmony lists on the New York Stock Exchange ("NYSE").

November, 2002

Acquisition of 21% of the ordinary share capital of High River Gold Limited for a consideration of ZAR141m.

January, 2003

Randfontein Estates Limited ("Randfontein"), entered into agreement with Africa Vanguard Resources (Pty) Ltd ("AV"), in terms of which Randfontein sold 26% of its mineral rights in respect of Doornkop Mining Area to AV for a purchase consideration of R250m. Randfontein and AV entered into a JV agreement to jointly conduct mining operations at Doornkop.

February, 2003

Harmony announces offer for Abelle Limited ("Abelle") which values Abelle at ZAR689m.

May, 2003

Announcement of merger with ARMgold.

May, 2003

Announcement of an acquisition by Free Gold of 34.5% of the shares of Avmin for a consideration of ZAR844m in which Harmony and ARMgold each have 50%.

August 2003

Shareholder approval of the merger between Harmony and ARMgold for which 64,000,000 Harmony shares were issued to ARMgold, in the ratio of 2 Harmony shares for every 3 ARMgold shares.

August 2003

The arrangements between Randfontein and AV were implemented, and purchase price paid as per the agreement drawn up in January 2003. Gold at UK£2.05 per share valuing the shareholding at ZAR830.0m.

October 2003

Harmony disposed of its 17.0% shareholding in High River Gold at C\$1.75 per share valuing the shareholding at ZAR156.7m.

November 2003

Announcement that: Anglovaal Mining Limited ("Avmin") will dispose of its entire 42.2% interest in Avgold to Harmony, Harmony will dispose of its Kalplats platinum discovery and associated mineral rights to Avmin.

November 2003

Harmony announced the sale of its Kalgold Operations to The Afrikander Lease Limited ("Alease") for a consideration of ZAR275m. In terms of the agreement, Alease will pay Harmony ZAR137.5m in cash, with the remaining ZAR137.5m being funded with the issue of ordinary shares. The sale will be effective after all legal conditions of the deal have been met, by approximately the end of February 2004. Harmony excluded its Kalplats deposit interests from this transaction.





70

70

**Annexure 7**

**Table 2.4 Harmony: Salient Historical Operating Statistics**

(1), (2)

**Statistic**

**Units**

**2001**

**2002**

**2003**

**2004**

(3)

**Production**

Area Mined

(m

2

)

2,027,043

2,286,395

3,301,125

1,690,296

Tonnes Milled

(kt)

17,074

22,934

35,259

16,777

Yield

(g/t)

3.9

3.6

3.6

3.5

Gold Production

(koz)

2,140

2,668

4,040

1,911

Development

(m)

128,625

152,006

207,272

109,746

**Productivity**

TEC

(No.)

43,448

46,873

58,886



59,451

Centares

(m

2

/TEC/month)

3.9

4.8

4.7

4.7

Milling

(t/TEC/month)

32

41

50

47

Gold Production

(g/TEC/month)

125

147

178

167

**Health and Safety**

Fatalities

(No.)

26

37

38

21

Fatality Rate

(per mmhrs)

0.28

0.35

0.30

0.28

LTIFR

(per mmhrs)

28

23

25

19

**Expenditures**

Cash Operating Costs

(ZARm)

3,822

5,215

8,673

4,486

Capital Expenditure

(ZARm)

424

735

773

445

**Cost Performance**

Cash Operating Costs

(ZAR/t)

224

227

246

267

(ZAR/kg)

57,419

62,853

69,030

75,479

Capital Expenditure

(ZAR/t)

25

32

22

27

(ZAR/kg)

6,370

8,859

6,154

7,486

(1)

TEC and productivity statistics exclude the Canadian operations as TEC figures unavailable.

(2)

Health and Safety statistics for Canadian and Australian Operations for 2001 are unavailable.

(3)

2004 reports actual results to December 2003.

**2.3****Overview of the Mining Assets****2.3.1*****Target Operations***

Target Operations comprise Target Mine, Target North and Extensions and Oribi Exploration Property situated near the town of Allanridge in the Free State Province, South Africa, some 270km southwest of Johannesburg. Located at approximately latitude 28°00'S and longitude 26°30'E on the northern limit of the Welkom Goldfields, the site is accessed via the R30 situated between the towns of Bothaville and Welkom.

The Target Operations area was initially explored through surface drilling in the late 1980s with further exploration being undertaken from a 5.6km long decline, commenced in 1995, driven from 203L at Lorraine No.1 shaft. A positive feasibility study into the development of a 105ktpm operation was produced in May 1998 resulting in the decision to develop Target Mine. A detailed mine design was produced in 2000 and the mine officially opened in May 2002. Upon the closure of Lorraine Mine in August 1998 the Lorraine No.1 and No.2 shafts were transferred to Target Mine becoming Target No.1 Shaft and Target No.2 Shaft, respectively.

Mining operations comprise one primary underground mine commissioned in May 2002 making use of information systems and mechanisation, combined with process-driven organisational design that relies on a multi-skilled workforce. The majority of the production is derived from mechanised mining; however conventional stoping is still employed primarily to de-stress areas ahead of the mechanised mining. The mining operations feed one central process facility, namely the Target Gold Plant.

Table 2.5 gives the salient operating statistics and Table 2.6 gives the historical operating statistics for Target Mine from 1 July 2001 through to 31 December 2003, inclusive.





71

71

**Annexure 7**

**Table 2.5 Target Operations - Target Mine: Salient Operating Statistics**

**Maximum**

**Design**

**Operating**

**Production Unit**

**Capacity**

**Capacity**

(1)

**Life**

**Classification**

(ktpa)

(ktpa)

(years)

**Business Units**

Target Mine

1,500

1,404

17

Long-life

**Total Hoisting Capacity**

**1,500**

**1,404**

**17**

**Long-life**

Surface Sources

**Processing Plants**

Target Gold Plant

1,260

1,285

17

Long-life

**Total Processing Capacity**

**1,260**

**1,285**

**17**

**Long-life**

(1)

Maximum Operating Capacity represents the maximum planned annual throughput for the LoM period.

**Table 2.6 Target Operations - Target Mine: Salient Historical Operating Statistics**

**Statistic**

**Units**

**2001**

**2002**

**2003**

**2004**

(1)

**Production**

Tonnes Milled

(kt)  
492  
782  
1,068  
540  
Yield  
(g/t)  
3.0  
6.6  
8.6  
11.1  
Gold Production  
(koz)  
47  
165  
294  
192  
Development  
(m)  
5,144  
6,022  
7,431  
4,226  
**Productivity**  
TEC  
(No.)  
1,177  
1,355  
1,119  
1,088  
Milling  
(t/TEC/month)  
35  
48  
31  
83  
Gold Production  
(g/TEC/month)  
105  
316  
262  
917  
**Health and Safety**  
Fatalities  
(No.)  
2  
0  
0  
0  
Fatality Rate  
(per mmhrs)

0.35  
0  
0  
0

LTIFR

(per mmhrs)

9  
9  
11  
6

**Expenditures**

Cash Operating Costs

(ZARm)

290  
523  
470  
260

Capital Expenditure

(ZARm)

521  
102  
101  
48

**Cost Performance**

Cash Operating Costs

(ZAR/t)

589  
669  
440  
482

(ZAR/kg)

189,949  
98,496  
51,327  
43,461

Capital Expenditure

(ZAR/t)

1,059  
130  
94  
89

(ZAR/kg)

341,252  
19,181  
10,982  
8,002

(1)

2004 reports six-month actual results to December 2003.

**2.3.2**

***Free Gold Operations***



The Free Gold Operations are situated in the Free State Province, South Africa, some 270km southwest of Johannesburg. Located at approximately latitude 28°00'S and longitude 26°30'E, the site is accessed via the national highway N1 between Johannesburg and Bloemfontein.

Exploration, development and production history in the area dates from the early 1940s, leading to commercial production by 1947. Subsequent consolidation and restructuring led to the formation of Free State Consolidated, which in addition to HJ Joel, became a wholly-owned subsidiary of AngloGold Limited ("AngloGold") in June 1998. Free Gold acquired the assets from AngloGold in December 2001 and St. Helena BUs from Goldfields during May 2002.

Mining operations comprise nine underground mining BUs: Tshepong, Phakisa, Bambanani, West, Eland, Sable & Kudu, Nyala, Joel and St. Helena (comprising BUs No.2, No.4, No.8 and No.10). Phakisa is currently a project for which capital is committed and is anticipated to commence in 2004. The mining operations feed four process facilities: FS1 Plant; FS2 Plant; Joel Plant and St. Helena Plant.





72

72

**Annexure 7**

Table 2.7 gives the salient operating statistics and Table 2.8 gives the historical operating statistics for Free Gold Operations from 1 January 2001 through to 31 December 2003, inclusive. Note that 2001 is reported on a calendar year, 2002 comprises six-months to 30 June 2002 and 2003 comprises 12-month actual results to June 2003 and 2004 is reports actual results to 31 December 2003.

**Table 2.7 Free Gold Operations: Salient Operating Statistics****Maximum****Design****Operating****Business Unit****Capacity****Capacity**

(1)

**Life****Classification****(ktpa)****(ktpa)****Production Shafts**

Tshepong BU

2,400

3,026

16

Long-Life

Bambanani BU

2,340

1,835

8

Medium-life

West BU

960

306

4

Short-life

Eland BU

840

385

3

Short-life

Kudu &amp; Sable BU

1,440

247

4

Short-life

Nyala BU

3,360

606

7

Medium-life

Joel North &amp; South BU

4,200  
544  
11  
Long-Life  
Phasika BU  
1,800  
1,400  
19  
Long-Life  
St. Helena BU  
4,020  
618  
5  
Medium-life  
**Total Hoisting Capacity**  
**21,360**  
**7,079**  
**20**  
**Long-Life**  
Surface Sources  
**3,547**  
**4**  
**Short-life**  
**Processing Plants**  
FS1 Plant - Milling  
5,280  
5,006  
20  
Long-Life  
FS1 Plant - Leaching  
5,280  
5,006  
20  
Long-Life  
FS2 Plant - Milling  
3,240  
3,240  
4  
Short-life  
FS2 Plant - Leaching  
3,600  
3,600  
4  
Short-life  
Joel Plant - Milling  
1,620  
1,458  
11  
Long-Life  
Joel Plant - Leaching  
1,800

1,458  
 11  
 Long-Life  
 St. Helena Plant - Milling  
 1,080  
 34  
 1  
 Short-life  
 St. Helena Plant - Leaching  
 1,200  
 1,120  
 3  
 Short-life  
**Total Processing Milling Capacity**  
**11,220**  
**9,561**  
**20**  
**Long-Life**  
**Total Processing Leaching Capacity**  
**11,880**  
**11,007**  
**20**  
**Long-Life**

(1)  
 Maximum Operating Capacity represents the maximum planned annual throughput for the LoM period.

**Table 2.8 Free Gold Operations: Salient Historical Operating Statistics**

**Statistic**

**Units**

**2001**

**2002**

**2003**

**2004**

(1)

**Production**

Area Mined

(m

2

)

1,045,758

395,496

964,142

508,968

Tonnes Milled

(kt)

8,479

4,371

9,362

6,997

Yield

(g/t)

4.4

4.0

3.8

4.8

Gold Production

(koz)

1,199

558

1,155

1,085

Development

(m)

41,455

19,324

53,551

29,231

**Productivity**

TEC

(No.)

20,368

14,722

16,106

17,119

Centares

(m

2

/TEC/month)

4.3

4.5

5.0

5.0

Milling

(t/TEC/month)

35

49

48

68

Gold Production

(g/TEC/month)

153

197

186

329

**Health and Safety**

Fatalities

(No.)

11

10

6

5

Fatality Rate

(per mmhrs)

0.35

0.24

0.15

0.25

LTIFR

(per mmhrs)

17

15

15

20

**Expenditures**

Cash Operating Costs

(ZARm)

2,409

883

2,125

2,290

Capital Expenditure

(ZARm)

58

32

63

135

**Cost Performance**

Cash Operating Costs

(ZAR/t)

284

202

227

327

(ZAR/kg)

64,619

50,879

59,141

67,847

Capital Expenditure

(ZAR/t)

7

7

7

19

(ZAR/kg)

1,555

1,827

1,746

4,010

(1)

2004 reports six-month actual results to December 2003.







73

73

**Annexure 7****2.3.3*****Harmony Free State Operations***

The Harmony Free State Operations are situated in the Free State Province, South Africa, some 270km southwest of Johannesburg. Located at approximately latitude 28°10'S and longitude 26°30'E, the site is accessed via the national highway N1 between Johannesburg and Bloemfontein.

Exploration, development and production history in the area dates from the early 1940s. Harmony's Free State Operations commenced with amalgamation of Harmony, Virginia and Merriespruit mining operations. Subsequent acquisitions included: Unisel BU in 1996; Saaiplaas BU in 1997; Brand BUs in 1998 and Masimong in 1998.

Table 2.9 gives the salient operating statistics and Table 2.10 gives the historical operating statistics for Harmony Operations from 1 January 2001 through to 31 December 2003, inclusive. Note that 2003 comprises twelve-month actual results to June 2003 and 2004 reports the actual results to 31 December 2003.

**Table 2.9 Harmony Free State Operations: Salient Operating Statistics****Maximum****Design****Operating****Business Unit****Capacity****Capacity**

(1)

**Life****Classification****(ktpa)****(ktpa)****Production Shafts** Harmony No.2 BU

2,724

550

5

Medium-life

Harmony No.3 BU

1,080

0

0

Not in use

Harmony No.4 BU

1,752

0

0

Not in use

Merriespruit No.1 BU

1,548

597

9

Medium-life

Merriespruit No.3 BU

2,364

826

9

Medium-life

Virginia No.2 BU  
1,236  
0  
0  
Not in use  
Unisel BU  
1,644  
751  
11  
Long-Life  
Saaiplaas No.3 BU  
2,112  
327  
10  
Long-Life  
Brand No.2 BU  
1,440  
0  
0  
Not in use  
Brand No.3 BU  
1,440  
461  
5  
Medium-life  
Brand No.5 BU  
1,812  
0  
0  
Not in use  
Masimong No.4 BU  
840  
341  
10  
Long-Life  
Masimong No.5 BU  
960  
946  
15  
Long-Life  
**Total Hoisting Capacity**  
**20,952**  
**4,504**  
**15**  
**Long-Life**  
Surface Sources  
**2,822**  
**13**  
**Long-Life**  
**Processing Plants** Central Plant - Milling  
2,160

2,160

11

Long-Life

Central Plant - Leaching

2,880

2,880

11

Long-Life

Virginia Plant - Milling

1,980

1,944

9

Medium-life

Virginia Plant - Leaching

2,160

1,944

9

Medium-life

Saaiplaas Plant - Milling

1,800

1,823

15

Long-Life

Saaiplaas Plant - Leaching

2,640

2,663

15

Long-Life

**Total Processing Milling Capacity**

**5,940**

**5,927**

**15**

**Long-Life**

**Total Processing Leaching Capacity**

**7,680**

**7,487**

**15**

**Long-Life**

(1)

Maximum Operating Capacity represents the maximum planned annual throughput for the LoM period.





74

74

**Annexure 7**

**Table 2.10 Harmony Free State Operations: Salient Historical Operating Statistics**

**Statistic**

**Units**

**2001**

**2002**

**2003**

**2004**

(1)

**Production**

Area Mined

(m

2

)

721,709

738,793

767,555

427,929

Tonnes Milled

(kt)

5,289

4,536

5,338

2,950

Yield

(g/t)

4.0

4.2

3.6

3.5

Gold Production

(koz)

686

612

611

330

Development

(m)

50,027

51,188

53,691

28,047

**Productivity**

TEC

(No.)

15,668

12,776

11,178

12,673



Centares

(m

2

/TEC/month)

3.8

4.8

5.7

5.6

Milling

(t/TEC/month)

28

30

40

39

Gold Production

(g/TEC/month)

114

124

142

135

**Health and Safety**

Fatalities

(No.)

9

8

2

6

Fatality Rate

(per mmhrs)

0.26

0.27

0.07

0.51

LTIFR

(per mmhrs)

35

26

24

21

**Expenditures**

Cash Operating Costs

(ZARm)

1,385

1,351

1,518

852

Capital Expenditure

(ZARm)

120

95

126

26

**Cost Performance**

Cash Operating Costs

(ZAR/t)

262

298

284

289

(ZAR/kg)

64,883

70,978

79,875

82,995

Capital Expenditure

(ZAR/t)

23

21

24

9

(ZAR/kg)

5,622

4,991

6,631

2,515

(1)

2004 reports six-month actual results to December 2003.

**2.3.4*****Welkom Operations***

The Welkom Operations are situated in the Free State Province, South Africa, some 270km southwest of Johannesburg. Located at approximately latitude 28°00'S and longitude 26°30'E, the site is accessed via the national highway N1 between Johannesburg and Bloemfontein.

Exploration, development and production history in the area dates from the 1940s leading to commercial production by 1947. Mining operations comprise six underground mining BUs: BU No.1; BU No.2; BU No.3, BU No.4; BU No.6 and BU No.7 which have a combined rock hoisting capacity of 313ktpm. The mining operations process their ore via a toll agreement with Free Gold.

Table 2.11 gives the salient operating statistics and Table 2.12 gives the historical operating statistics for Welkom Operations from 1 January 2001 through to 31 December 2003, inclusive. Note that 2001 is reported on a calendar year, 2002 comprises six months to 30 June 2002 and 2003 comprises 12-month actual results to June 2003 and 2004 reports the actual results to 31 December 2003.

**Table 2.11 Welkom Operations: Salient Operating Statistics****Maximum****Design****Operating****Business Unit****Capacity****Capacity**

(1)

**Life****Classification****(ktpa)****(ktpa)**

**Production Shafts**

No.1 BU

816

305

3

Short-life

No.2 BU

648

66

2

Short-life

No.3 BU

660

76

3

Short-life

No.4 BU

660

49

2

Short-life

No.6 BU

816

105

3

Short-life

No.7 BU

816

288

8

Medium-life

**Total Hoisting Capacity**

**4,416**

**864**

**8**

**Medium-life**

No Surface Sources

**Processing Plants**

No operational plant

(1)

Maximum Operating Capacity represents the maximum planned annual throughput for the LoM period.





75

75

**Annexure 7**

**Table 2.12 Welkom Operations: Salient Historical Operating Statistics**

**Statistic**

**Units**

**2001**

**2002**

**2003**

**2004**

(1)

**Production**

Area mined

(m

2

)

73,178

38,065

104,571

58,764

Tonnes Milled

(kt)

340

224

577

315

Yield

(g/t)

5.1

4.9

3.4

3.6

Gold Production

(koz)

56

35

63

36

Development

(2)

(m)

1,296

1,483

5,843

459

**Productivity**

TEC

(No.)

1,492

1,786

2,348

2,179

Centares

(m

2

/TEC/month)

4.1

3.6

3.7

4.5

Milling

(t/TEC/month)

19

21

20

24

Gold Production

(g/TEC/month)

97

102

69

86

**Health and Safety**

Fatalities

(No.)

4

1

2

0

Fatality Rate

(per mmhrs)

0.92

0.38

0.35

0

LTIFR

(per mmhrs)

17

10

12

15

**Expenditures**

Cash Operating Costs

(ZARm)

144

101

203

115

Capital Expenditure

(ZARm)

10

7

30

0

**Cost Performance**

Cash Operating Costs

(ZAR/t)

425

449

352

366

(ZAR/kg)

82,737

92,093

104,211

102,703

Capital Expenditure

(ZAR/t)

28

33

51

0

(ZAR/kg)

5,444

6,778

15,236

0

(1)

2004 reports actual results to December 2003.

(2)

During 2003 high-speed development team was contracted for a specific development project required to improve ventilation aspects at BU No.1.

**2.3.5*****West Wits Operations***

The West Wits Operations principally comprise Elandsrand BU, Deelkraal BU, Cooke 1 BU, Cooke 2 BU, Cooke 3 BU and Doornkop BU and the non-operational Randfontein No.4 BU. Elandsrand BU and Deelkraal BU are situated in the Gauteng and North West Province, South Africa, some 85km southwest of Johannesburg. Located at approximately latitude 26°00'S and longitude 27°00'E, the site is accessed via the national highway N12 between Johannesburg and Kimberley. Cooke BUs and Doornkop BU are situated in the Gauteng Province, South Africa, some 50km west of Johannesburg. Located at latitude 26°22'S and longitude 27°42'E, the site is accessed via the local R28 highway between Randfontein and Westonaria.

Exploration, development and production history in the West Wits area dates from 1930, leading to large-scale production by the 1940s whilst exploration, development and production history in the Cooke BUs and Doornkop BU areas dates back to 1889.

Table 2.13 gives the salient operating statistics and Table 2.14 gives the historical operating statistics for West Wits Operations from 1 January 2001 through to 31 December 2003, inclusive. Note that 2003 comprises 12-month actual results to June 2003 and 2004 reports the actual results to 31 December 2003.







76

76

**Annexure 7**

**Table 2.13 West Wits Operations: Salient Operating Statistics**

**Maximum**

**Design**

**Operating**

**Business Unit**

**Capacity**

**Capacity**

(1)

**Life**

**Classification**

(ktpa)

(ktpa)

**Production Shafts**

Elandsrand BU

3,972

2,168

20

Long-Life

Deelkraal BU

2,244

837

6

Medium-life

Cooke 1 BU

2,112

672

6

Medium-life

Cooke 2 BU

2,244

853

16

Long-Life

Cooke 3 BU

3,180

1,186

16

Long-Life

Cooke 4 BU

1,788

0

0

Not in use

Doornkop BU

2,400

2,383

19

Long-Life

**Total Hoisting Capacity**

17,940

6,605

20

**Long-Life**

Surface Sources

2,250

6

**Medium-life**

**Processing Plants**

Elandsrand Plant - Milling

2,280

1,775

20

Long-Life

Elandsrand Plant - Leaching

2,280

1,775

20

Long-Life

Deelkraal Plant - Milling

1,260

720

6

Medium-life

Deelkraal Plant - Leaching

1,260

720

6

Medium-life

Cooke Plant - Milling

3,360

3,173

19

Long-Life

Cooke Plant - Leaching

3,360

3,173

19

Long-Life

Doornkop Plant - Milling

2,400

2,220

2

Short-life

Doornkop Plant - Leaching

2,700

2,220

2

Short-life

**Total Processing Milling Capacity**

9,300

7,444

20

Long-Life

Total Processing Leaching Capacity

9,600

7,444

20

Long-Life

(1)

Maximum Operating Capacity represents the maximum planned annual throughput for the LoM period.

**Table 2.14 West Wits Operations: Salient Historical Operating Statistics**

**Statistic**

**Units**

**2001**

**2002**

**2003**

**2004**

(1)

**Production**

Area Mined

(m

2

)

870,966

946,311

806,649

373,309

Tonnes Milled

(kt)

6,991

8,078

7,862

3,893

Yield

(g/t)

3.8

4.0

3.4

3.1

Gold Production

(koz)

846

1,038

859

394

Development

(m

47,738

59,155

57,355

35,884

**Productivity**

TEC

(No.)

17,640

16,907

15,110

14,131

Centares

(m

2

/TEC/month)

4.1

4.7

4.4

4.4

Milling

(t/TEC/month)

33

40

43

46

Gold Production

(g/TEC/month)

124

159

147

144

**Health and Safety**

Fatalities

(No.)

12

20

20

5

Fatality Rate

(per mmhrs)

0.32

0.47

0.54

0.23

LTIFR

(per mmhrs)

24

23

23

22

**Expenditures**

Cash Operating Costs

(ZARm)

1,400

1,963

1,869

1,017

Capital Expenditure

(ZARm)

115

262

169

134

**Cost Performance**

Cash Operating Costs

(ZAR/t)

200

243

238

261

(ZAR/kg)

53,187

60,819

69,973

83,048

Capital Expenditure

(ZAR/t)

16

32

22

34

(ZAR/kg)

4,369

8,117

6,335

10,915

(1)

2004 reports six-month actual results to December 2003.







77

77

**Annexure 7****2.3.6*****Evander Operations***

Evander Operations are situated in the Mpumalanga Province, South Africa, some 120km east- southeast of Johannesburg. Located at latitude 28°28'S and longitude 29°06'E, the site is accessed via the local R29 road between Leandra and Bethel in the vicinity of Kinross.

Exploration, development and production history in the area dates from 1903, leading to full-scale production by 1955. Evander Operations originally comprised Kinross, Bracken, Leslie and Winkelhaak that were merged in 1996 due to declining Mineral Reserves. In August 1998, Harmony acquired Evander as a wholly-owned subsidiary.

Table 2.15 gives the salient operating statistics and Table 2.16 gives the historical operating statistics for Evander Operations from 1 January 2001 through to 31 December 2003 inclusive. Note that 2003 comprises 12-month actual results to June 2003 and 2004 reports the actual results to 31 December 2003.

**Table 2.15 Evander Operations: Salient Operating Statistics****Maximum****Design****Operating****Business Unit****Capacity****Capacity**

(1)

**Life****Classification****(ktpa)****(ktpa)****Production Shafts**

Evander No.2 BU

828

615

10

Long-Life

Evander No.3 BU

240

0

0

Not in use

Evander No.5 BU

1,128

332

10

Long-Life

Evander No.7 BU

1,272

602

11

Long-Life

Evander No.8 BU

1,764

824

15

Long-Life

Evander No.9 BU

996

235

4

Short-life

**Total Hoisting Capacity**

**6,228**

**2,545**

**15**

**Long-Life**

Surface Sources

**237**

**9**

**Medium-life**

**Processing Plants**

Kinross Plant - Milling

1,920

1,576

15

Long-Life

Kinross Plant - Leaching

2,400

2,428

15

Long-Life

Winkelhaak Plant - Milling

816

852

10

Long-Life

Winkelhaak Plant - Leaching

0

0

0

Not in use

**Total Processing Milling Capacity**

**2,736**

**2,428**

**15**

**Long-Life**

**Total Processing Leaching Capacity**

**2,400**

**2,428**

**15**

**Long-Life**

(1)

Maximum Operating Capacity represents the maximum planned annual throughput for the LoM period.

**Table 2.16 Evander Operations: Salient Historical Operating Statistics**

**Statistic**

**Units**

**2001**

**2002**

**2003**

**2004**

(1)

**Production** Area Mined

(m

2

)

434,368

403,543

350,391

183,029

Tonnes Milled

(kt)

2,481

2,352

2,127

1,113

Yield

(g/t)

5.7

5.5

5.3

5.3

Gold Production

(koz)

458

415

360

188

Development

(m

30,861

32,002

28,435

14,074

**Productivity**

TEC

(No.)

8,805

8,639

6,906

7,203

Centares

(m

2

/TEC/month)

4.1

3.9

4.2

4.2

**Milling**

(t/TEC/month)

23

23

26

26

**Gold Production**

(g/TEC/month)

135

125

135

135

**Health and Safety**

**Fatalities**

(No.)

5

6

4

3

**Fatality Rate**

(per mmhrs)

0.27

0.33

0.23

0.41

**LTIFR**

(per mmhrs)

22

24

34

30

**Expenditures**

**Cash Operating Costs**

(ZARm)

693

723

796

441

**Capital Expenditure**

(ZARm)

69

98

98

49

**Cost Performance**

**Cash Operating Costs**

(ZAR/t)

279

307

374

396

(ZAR/kg)

48,628

55,960

71,006

75,433

Capital Expenditure

(ZAR/t)

28

42

46

44

(ZAR/kg)

4,842

7,585

8,776

8,405

(1)

2004 reports six-month actual results to December 2003.







78

78

**Annexure 7****2.3.7*****Orkney Operations***

The Orkney Operations are situated in North West Province, South Africa, some 175km south-west of Johannesburg. Located at approximately latitude 26°30'S and longitude 26°45'E, the site is accessed via the national highway N12 between Johannesburg and Kimberley.

Exploration, development and production history in the area dates from 1886 and following dormant periods, large-scale production commenced during the 1940s with the formation of Vaal Reefs Gold Mining and Exploration Company Limited ("Vaal Reefs") in 1944.

Mining operations comprise six underground mining BUs: BU No.1, BU No.2, BU No.3, BU No.4, BU No.6 and BU No.7. BU No.1 will shortly become non-operational and BU No.5 has been closed. The mining operations process their ore via a toll agreement with Vaal River Operations ("VRO") belonging to AngloGold.

Table 2.17 gives the salient operating statistics and Table 2.18 gives the historical operating statistics for Orkney Operations from 1 January 2001 through to 31 December 2003, inclusive. Note that 2001 is reported on a calendar year basis, 2002 comprises six-months to 30 June 2002 and 2003 comprises 12-month actual results to June 2003 and 2004 is reported as the actual results to 31 December 2003.

**Table 2.17 Orkney Operations: Salient Operating Statistics****Maximum****Design****Operating****Business Unit****Capacity****Capacity**

(1)

**Life****Classification****(ktpa)****(ktpa)****Production Shafts No.1 BU**

1,644

0

0

Not in use

**No.2 BU**

1,704

468

3

Short-life

**No.3 BU**

1,560

279

4

Short-life

**No.4 BU**

1,920

443

5

Medium-life

**No.5 BU**

1,320

0

0

Not in use

No.6 BU

1,620

218

8

Medium-life

No.7 BU

1,620

108

8

Medium-life

**Total Hoisting Capacity**

**11,388**

**1,484**

**8**

**Medium-life**

No Surface Sources

**Processing Plants** No operational plant

(1)

Maximum Operating Capacity represents the maximum planned annual throughput for the LoM period.

**Table 2.18 Orkney Operations: Salient Historical Operating Statistics**

**Statistic**

**Units**

**2001**

**2002**

**2003**

**2004**

(1)

**Production**

Area Mined

(m

2

)

348,345

164,939

307,817

138,297

Tonnes Milled

(kt)

2,060

942

1,761

783

Yield

(g/t)

7.1

7.6

7.2

6.4  
Gold Production  
(koz)

468

232

408

161

Development  
(m)

6,944

2,628

4,398

2,053

**Productivity**

TEC

(No.)

6,579

6,174

5,854

4,696

Centares

(m

2

/TEC/month)

4.4

2.2

4.4

4.9

Milling

(t/TEC/month)

26

13

25

28

Gold Production

(g/TEC/month)

184

97

180

178

**Health and Safety**

Fatalities

(No.)

10

7

4

2

Fatality Rate

(per mmhrs)

0.56

0.48

0.48  
0.45  
LTIFR  
(per mmhrs)  
28  
24  
24  
15

**Expenditures**

Cash Operating Costs  
(ZARm)

730  
407  
788  
345

Capital Expenditure  
(ZARm)

30  
23  
6  
4

**Cost Performance**

Cash Operating Costs  
(ZAR/t)

355  
432  
447  
440

(ZAR/kg)

50,195  
56,450  
62,125  
68,827

Capital Expenditure  
(ZAR/t)

15  
24  
4  
5

(ZAR/kg)

2,076  
3,152  
490  
856

(1)

2004 reports six-month actual results to December 2003.





79

79

**Annexure 7****2.3.8*****Kalgold Operation***

Kalgold Operation is currently subject to sale as described in more detail within the circular. Until such time as the sale agreement has become unconditionally effective, the asset still forms part of Harmony. As at the base valuation date of 31 December 2003, Kalgold was still contributing to the equity value of Harmony as reported in Section 14. Notwithstanding this statement, the valuation as reported in Section 14 considers the combined Mining Asset valuation with and without Kalgold.

The Kalgold Operation is situated some 50km southwest of Mafikeng in the North West Province, South Africa, some 300km west of Johannesburg. Located at latitude 26°10'S and longitude 26°14'E, the site is accessed via the local R49 road between Mafikeng and Vryburg.

The gold deposits at Kalgold were discovered by Shell South Africa (Pty) Limited ("Shell") in 1991 following an exploration programme focused on the poorly exposed Archaean Greenstone belts of the Kraaipan Group, which occur in the area. In 1995 a feasibility study was conducted by West Rand Consolidated Mines Limited ("WRCM") who acquired the mineral and surface rights leading to the development of an open pit operation in July 1996. Harmony acquired Kalgold in July 1999.

Table 2.19 gives the salient operating statistics and Table 2.20 gives the historical operating statistics for Kalgold Operations from 1 January 2001 through to 31 December 2003, inclusive. Note that 2003 comprises 12-month actual results to June 2003 and 2004 reports the actual results to 31 December 2003.

**Table 2.19 Kalgold Operation: Salient Operating Statistics****Maximum****Design****Operating****Business Unit****Capacity****Capacity**

(1)

**Life****Classification****(ktpa)****(ktpa)****Business Units Processing Operations**

1,620

1,572

4

Short-life

(1)

Maximum Operating Capacity represents the maximum planned annual throughput for the LoM period.

**Table 2.20 Kalgold Operation**

(1)

**: Salient Historical Operating Statistics****Statistic****Units****2001****2002****2003****2004**

(2)

**Production**

Waste Tonnes Mined

(kt)

8,542

7,323

7,711

4,763

Tonnes Milled

(kt)

959

961

1,084

694

Yield

(g/t)

1.6

2.0

2.1

2.0

Gold Production

(koz)

49

62

75

46

Stripping Ratio

(t

waste:

t

ore

)

8.9

7.6

7.1

6.9

**Productivity**

TEC

(No.)

453

444

501

533

Milling

(t/TEC/month)

176

180

180

217

Gold Production

(g/TEC/month)

282



363  
386  
445

**Health and Safety**

Fatalities

(No.)

0  
0  
0  
0

Fatality Rate

(per mmhrs)

0.00  
0.00  
0.00  
0.00

LTIFR

(per mmhrs)

7  
13  
4  
9

**Expenditures**

Cash Operating Costs

(ZARm)

98  
130  
150  
99

Capital Expenditure

(ZARm)

33  
25  
39  
1.8

**Cost Performance**

Cash Operating Costs

(ZAR/t)

102  
135  
138  
143

(ZAR/kg)

63,844  
67,218  
64,583  
69,845

Capital Expenditure

(ZAR/t)

34  
26

36

3

(ZAR/kg)

21,498

12,927

16,785

1,232

(1)

The contribution from Kalgold is subject to a current sale agreement which may see a 100% disposal of the asset in the near future.

(2)

2004 reports six-month actual results to December 2003.





80

80

**Annexure 7****2.3.9*****Harmony Australian Operations***

The two main operating groups of Harmony Australia are the Mt. Magnet & Cue Operations and the South Kalgoorlie Operations. Mt. Magnet & Cue Operations are situated in the Murchison region, Western Australia whilst the South Kalgoorlie operations are located as part of the Eastern Goldfields near the town of Kalgoorlie. Mt. Magnet Operation comprises a number of open pits and decline operations at Morning Star and Hill 50 and the processing of surface stockpiles. The Cue Operation comprises a number of open pits at Big Bell, Cuddingwarra, Golden Crown and Tuckabianna. The Big Bell underground operation was recently closed. The South Kalgoorlie operations comprise the Jubilee and New Celebration facilities, the Mt. Marion mine comprises an underground and open pit operations. Exploration, development and production history at Mt. Magnet & Cue and South Kalgoorlie areas dates from 1896 and 1937, respectively. Mining at Mt. Magnet began with the discovery of gold in 1896 and up to 30 June 2002 some 5Moz has been produced. Gold mining at Big Bell in the Cue area commenced in 1937 but closed between 1955 and 1989 and up until 30 June 2002 gold sales exceeded 2Moz. Mining at South Kalgoorlie substantively commenced in 1987 and up until 30 June 2002 gold production of some 2Moz has been realised.

Table 2.21 gives the salient operating statistics and Table 2.22 gives the historical operating statistics for Harmony Australia Operations from 1 January 2001 through to 31 December 2003 inclusive. Note 2003 comprises 12-month actual results to June 2003 and 2004 reports the actual results to 31 December 2003.

**Table 2.21 Harmony Australian Operations: Salient Operating Statistics****Maximum****Design****Operating****Business Unit****Capacity****Capacity**

(1)

**Life****Classification****(ktpa)****(ktpa)****Business Units**

Mount Magnet &amp; Cue Plant

5,940

2,496

7.3

Medium-life

Jubilee Plant

1,320

1,176

3.0

Short-life

New Celebration Plant

1,656

504

0.3

Short-life

**Total****8,916****4,176**

**7.3**

**Medium-life**

(1)  
 Maximum Operating Capacity represents the maximum planned annual throughput for the LoM period.

**Table 2.22 Harmony Australian Operations: Salient Historical Operating Statistics**

**Statistic**

**Units**

**2001**

**2002**

**2003**

**2004**

(1)

**Production**

Tonnes Milled

(kt)

1,088

4,782

7,148

2,545

Yield

(g/t)

1.6

1.6

2.2

2.4

Gold Production

(koz)

56

253

510

193

**Productivity**

TEC

(No.)

882

882

882

917

Milling

(t/TEC/month)

103

452

675

463

Gold Production

(g/TEC/month)

164

743

1,498

1,092

**Health and Safety**

Fatalities

(No.)

0

0

0

0

Fatality Rate

(per mmhrs)

0.00

0.00

0.00

0.00

LTIFR

(per mmhrs)

na

15

2

15

**Expenditures** Cash Operating Costs

(ZARm)

135

608

1,226

431

Capital Expenditure

(ZARm)

18

233

242

95

**Cost Performance**

Cash Operating Costs

(ZAR/t)

124

127

171

169

(ZAR/kg)

77,990

77,265

77,311

71,643

Capital Expenditure

(ZAR/t)

17

49

34

37

(ZAR/kg)

10,399

29,610

15,274

15,798

(1)

2004 reports six-month actual results to December 2003.







81

81

**Annexure 7****2.3.10 Harmony Canadian Operations**

Harmony's Canadian Operations comprise the Bisset gold mine located near Bisset in the Manitoba Province, Canada. Mining activities were suspended in the second quarter of 2002 for economic reasons. The first mining at Bisset commenced in 1932 and continued until operations were ceased in June 1998 following the liquidation of the Bisset Gold Mine Company. Bisset had sold some 1.3Moz up until June 1995.

Table 2.23 gives the historical operating statistics for Harmony Canadian Operations from 1 July 2001 through to 31 December 2003, inclusive. For 2003, there was no production due to suspension of mining operations in the previous year.

**Table 2.23 Harmony Canadian Operations: Salient Historical Operating Statistics****Statistic****Units****2001****2002****2003****2004****Production**

Tonnes Milled

(kt)

266

39

na

na

Yield

(g/t)

5.2

6.6

na

Gold Production

(koz)

44

8

na

**Productivity**

TEC

(No.)

na

na

na

na

Milling

(t/TEC/month)

na

na

na

na

Gold Production

(g/TEC/month)

na

na

na

na

**Health and Safety**

Fatalities

(No.)

0

0

na

na

Fatality Rate

(per mmhrs)

0.00

0.00

na

na

LTIFR

(per mmhrs)

37

32

na

na

**Expenditures**

Cash Operating Costs

(ZARm)

111

9

na

na

Capital Expenditure

(ZARm)

49

-10

na

na

**Cost Performance**

Cash Operating Costs

(ZAR/t)

417

231

na

na

(ZAR/kg)

80,552

35,019

na

na

Capital Expenditure

(ZAR/t)

184

-256

na

na

(ZAR/kg)

35,559

-38,911

na

na

## 2.4

### Significant Exploration Properties

#### 2.4.1

##### *Avgold*

The Target North Project considers options to exploit the Sun South area comprising the Paradise, Siberia and Mariasdal blocks of ground located immediately north of the Eldorado block of the existing Target Mine. From the south, the Blast Fault separates the Eldorado and Paradise blocks whilst the Siberia Fault separates the Paradise and Siberia blocks. The Mariasdal block adjoins the Siberia block and is bounded to the north by the Mariasdal Fault. The Sun South area comprises an extension of the Elsburg and Dreyerskuil reefs mined at Target Mine. Mineral Resources (Table 4.9 in Section 4) have been identified, of which 60% are classed as Inferred. High-level pre-feasibility/scoping studies have been completed by Avgold that consider three options for possible future development:

.  
a "greenfields" development comprising a newly developed two shaft system to exploit all the blocks;

.  
the "brownfields" development comprising an initial twin shaft system sunk to 2,500m below surface adjacent to the Target Mine ground handling infrastructure at 282L, a third "North Shaft" to be sunk to 2,500m below surface located towards the north of the Siberia block. The twin shaft system would exploit the Paradise block and certain material of the Siberia block whilst the North Shaft would be used to exploit the remainder of the Siberia block and the Mariasdal block. Ground between 2,500m and 3,000m would be accessed by vehicle ramps; and

.  
the "brownfields" development comprising an initial single shaft sunk to 2,500m below surface, adjacent to the Target Mine ground handling infrastructure at 282L (South Shaft) and a subsequent North Shaft located towards the north of the Siberia block. The South Shaft would cater for men, material, ventilation and limited rock handling facilities. These shafts, together with access ramps for ground between 2,500m and 3,000m, would be used to exploit the blocks of the Sun South area.





82

82

**Annexure 7**

High-level indicative cash flows derived negative NPVs for the first two options; however the third option did realise a positive NPV. For Option 3, the first phase of the two-shaft system would utilise the existing ground handling facilities of Target Mine to recover 120ktpm of high-grade ore whilst 40 ktpm of low-grade material would be hoisted directly by the South Shaft, resulting in overall production of some 160ktpm. Mining would be concentrated on material above 2,500m from the Target workings and the Paradise block. Phase 2 would focus on development into the Paradise and Siberia blocks and expand production to some 220ktpm. The final third phase would introduce the North Shaft for the provision of men, material and ventilation to the northern blocks maintaining production at some 220ktpm.

Installing the initial single shaft for Phase 1 is estimated, by Avgold, to cost ZAR0.9billion, a further ZAR1.5 billion is estimated for the expanded infrastructure to cater for a 220ktpm operation of Phase 2 and an additional ZAR4billion for Phase 3. A feasibility study will commence during 2004 to further define the technical and economic parameters of the project to ascertain the NPV prior to making any capital commitments.

Until such time as the appropriate level of technical detail has been completed no Mineral Reserves and associated DCF valuation can be applied and as such only reports Mineral Resources.

**2.4.2****Harmony**

Harmony has three significant exploration properties: namely Poplar, Rolspruit and Kalplats.

The **Poplar Project** considers the green-fields development through installation of a twin shaft system to some 1,200m below surface to access ore some 20km from the existing Evander Operations. Mineral Resources have been estimated and the project is currently the focus of a pre-feasibility study.

The **Rolspruit Project** considers the exploitation of deeper resources of the Kimberley Reef adjacent to the No.8 BU at Evander Operations. Harmony has recently (March 2003) completed a feasibility study, which assesses two distinct options:

.  
green-fields option:

the installation of a twin shaft system from surface; and

.  
brown-fields option:

the installation of a twin sub-vertical shaft system at No.8 BU.

Given the high capital expenditure requirements and long lead-time to full production, current focus is on improving project economic performance.

The **Kalplats Project** is situated some 90km southwest of Mafikeng in the North West Province, South Africa, some 340km west of Johannesburg. The project is located some 40km to the west of the Kalgold Operation and accessed via the local R49 road between Mafikeng and Vryburg.

Kalplats is a platinum group metal ("PGM") prospect that was discovered during the course of gold prospecting in the Kraaipan greenstone belt in 2000. Mineralisation is contained in some seven separate ore zones with strike lengths between 500m to 1,000m and widths between 15m and 45m. Exploration has been completed and comprised a combination of Rotary Air Blast, Reverse Circulation and Diamond Drilling and a Pre-feasibility Study was completed in July 2002.

The Pre-feasibility Study concluded that the future viability of commissioning a mining operation at Kalplats depended on selectively mining the higher-grade reef zones. A Feasibility Study was commissioned in 2003 and work included the excavation of a 500t bulk sample for metallurgical testing of anticipated flotation recoveries and concentrate grades. Harmony is currently commissioning a Feasibility Study in order to assess the potential development of an open pit mining operation.

**2.5****Mining Authorisations and Mining Leases**

SRK has not reviewed the various agreements relating to mineral rights, authorisations and leases from a legal perspective and has consequently relied on advice by the Companies to the effect that the Companies are entitled to



mine all material falling within their respective mineral rights and/or mining rights and that all the necessary statutory mining authorisations are lawfully in place.

Notwithstanding this statement, SRK has been provided with sufficient documentation and a supporting letter confirming that following the completion of a recent and comprehensive internal audit all mineral rights, mynpatches, claims and mining leases being in respect of said mining leases have been duly validated and verified by the individuals as identified in Section 1 and employed by Harmony's legal services.





83

83

**Annexure 7****2.5.1*****South African Law: Current Status***

Ownership of mineral rights and statutory mining rights in South Africa may be affected through the common law or by statute. Under the common law, mineral rights vest with the owner of the land. The common law recognises the principal that mineral rights may be severed from title to land, rendering it possible for the surface rights, the rights to precious metals and the rights to base minerals to be owned by different persons.

Earlier mining legislation, which has since been repealed, granted, by way of mining leases, statutory rights to mine for precious metals. Despite the repeal of this earlier legislation, mining leases continue to be valid under the terms of the Minerals Act (Act 50 of 1991) (the "Act"). Registration of title to mineral rights ensures that real rights are constituted in and to the minerals concerned. Upon registration, those rights (either common law mineral rights or statutory mining rights) become effective against third parties. Registered title may be obtained in a number of ways. For example, where mineral right ownership has been separated from land ownership, registered title to the common law mineral rights is obtained by the registration of such ownership in the Deeds Registry Office. Alternatively, where a person has acquired statutory mining rights pursuant to a mining lease, registered title to the statutory mining rights is effected after receipt of the necessary consent from the Minister of Minerals and Energy and by registration of those rights in the Mining Titles Office.

The Act currently governs prospecting and mining activities in South Africa. The Act provides that statutory mining rights supersede common law mineral rights. Thus, pursuant to the Act, the holders of statutory mining rights are deemed to be the common law holders of the mineral rights.

**2.5.2*****South African Law: The Minerals and Petroleum Resources Development Act***

The Minerals and Petroleum Resources Development Act (Act 28 of 2002) was promulgated by the South African Parliament during July 2002 as the Minerals Act (the "Minerals Act"). The Minerals Act sets out to "make provision for the equitable access and sustainable development of the nation's mineral and petroleum resources" by bringing the country's mining law up to internationally accepted standards. It is also expected to provide many opportunities for recognised empowerment exploration and mining companies.

The legislation will enforce the "use it or lose it" principle of mineral exploration and development. In platinum, in particular, it unlocks stagnant areas currently owned by private owners of mineral rights unwilling or unable to bring them to account and by mining companies wishing to hold reserves and resources for the next 30 years and longer.

Government's view is that in order to redress the wrongs of the past, it needs to promote industry to provide employment and to generate revenue for the country-wide Reconstruction and Development Initiative.

The Minerals Act seeks to address the issue of Historically Disadvantaged South Africans ("HDSA") ownership. The South African Government's Mining Charter embodies the policy of facilitating the transfer of ownership within the South African mining industry to HDSA within the next 10 years. All stakeholders have agreed a target of 26% empowerment status to be achieved in a transparent manner and at fair market value.

The Mining Charter also aspires to achieve employment equity and targets of at least 40% HDSA participation in management within five years, with 10% being participation by women.

**2.5.3*****South African Law: Prospecting Permits***

Prospecting is governed by the Act and is defined as "intentionally searching for any mineral by means which disturb the surface of the earth, including the portion under the sea or under other water or of any tailings, by means of excavation or drilling necessary for that purpose".

Section 5(2) states that no person may prospect or mine without the necessary authorisations. This requirement departs from the common law principles governing ownership of minerals and restricts the right of owners to prospect and exploit mineral resources that fall within their ownership. It is a requirement that the applicant for a prospecting permit be the holder of the mineral right or has acquired the written consent of the mineral right holder to prospect for his own account. The prospector may not remove or dispose of any mineral found during prospecting operations unless the Director of Mineral Development has given permission for such removal. Under the Act the Director of

Mineral Development has the power to issue prospecting permits. A prospecting application must be submitted and be accompanied by proof of right to the minerals, details about the manner in which the applicant intends to prospect and rehabilitate disturbances of the surface which may be caused by the intended prospecting operations and particulars concerning the applicant's ability to make the necessary provision to rehabilitate disturbances of the surface which may be caused by the intended prospecting operations.





84

84

**Annexure 7**

The details of the manner in which the applicant intends to rehabilitate disturbances of the surface are to be submitted in the form of an environmental management programme ("EMP") for approval by the Director of Minerals Development. Such approval is in addition to the approval of the prospecting permit and no prospecting operation may commence without approval of the EMP.

A prospecting permit is issued for a period of 12 months but may be granted for longer should it be so determined by the Director of Minerals Development and can be renewed. The Act restricts and prohibits prospecting on certain lands including National Parks, townships or urban areas, land comprising public roads, a railway or cemetery and land that has been reserved for public purposes.

**2.5.4*****South African Law: Mining Authorisations***

Under the Act, no person or mining entity may mine for minerals without being granted a mining authorisation, either temporary or permanent. Prior to granting a mining authorisation, two requirements must be fulfilled. Firstly, the mining entity must either be the registered holder of the mineral rights or have obtained the written consent of the registered holder of the mineral rights to mine the minerals concerned, for its own account. Secondly, the Department of Minerals and Energy must be satisfied with the scale, manner and duration of the intended mining operations and must approve an Environmental Management Programme Report ("EMPR").

The Act provides for two forms of permanent mining authorisations, namely mining permits and mining licences. A mining permit is issued where the minerals occur in limited quantities or will be mined on a limited scale and on a temporary basis. A mining licence is issued where the minerals occur in more than limited quantities or will be mined on a larger than limited scale and for a period longer than two years.

The Act allows a temporary mining authorisation to be issued either to ensure the continuation of existing operations or to accommodate circumstances where approval of an EMPR is outstanding. Temporary mining authorisations are generally issued for limited periods but are renewable until the EMPR has been approved.

**2.5.5*****South African Law: The Royalty Bill***

On 10 March 2003, the Royalty Bill was released for public comment. The Royalty Bill is currently being revised and the date of release of the revised version is unknown.

The Royalty Bill proposes to impose a 3%, 4% and 8% revenue-based royalty on the South African gold mining sector, platinum sector and diamond sector respectively, payable to the South African Government. Under the terms of the Royalty Bill released for comment, the royalty is to take effect when companies convert to New Order Mining Rights in accordance with the New Minerals Act, although the Minister has indicated that the royalty is not expected to take effect until the transitional period for the conversion of mining rights under the New Minerals Act expires. If adopted, the Royalty Bill may have an impact on the operating results (technical) and will have a negative impact on the financial performance, hence valuation of the Mining Assets.

**2.5.6*****Australian Law***

In Australia, with few exceptions, all onshore mineral rights are reserved to the government of the relevant state or territory. Exploration for and mining of minerals is regulated by the mining legislation of that state or territory and controlled by the relevant state or territory department. Where native title has not been extinguished, native title legislation may apply to the grant of tenure and some subsequent administrative processes. Heritage legislation may operate to preclude or regulate the disturbance of a particular area. In most Australian states, if the holder of an exploration license establishes indications of an economic mineral deposit and expends a minimum level of investment, it may apply for a mining lease which gives the holder exclusive mining rights with respect to all minerals on the property. It is possible for one person to own the surface of the property and for another to own the mineral rights. The maximum initial term of a mining lease is 21 years and the holder has the right to renew the lease for a further period of 21 years. Subsequent renewals are subject to the minister's discretion and the lease can only be assigned with the consent of the relevant minister. Royalties are payable as specified in the relevant legislation in each state or territory. A general-purpose lease may also be granted for one or more of a number of permitted purposes.



These purposes include erecting, placing and operating machinery in connection with mining operations, depositing or treating minerals or tailings and using the land for any other specified purpose directly connected with mining operations.





85

85

**Annexure 7****2.5.7*****Avgold: Current Status***

Avgold classifies their land holding position into three main categories: existing mining authorisation; contiguous mineral rights for which extensions may be applied; and all non-contiguous mineral rights. On approval of areas currently under consideration for extension Avgold will have mining authorisations totalling 4,151Ha.

Details relating to the EMPR status as required by section 39(1) of the Minerals Act are also included in Section 11 of this CPR.

**Table 2.24 Avgold: Land Holdings****Existing Mining****Extension****Contiguous****Non-Contiguous****Mining Area****Authorisation****Application****Mineral Rights****Mineral Rights****(Ha)****(Ha)****(Ha)****(Ha)**

Target

4,151

Sun - Target North

23,200

Oribi

3,251

**Total****4,151****23,200****3,251****2.5.8*****Harmony: Current Status***

Harmony currently classifies their land holding position into four main categories: existing mining authorisation; area for which extensions have been applied; all contiguous mineral rights; and all non- contiguous mineral rights. On approval of areas currently under consideration for extension Harmony will have mining authorisations totalling 122,615Ha.

Being effectively lease bound, Harmony's South African mining operations do not include any significant mineral rights external to the current lease areas.

Details relating to the EMPR status as required by section 39(1) of the Minerals Act are also included in Section 11 of this CPR.

**Table 2.25 Harmony: South African Operations Land Holdings****Existing Mining****Extension****Contiguous****Non-Contiguous****Tax Entity****Authorisation**

**Application**

**Mineral Rights**

**Mineral Rights**

(Ha)

(Ha)

(Ha)

(Ha)

Free Gold including Joel

21,204

9,162

4,877

24,484

Harmony Free State

22,583

1,815

3,256

4,094

Welkom

5,511

0

0

0

Randfontein

24,266

0

3,006

572

Evander

(1)

36,898

2,262

2,837

1,462

Orkney Operations

9,317

0

0

0

Harmony Free State

22,583

1,815

3,256

4,094

Kalgold

(2)

615

3,810

0

0

**Total**

**142,977**

**18,864**

**17,232**

**34,706**

(1)

Evander excludes prospecting rights granted of 162,237Ha.

(2)

Kalgold is currently the subject of a sale agreement.

Harmony Australian Operations control exploration and mineral rights over a total area of 298,355Ha, of which the active mining areas currently total 75,516Ha.

In Australia, most mineral rights belong to the government and mining companies must pay royalties to the government based on production. There are, however, limited areas where the government granted freehold estates without reserving mineral rights. Harmony has freehold ownership of its Jubilee mining areas, but the other mineral rights in Harmony Australian Operations belong to the Australian Government and are subject to royalty payments. In addition, current Australian law generally requires native title approval to be obtained before a mining license can be granted and mining operations can commence. Harmony Australian Operations have approved mining leases for most of their Mineral Reserves, including all Mineral Reserves that are currently being mined and Mt. Magnet & Cue Operations, which have an approved mining license for the current development area. If Harmony Australia Operations expand into additional areas under exploration, these operations would need to convert the relevant exploration licenses prior to commencing mining and that process could require native title approval. There can be no assurance that any approval would be received.







86

86

**Annexure 7**

**Table 2.26 Harmony: Australian Operations Land Holdings**

**(1)**

**Mt.Magnet &**

**Sth.**

**Regulatory Area**

**Units**

**Totals**

**Cue**

**Kalgoorlie**

**Other**

**Western Australia**

**Mining Lease**

**Active Permits**

**(1)**

Areas/Blocks

(No.)

**65,577**

38,199

27,379

0

Total Area

(Ha)

**655**

382

274

0

**Pending Permits**

Areas/Blocks

(No.)

**54,951**

17,114

37,837

0

Total Area

(Ha)

**550**

171

378

0

**Prospecting Licence**

**Active Permits**

Areas/Blocks

(No.)

**16,664**

8,096

8,568

0

Total Area

(Ha)

**167**

81

86

0

**Pending Permits**

Areas/Blocks

(No.)

**9,285**

2,578

5,138

1,569

Total Area

(Ha)

**93**

26

51

16

**Exploration Licence**

**Active Permits**

Areas/Blocks

(No.)

**311**

127

185

0

Total Area

(Ha)

**870**

372

498

0

**Pending Permits**

Areas/Blocks

(No.)

**454**

198

218

38

Total Area

(Ha)

**1,264**

566

589

109

**Miscellaneous Licence**

**Active Permits**

Areas/Blocks

(No.)

**6,848**

532

6,316

0

Total Area

(Ha)

**68**

5

63

0

**Pending Permits**

Areas/Blocks

(No.)

**177**

97

80

0

Total Area

(Ha)

**56**

1

55

0

**General Purpose Lease**

**Active Permits**

Areas/Blocks

(No.)

**936**

936

0

0

Total Area

(Ha)

**9**

9

0

0

**Pending Permits**

Areas/Blocks

(No.)

**0**

0

0

0

Total Area

(Ha)

**0**

0

0

0

**Special Lease**

**Active Permits**

Areas/Blocks

(No.)

**2,226**

0

2,226

0

Total Area

(Ha)

**22**

0

22

0

**Pending Permits**

Areas/Blocks

(No.)

**0**

0

0

0

Total Area

(Ha)

**0**

0

0

0

(1)

The Mineral Reserves supporting the valuation reported in Section 14 are contained within the Active Permits and are valid for the LoM period.





87

87

**Annexure 7**

**Figure 2.1 Mining Assets: General Location Map**







88

88

**Annexure 7**

**Figure 2.2 Avgold: Location Map and Lease Area for Target Operations**





89

89

**Annexure 7**

**Figure 2.3 Harmony: Location Map and Lease Area Harmony Free Gold Operations, Free State Operations and Welkom Operations**





90

90

**Annexure 7**

**Figure 2.4 Harmony: Location Map and Lease Area for Evander Operations**







91

91

**Annexure 7**

**Figure 2.5 Harmony: Location Map and Lease Area for Orkney Operations**





92

92

**Annexure 7**

**Figure 2.6 Harmony: Location Map and Lease Area for West Wits Operations, Elandsrand and Deelkraal**







93

93

**Annexure 7**

**Figure 2.7 Harmony: Location Map and Lease Area for West Wits Operations, Randfontein Estates**





94

94

## **Annexure 7**

### **3.**

## **GEOLOGY**

### **3.1**

#### **Introduction**

This section describes the geology of the Mining Assets. The nature and geometry of the orebodies being or planned to be mined, their structural complexity and the variability of grades is also discussed. In addition to this, a brief description of the geological potential is presented.

### **3.2**

#### **South African Goldfields**

**Witwatersrand Basin Geology:** Witwatersrand Basin operations are mostly deep-level underground mines exploiting gold bearing, shallow dipping tabular bodies, which have collectively produced over 50kt (1,608Moz) of gold over a period of more than 100 years.

The Witwatersrand Basin comprises a 6km vertical thickness of argillaceous and arenaceous sedimentary rocks situated within the Kaapvaal Craton, extending laterally for some 300km east-northeast and 150km south-southeast. The sedimentary rocks generally dip at shallow angles towards the centre of the basin though locally this may vary. The basin sediments outcrop to the south of Johannesburg but further to the west, south and east these are overlain by up to 4km of Archaean, Proterozoic and Mesozoic volcanic and sedimentary rocks. The Witwatersrand Basin sediments themselves are considered to be between 2,700 and 3,100 million years old.

Gold mineralisation in the Witwatersrand Basin occurs within laterally extensive quartz pebble conglomerate horizons, termed reefs. These occur within seven separate goldfields located along the eastern, northern and western margins of the basin. These goldfields are known as the Evander Goldfield, the East Rand Goldfield, the Central Rand Goldfield, the West Rand Goldfield, the Far West Rand Goldfield, the Klerksdorp Goldfield and the Free State Goldfield. As a result of faulting and other primary controls on mineralisation, the goldfields are not continuous and are characterised by the presence or dominance of different reef units. The reefs are generally less than 2m in thickness and are widely considered to represent laterally extensive braided fluvial deposits or unconfined flow deposits, which formed along the flanks of alluvial fan systems that developed around the edge of what was effectively an inland sea.

All major reef units are developed above unconformity surfaces. The extent of unconformity is typically greatest near the basin margin and decreases toward more distal areas. Complex patterns of syn-depositional faulting have caused complex variations in sediment thickness within the basin. Sub-vertical to over-folded reef structures is a characteristic of basin margin features within certain areas.

Most early theories believed the gold to be deposited syngenetically with the conglomerates, but recent research has confirmed that the Witwatersrand Basin has been subject to metamorphism and that some post-depositional redistribution of gold has occurred. Other experts regard the gold to be totally epigenetic and to have been deposited solely by hydrothermal fluids some time after deposition of the reef sediments.

Despite these varied viewpoints, the most fundamental control to the gold distribution remains the association with quartz-pebble conglomerates on intra-basinal unconformities. The reefs are extremely continuous, as a consequence of the regional nature of the erosional surfaces. Bedrock (footwall) controls have been established governing the distribution of many of the reefs. Preferential reef development within channel systems and sedimentary features such as facies variations and channel frequency assist in mapping out local gold distributions. In all cases the grade of the orebodies varies above and below the pay limit. Consequently, the identification and modeling of erosional/sedimentary features is the key to in-situ resource estimation.

#### **3.2.1**

##### ***Free State Goldfield***

The Free State Goldfield lies some 270km southwest of Johannesburg on the southwest rim of the Witwatersrand Basin. Exploration within the Free State Goldfield dates from the mid-1940s when values within the Basal Reef, the predominant economic reef in the district, were intersected.

Structurally, the Free State Goldfield lies within a north-south trending syncline forming an apex in the southwestern corner of the Witwatersrand Basin. The northerly plunging syncline is roughly divided by two major faults into three major blocks: the Odendaalsrus section to the west of the De Bron fault, the Central Horst, between the De Bron and Homestead faults and the Virginia Section east of the Homestead Fault. The Central Horst was uplifted and the Central Rand Group rocks eroded away prior to Ventersdorp time.

The Central Rand Group in the Free State comprises some 2,000m of sedimentary sequences deposited over successive unconformity surfaces in an expanding depositional area. The lack of major faulting and folding of Central Rand Group age has led to the conclusion that subtle tectonic warping of the basin with granite doming on the margins controlled deposition.





95

95

**Annexure 7**

The auriferous horizons are most typically conglomeratic units deposited at the base of each depositional sequence, although they may also occur as scours within a given formation. The principal reefs mined in the Free State are the Basal Reef, the Saaiplaas Reef, the Leader Reef, the 'B' Reef, the 'A' Reef, Elsburg Reefs and the Dreyerkuil Reefs. The Basal Reef is the most extensive, continuous and economically significant reef in the Free State Province, accounting for over one-half of all of the gold produced there to date.

**3.2.2*****West Rand Goldfield***

The Cooke BUs and Doornkop BU of the West Wits Operations are situated in the West Rand Goldfield, the structure of which is dominated by the Witpoortjie and Panvlakte Horst blocks which are superimposed over broad folding associated with the southeast plunging West Rand Syncline. The northern limb of the syncline dips in a south-south-westerly direction and the southern limb in an east-south-easterly direction. The fold axis of the West Rand Syncline is located along a line that runs from the West Rand Consolidated Mines Limited lease area near Krugersdorp and trends south- eastwards through the northern part of the Doornkop section.

The structural geology in the north section of the Cooke shafts is dominated by a series of northeast trending dextral wrench faults. The most significant of these are the Roodepoort/Panvlakte Fault and the Saxon Fault, which have downthrows of 550m to the southeast and the Doornkop Fault which has a 250m down throw to the southeast. Several other smaller scale faults have downthrows ranging from 20m to 150m. Pilanesburg, Bushveld and Ventersdorp age doleritic dykes are also present. These strike in a northerly direction, with the exception of some of the latter dykes, some of which strike in an easterly direction.

At Cooke Section two major fault trends are present. The first set parallel the Panvlakte Fault striking NNE. These faults are steeply dipping, generally have small throws and do have any noticeable lateral movement to displace payshoots. A second major fault system, however trends north-westerly to east- west, which significantly displace these payshoots. They have small throws and tend to be water bearing showing a connection to the dolomites and indicating a Transvaal age. Many of them are mylonite or dyke filled.

Six main reef groupings have been identified at West Wits Operations on the West Rand Goldfield, the Elsburg Formations, the Kimberleys, the Black Reef, the Livingstone Reefs, the Ventersdorp Contact Reef (the "VCR") and the South Reef. Within these, a total of nine economic reef horizons have been mined at depths below surface between 600m and 1,260m.

**3.2.3*****Far West Rand Goldfield***

Three primary reefs are exploited in the Far West Rand Goldfield, the VCR located at the top of the Central Rand Group, the Carbon Leader Reef near the base and the Middelvlei Reef, which occurs some 50m to 75m above the Carbon Leader Reef. Secondary reefs also occur in the area but the only examples of any significance are individual bands within the Mondeor Conglomerate Reef Zone that sub-crop beneath the VCR at Deelkraal BU and on the western side of Elandsrand BU.

The separation between the VCR and Carbon Leader Reef increases east to west from 900m to over 1,300m as a result of the relative angle of the VCR unconformity surface to the regional stratigraphic strike and dip. The Carbon Leader Reef strikes west-southwest and dips to the south at 25°. The VCR strikes east-northeast and has a regional dip of 21° to the south-southeast. Local variations in dip are largely due to the terrace-and-slope palaeotopographic surface developed during VCR deposition. In the location of the Mining Assets the Carbon Leader Reef occurs too deep to allow mining from current infrastructure and is lower in grade than elsewhere on the Far West Rand Goldfield. Consequently the VCR is the only reef currently exploited.

There are a series of east trending, north dipping normal faults with throws of up to 40m and a series of north-northeast striking normal faults with generally smaller displacements in the northwest. The original displacements on these faults are occasionally increased as a function of subsequent post-Bushveld displacement but overall faulting is much less prevalent than it is in other Witwatersrand goldfields. There are, for example, no major faults with throws of the order of several hundred meters or more. Moving to the eastern sections of the Far West Rand Goldfield the structure becomes simpler with few major faults. Most faults are high-angle normal faults trending



north- northwest and eastwards and having throws of less than 70m.





96

96

**Annexure 7****3.2.4*****Evander Goldfield***

The Evander Basin is a tectonically preserved sub-basin outside of the main Witwatersrand basin, the Devon Dome, a large granitoid cupola, separates it from the main Witwatersrand Basin. It is the most easterly mined Witwatersrand gold occurrence. The basin forms an asymmetric syncline, with the fold axis between No.5 BU and No.6 BU, plunging to the northwest and contains only one economic reef system, the Kimberley Reef.

The Evander Basin was a part of the main Witwatersrand Basin until post-Booyens shale times. It was separated from the East Rand and South Rand Basins by uplift in the areas now marked by the basement Devon and Cedarmont Domes. Deeper within the basin, the Central Rand Group is overlain by Ventersdorp Lavas and Transvaal Sequence sedimentary rocks. West Rand Group rocks are present beneath the Central Rand Group. A poorly mineralised reef, stratigraphically above the Kimberley Reef, termed the Intermediate Reef, is also developed but is not economic, except where it has eroded the sub-cropping Kimberley Reef in the south and west of the basin.

The Evander Basin is one of the more structurally complicated parts of the Witwatersrand. Mining and drilling have defined the larger elements of the structure of the shallow southern and western basin margins. The northern and north-eastern extent of the basin is poorly drilled because of the depth to the Kimberley Reef and because of poor grades encountered to the north. The geological structure there has been inferred from two-dimensional seismic survey lines.

**3.2.5*****Klerksdorp Goldfield***

The Klerksdorp Goldfield is located on the northwest margin of the Witwatersrand Basin and lays some 150km south-southwest of Johannesburg. Exploration, development and production history in the area dates from 1886 and following dormant periods, large-scale production commenced during the 1940s.

The Witwatersrand Basin sedimentary rocks are overlain by up to 2,000m of cover rocks and the reefs themselves occur at depths of between 80m and 4,000m and, with the exception of the VCR, which dips moderately steeply west-northwest, generally dip gently to the southeast.

The most significant structural features of the Klerksdorp Goldfield are northeast striking normal faults, which dip to the northwest and southeast and have throws of several hundred metres. These features break up the stratigraphy containing the stratiform orebodies into a series of horsts and grabens, which vary in width from several hundred metres to over a thousand metres. These horsts and grabens are internally disturbed by small-scale faults sympathetic to the major faults, which typically have throws of tens of metres and break up the reef into continuous blocks of up to 100m in width. These brittle faults can be identified by drilling from access development and as the dip of the stratigraphy is reasonably consistent, can usually be negotiated without significant difficulty. There are, however, smaller-scale faults in the immediate vicinity of these larger faults, which disrupt the reefs and can result in increased losses and dilution.

All mining to date in the Klerksdorp Goldfield has taken place to the northwest of one of the major northeast-southwest striking normal faults, the Jersey Fault, which has a down throw to the southeast of up to 1,000m, displacing the Vaal Reef down to a depth below surface exceeding 3,000m. Two further sub-parallel faults occur to the southeast of the Jersey Fault displacing the reefs down to more than 5,000m below surface.

Two primary conglomerate reefs are exploited within the Klerksdorp Goldfield, namely the Vaal Reef and the VCR. The Vaal Reef and VCR reef horizons occur at depths between 80m and 4,000m. The VCR dips moderately steeply west-northwest, the Vaal Reef generally dips gently to the southeast. Other, secondary reefs, including the Black Reef, Zandpan Marker and Denny's Reef exist; however they are not currently considered to be economically viable.

**3.3****Deposit Geology**

Most of the operations can be described as mature mining operations with good underlying geological models backed up with grade models based on vast amounts of historical mining and sampling data. The electronic capture of sampling data over the past ten-years has allowed a far greater understanding of the grade and payshoot characteristics of the orebodies than was possible previously. The Companies Indicated and Inferred Mineral Resources are more

reliant on the projection of geological or facies models than the Measured Mineral Resources due to the much lower density of sampling data in these areas.





97

97

**Annexure 7****3.3.1*****Target Operations***

The gold mineralisation currently exploited by Target Mine is contained within a succession of Elsburg and Dreyerskuil quartz pebble conglomerate reefs hosted by the Van den Heeverrust and Dreyerskuil Members of the Eldorado Formation, respectively. Additional Mineral Resources have been delineated in the Big Pebble Reefs of the Kimberley Formation but these are not planned to be exploited in the current LoM plan.

The individual Elsburg Reefs are separated by quartzite beds and form a wedge shaped stacked sequence which strikes north north-west and comprises some 35 separate reef horizons interpreted to have been deposited in an alluvial fan system similar in nature to present day river deltas. This sequence of Elsburg Reefs and quartzites is truncated by an unconformity with the overlying younger Dreyerskuil Member. Immediately below the sub-crop with the Dreyerskuil the Elsburg Reefs and quartzites dip steeply to the east becoming progressively shallower dipping resulting in a structure analogous with a recumbent syncline, verging to the west, with the upper limb removed. This synclinal structure plunges shallowly at 10° to the north. In the more proximal areas to the sub-crop the thickness of the intervening quartzites reduces and many of the individual Elsburg Reefs coalesce to form reef packages that are exploited by the massive mining methods employed at Target Mine. Gold grades in the Elsburg Reefs are also higher in the proximal areas decreasing down dip until reaching an economic limit some 200m to 450m from the sub-crop. The majority of the Mineral Reserves at Target Mine are contained within the Eldorado fan, a structure with dimensions of some 135m vertically, 450m down-dip and 500m along strike. The Eldorado fan is similar in nature to the fans historically mined at Loraine gold mine to the south. The Eldorado fan is connected to the subsidiary Zuurbron fan, located between Target Mine and Loraine, by a thinner and lower grade sequence of Elsburg reefs termed the Interfan area. The economic mineralisation in the Interfan is less persistent distally than within the fans and does not contribute significantly to the reserves. To the north of the Eldorado fan a number of other fans have been intersected by surface drilling of which the Siberia and Mariasdal fans are the most significant. These fans are subject to ongoing technical studies and do not form part of the current Target Mine LoM Mineral Reserve.

The Dreyerskuil Member consists of a series of stacked reefs, dipping shallowly to the east, that are less numerous but laterally more continuous than the underlying Elsburg Reefs. At Loraine this unit correlates stratigraphically with the Uitkyk Member that consists of an immature conglomerate informally termed the 'Boulder Beds'. These beds did not contain significant gold mineralisation and were therefore not mined at Loraine. Towards the north the Uitkyk Member grades into a series of reworked conglomerates and quartzites, similar in nature to the Elsburgs, which becomes the Dreyerskuil Member in the vicinity of Target Mine. The conglomerate reefs contain economic mineralisation, some of which may have been derived through the erosion and reworking of Elsburg Reefs at the sub-crop.

The Big Pebble Reefs are found in the Kimberley Formation, which is overlain by the Eldorado Formation. The BP6a Reef, which has been historically mined at Loraine No.2 Shaft, lies on the unconformity at the base of the upper member of the Kimberley Formation (the Earl's Court Member). This overlies the Big Pebble Reef Member, the base of which comprises a series of argillaceous quartzites and several well-developed conglomerates. These are collectively referred to as the Big Pebble Zone ("BPZ"), which varies in thickness between 1m and 15m. The BPZ conglomerates are well developed at Target Mine and Loraine and coalesce into thick multiple conglomerate reef units close to their western subcrop position. Although resources have been delineated in the BPZ in the Loraine and Target Mine areas, these are not exploited in the current LoM plan.

A number of faults that displace the reefs at Target Mine have been identified of which the most prominent are the north-south trending Eldorado fault and the east-west trending Dam and Blast faults. The Eldorado uplifts the more distal portions of the Elsburg and Dreyerskuil Reefs while the Blast fault forms the northern boundary of Target Mine. The structure is known to a reasonable degree of confidence through a combination of underground drilling and mapping augmented by surface seismic surveys.

The plunging synclinal feature at Target Mine continues northwards, where the geological setting is similar and additional non-LoM resources have been delineated on the Elsburgs, Dreyerskuil and Big Pebble Reefs. In the Target North area low-grade mineralisation has also been intersected on the Maraisdal Reef and the Sun Reef, which are



thought to be the equivalent of the 'B' Reef and Basal Reef, respectively, elsewhere in the Free State Goldfield. An erratically developed reef has been intersected in some surface boreholes in an area to the far north of the Target Mine at the base of the Ventersdorp Conglomerate Formation, which overlies the Eldorado Formation. This is interpreted to be the VCR, which is present in the Klerksdorp, West Rand and Far West Rand Goldfields but not elsewhere in the Free State Goldfield. The VCR is a coarse to very coarse quartz pebble conglomerate, which appears to be highly channelised and varies in thickness from almost zero to 4m.





98

98

**Annexure 7**

Target North is sub-divided into the Paradise, Siberia and Maraisdal areas by the east-west trending Siberia and Maraisdal faults. To the north of the Siberia Fault, the Eldorado Fault continues trending more to the northwest and an additional north-south trending fault, the Twin fault has uplifted the distal portions of the reefs. North of the Maraisdal fault the reef horizons are at a depth greater than 2,500m below surface and a farm boundary sub-divides this area into Maraisdal and Kruidfontein. The large-scale structure in the Target North area is known to a reasonable degree of confidence through the surface boreholes and extensive three-dimensional seismic surveys. Resources have been delineated on strike up to 15km north of Target Mine.

Approximately 40 km north of Target Mine, surface boreholes have intersected gold bearing reefs in the Oribi area close to the town of Bothaville. Resources have been delineated at Oribi on the VCR and Elsburgs at depths of approximately 2.75km below surface.

**3.3.2*****Free Gold Operations***

The primary reef mined at Tshepong BU is the Basal Reef with minor contribution from the 'B' Reef, which lays some 140m stratigraphically above the Basal Reef. The 'B' Reef is highly channelised in nature with a much more erratic grade distribution than the Basal Reef. The relatively incompetent Khaki Shale overlies the Basal Quartzite, which occurs in the upper portion of the Basal Reef. The Basal Quartzite provides natural support to the Khaki Shale and where the thickness of this is less than 60cm, mining dilution can and does increase dramatically.

The Basal Reef dips at shallow angles to the east and is intersected by two significant north-south striking faults, the Dagbreek and the Ophir Faults. These faults dip at moderate angles to the west and have significant strike-slip and up-dip throws of the order of 1,000m to 2,000m and 200m to 300m, respectively.

Economic grades at Tshepong BU are constrained within a broad payshoot, which trends east-southeast. Currently a geological model of the Basal Reef facies variations is used for grade estimation. The method of assigning facies type is a scoring system developed in conjunction with Leeds University, UK. Scoring is based on geological type (Lorraine Facies or Black Chert Facies), presence of Waxy Brown Quartzite ("WBQ"), which is thought to trap fluids in the underlying reef, presence of micro-thrusting, which is thought to encourage fluid flow into the reef and presence of reducing minerals such as sulphides and carbon, which are thought to encourage the precipitation of gold mineralisation.

Phakisa BU is situated immediately to the east of Tshepong BU where shaft-sinking operations ceased prior to completion. The resources at Phakisa comprise the Basal Reef and represent the down-dip extension from Tshepong BU.

The primary reefs mined at Bambanani include the Basal Reef and in particular the Steyn Facies which covers approximately 90% of the mine area. The Khaki Shale in the north and the Waxy Brown Quartzite in the south overlie the Basal Reef. Secondary reefs such as the Leader Reef have been mined on a small scale historically but have always been found to be low grade.

The whole package dips at angles of between 25° and 45° to the east and is generally between 1m and 3m thick.

The lease area is bound to the west by the Stuurmanspan Fault and to the east by the De Bron Fault. The Harrison Fault, parallel and to the west of the De Bron Fault demarcates the eastern mining limit. Both of these are significant north-south striking normal faults, which dip at moderate angles to the west and have throws of over 100m. Faults sympathetic to these occur with displacements of up to 50m, as do east-west faults with lateral shifts of up to 400m on the northern edge of the mining area.

Joel BU exploits two distinct forms of a single reef, developed on a single unconformity surface. These are known as the Beatrix Reef and the Beatrix-VS5 Composite Reef. The reefs dip to the northeast at 15° and the composite reef sub-crops against the overlying Karoo Supergroup just to the north of Joel South BU, defining the southern limit of the orebody.

The Beatrix Reef conglomerates are found throughout the mine area and generally have multiple basal degradation and internal scour surfaces, often thinning to a single pebble lag on paleotopographic highs. The Beatrix-VS5 Composite Reef represents a re-working of the Beatrix Reef accompanied by a mixing with lower grade VS5 material. This occupies a 500m to 1,000m wide channel running almost north-south through the centre of the lease area, which

is interpreted to widen to the northeast of Joel North BU.





99

99

**Annexure 7**

A deep erosional channel of Waterpan sedimentary rock, known as the Klippan Channel, truncates the reef some 1.8km to the northeast of Joel South BU. This washout is wedge-shaped with its apex to the west and widens to the southeast. The estimated dimension from the apex to the eastern property boundary is approximately 1.8km. The reefs have been shown to be continuous to the north of this transgressive feature.

Where untouched by the Klippan Channel, the reefs are bound to the east by the De Bron Fault, which strikes north-northeast. The CD Fault, which strikes northeast and is roughly halfway between the two shafts, has a 320m sinistral lateral displacement, which has moved ground south of the fault towards the northeast.

The complex nature of the reef, due to the multiple pulses of detrital influx and scouring, paleo- topographic highs and mixing between the Beatrix and Beatrix-VS5 Composite Reef, has resulted in a highly irregular distribution of gold throughout the mining area. There are broad low and high- grade zones on the scale of 100's of metres, which are likely to repeat beyond current development, however, the detailed grade distribution within these zones remains very unpredictable.

For the purposes of resource estimation, a detailed facies model is used and is based on detailed sedimentological observations and absence of well-mineralised reef at paleo-topographic highs.

Eland BU, Kudu & Sable BU and Nyala BU are contiguous to the south and west of Tshepong BU and Basal Reef is mined almost exclusively. The geological setting is similar to that described for Tshepong BU, however, faulting in the mining lease is the most intense to be found at the Free Gold Operations (excluding Joel BU). The Dagbreek fault intersects Eland BU lease area and the Rheedersdam thrust fault forms the western boundary of the remaining three BUs. These and other generally north striking normal faults including the Eureka, Rietpan and Wesselia faults represent the dominant the structures in the area. The reef in the Rheedersdam fault zone has been multiply repeated by thrusting which has resulted in stacks of up to eight reef repeats.

Further variability in reef occurrence has been caused by changes in palaeotopographic slope, which controlled the nature of sedimentation and subsequent mineralisation potential.

The Basal Reef is particularly carbonaceous at Eland BU, Kudu & Sable BU and Nyala BU and the gold tends to concentrate strongly on the kerogen-rich footwall contact and visible gold has been observed in several areas. The best grades were historically mined at Kudu & Sable BUs. The Nyala BU area is characterised by marginal grades. Eland BU and Kudu & Sable BU are predominantly remnant operations with short lives and the extensive historical mining and the nature of the remaining Basal Reef Mineral Resources minimise uncertainties regarding grade, structural complexity and loss of ground. Nyala BU has only recently re-opened and the LoM plan is focused on exploiting the Basal Reef shaft pillar.

The St. Helena BU has a complex geological structure with faults generally trending north south with downthrows of up to 2,000m and dips of between 30° and 50°. Reverse and thrust faulting is present, sometimes resulting in local duplication of reef. Two economic reefs are present within the mine property with the Basal Reef being the most economically important unit and the Leader Reef, which lies some 15m above the Basal Reef.

St. Helena is predominantly a remnant operation with extensive historical mining and the nature of the remaining Basal Reef Mineral Resources minimise uncertainties regarding grade, structural complexity and loss of ground. Surface sources at the Free Gold Operations comprise numerous Waste Rock Dumps ("WRDs") and Slimes Dams, which in addition to various plant clean-up tonnages, are processed at FS1 Plant, FS2 Plant and to some degree at Joel Plant. WRDs comprise both waste material and reef material, the latter of which is sourced from cross-tramming of mined ore. Typical grades range between 0.5g/t and 1.0g/t, which are either processed directly or pre-screened to ensure Run of Mine ("RoM") grades in excess of 1g/t.

Slimes Dams may also contain significant gold grades owing to occasional sub-optimal metallurgical performance, which resulted in gold being sent to tails. Grade distribution within WRDs and Slimes Dams can vary significantly owing to fundamental changes in mining, hoisting and processing methods, which have been implemented over prolonged years of mining.







100

100

**Annexure 7****3.3.3*****Harmony Free State Operations***

At these operations mining was originally established to exploit the rich Basal Reef, but, as reserves in this orebody became depleted, production is being increasingly sourced from the more erratically mineralised and lower grade Leader Reef, Middle Reef, `A' Reef and the `B' Reef. The Basal Reef is a high grade, generally thin (<100cm) reef, which has been payable across most of its exposed extent. In the south, at both Harmony No.2 BU and Unisel BU, the reef pinches out against elevated footwall and grades deteriorate. The Leader Reef, `A' Reef, `B' Reef and Middle Reef are only payable in distinctive and often extensive payshoots and discrete pods where these reefs overlie the Basal Reef. Where the Leader Reef truncates the Basal Reef east of the so-called "line of coalescence" at Harmony, it is more uniformly payable.

The mineralised meta-conglomerates mined at Masimong are the Basal Reef, `B' Reef and `A' Reef. The Basal is mined at all three of the Masimong BUs while the `A' Reef is mined at Masimong No.4 BU and the `B' Reef at Masimong No.5 BU . At Masimong No.4 BU and Saaiplaas No.3 BU the Basal Reef is present as the Steyn facies, comprising three to four upward fining sedimentary cycles. The lower cycle, being the primary gold carrier comprises a basal conglomerate with an overlying protoquartzite. Carbon seams, which carry most of the gold, occur locally on the bottom contacts. Channel widths are generally below 70cm but in places only the carbon contact between the hanging BU wall and footwall exists. A north-south trending payshoot extending through the Saaiplaas No.3 BU towards the north along the western side of Masimong No.4 BU forms the main target area for the Basal Reef. The black chert facies Basal Reef at Masimong No.5 BU comprises two upward fining cycles, of which the lower carbonaceous unit is the primary gold carrier. Channel widths average 60cm. The target area for this facies is a northwest-southeast trending payshoot that cuts through the shaft and is truncated to the east by younger leader quartzites.

The `A' Reef at Masimong No.4 BU lies 140m to 160m above the Basal Reef and is characterised by a highly channelised series of conglomerate bands that are generally only payable in locations where one or more bands exist within the channel itself. These oligomictic conglomerates are dark in colour with abundant, mostly fine pyrite and occasional carbon. Channel thickness is highly variable but can be up to 1.8m, with gold values highly dependent on the reef thickness and the presence of carbon.

The `B' Reef, lying 110m above the Basal Reef, comprises complex sedimentologically controlled gold mineralisation within a wide east-west trending channel that cuts through the Masimong No.5 BU area. Within this channel very high grade lenticular gravel bars contain abundant visible gold and form the targets for mining. Gold grades are erratic and extremely nuggety, while the channel widths also vary from zero to approximately 1.8m.

The two conglomerate horizons at Harmony No.2 BU, the Basal Reef and `A' Reef, are separated by 140m of mostly quartzites and conglomerate. The reefs dip 5° to 15° towards the west, becoming steeper to the west approaching the De Bron Fault. Numerous east-west trending dykes cut the reef, resulting in up throw and lateral shift. The Basal Reef occurs as thin bands of upward fining conglomerates, with full channel widths of up to 120cm. The payable reefs are often associated with carbon. Weak shales overlie the Basal Reef and must either be undercut or removed with the reef. The footwall to the `A' Reef at Harmony No.2 BU is the 1m to 15m thick Big Pebble Marker, which, where thinnest, is associated with better developed `A' Reef. Better gold grades are associated with thicker channels greater than 1m thick.

Brand No.1 BU and Brand No.3 BU are characterised by large north-south trending faults with lateral movement. The `A' Reef is the predominantly targeted reef and is found in wide fault displaced east west pay trends. The Basal Reef belongs to the former `Basal Placer' facies and is predominantly found in the form of a thin reef, rich in carbon. Pebbles are not always present. The reef thickness seldom exceeds 20cm and is generally less than 10cm.

Brand No.5 BU is sub-divided into fault blocks, with complex north-south structural trends intersected by normal north-northeast-south-southwest trending faults. Vertical fault displacements are minor, whereas right-lateral displacements are significant. The reefs on average, dip 40° to the east. The main reefs mined at Brand No.5 BU are the Basal Reef and Leader Reef. The Steyn Facies Basal Reef comprises four sedimentological conglomerate sub-facies, with gold best developed at the base of the conglomerates and associated with pyrite. The Leader Reef,

lying between 7m and 16m above the Basal Reef is highly channelised with thickness increasing from east to west. This upwardly fining sequence comprises three sub-facies that can be up to 400cm thick. Gold is generally distributed evenly throughout the reef package.

The reefs at Unisel BU dip 30° to the East and are structurally complex due to fault intersections and the presence of sills in the vicinity of the Basal Reef. The principal reefs mined are the Basal Reef and the Leader Reef. The Basal Reef has been divided into three distinct sedimentological facies, with gold mainly associated with moderate-to-well developed buckshot pyrite. The Leader Reef is highly channelised with limited sedimentological information and shows an erratic grade distribution.





101

101

**Annexure 7**

The Merriespruit area is structurally complex with extensive north-south and east-west trending faults, with vertical displacements of up to 650m. Igneous intrusives are associated with the structurally complex areas. In general the reefs structures strike northeast southwest and dip 20° to the north. The Basal Reef is typically thin (<1m) and channelised, with payable grades located in northeast- southwest trending payshoots. This upwardly fining conglomerate is poorly to well mineralised with the local occurrence of buckshot pyrite. Locally mineralised Middle Reef, found above the Basal Reef in the hanging wall quartzites, is only payable when adjacent to Basal Reef or overlying Leader Reef. The Leader Reef comprises a series of conglomerate bands separated by pebbly quartzite bands that are variably mineralised, with typically poor to moderate grades. Payable grades are often located in NE-SW trends. In general the gold is dispersed throughout the package, with gold associated with the pyrite.

Surface sources at the Harmony Operations comprise numerous WRDs, Slimes Dams and Other Sources, which in addition to various plant clean-up tonnages, are processed at the Central, Virginia and Saaiplaas Plants. WRDs comprise both waste material and reef material, the latter of which is sourced from cross-tramming of mined ore. Typical grades range between 0.4g/t and 1.0g/t.

Slimes Dams may also contain significant gold grades owing to occasional and historical sub-optimal metallurgical performance, which resulted in gold being sent to tails. Grade distribution within WRDs and Slimes Dams can vary significantly owing to fundamental changes in mining, hoisting and processing methods, which have been implemented over prolonged years of mining.

**3.3.4*****Welkom Operations***

The Welkom Operation lease area is centrally located within the Free State Goldfield in an area containing several other mature operations. The property is bounded to the south by the Free Gold Operation's St. Helena, Harmony Free State Operation's President Brand and President Steyn Gold Mines Limited's President Steyn Mine and the property is bounded to the north by Free Gold Operation's Eland BU, Kudu & Sable BU, Nyala BU and Tshepong BU.

The Basal Reef is the main reef exploited at Welkom Operation. In addition to the Basal Reef, No.6 BU also exploits the Leader Reef, lying some 15m above the Basal Reef. No.7 BU plans to exploit the Saaiplaas Reef or 'pyrite stringers' as it is commonly referred to at this mine. This consists of thick (up to 6m), low-grade channels superimposed on the Basal Reef.

The Basal Reef strikes north to north-northwest and generally dips to the east between 20° and 40°. The reef is bounded on the west by the north trending Rheedersdam Fault system and sub-crops against the Karoo Supergroup along a northward trending line representing the basin margin. To the east the north trending De Bron Fault bound the reef. Two major faults, the Dagbreek and Ararat further dissect the reef into three contiguous blocks.

No.1 BU and No.2 BU are situated within the easternmost of these three blocks, between the De Bron and the Ararat Faults. No.3 BU and No.4 BU are situated within the central block between the Dagbreek and Ararat Faults and No.6 BU and No.7 BU are situated within the western most block.

The Leader Reef also varies in thickness between 0.3m and 1.7m and comprises a well-packed, small- to-medium pebble conglomerate with white quartz and black chert clasts and a moderate percentage of buckshot and crystalline pyrite.

One other reef, the Middle Reef, has been exploited in a very small, opportunistic way. The Middle Reef is an impersistent, lensoid, cherty and/or quartz-pebble conglomerate unit within the Middling Quartzite of the Harmony formation. While sometimes of very high grade, individual lenses are typically less than 30m in planar dimensions and as such too small to systematically drill for, generally resulting in accidental discovery.

**3.3.5*****West Wits Operations***

The economic horizons change from north to south along the length of the Doornkop-Cooke-Western Areas part of the Witwatersrand Basin, from a few lower Central Rand unconformities in the north to the development of multiple upper Central Rand unconformities in the south. The structural and depositional history of the goldfield is still not fully understood due to the complicated pattern of stacked sub-cropping reefs, the syndepositional tectonics; however the individual orebodies have detailed grade models that assist evaluation.







102

102

**Annexure 7**

A key feature of reef development at Cooke Section is the thickening of the Westonia Formation to the east of the anticline and importantly to the south. This wedging of formations indicates that syndepositional uplift along the Panvlakte trend (before the anticline developed) had an effect on reef formation. The area to the west of the crest of the current anticline is characterised by narrow single band UE1A reef overlying a pronounced unconformity, whereas to the east the Elsburg A1 to A5 stacked package of conglomerate horizons forms a wedge interleaved with barren quartzites. This wedge opens out to the east and to the south with greater thicknesses of barren quartzites separating the individual reef horizons. To the east the conglomerates become increasingly distal in nature, to the south more individual horizons are developed.

The Main orebodies on the Cooke 1, 2 and 3 Section shafts of the West Wits Operations are the UE1A and the Elsburg A5 Reefs. Cooke 4 in the south mined 10 individual horizons including Elsburg Reefs and the VCR. On Doornkop the Kimberley Reefs and the South Reef are being mined. Moving further, the primary orebodies on the adjoining Central Rand goldfield were the Lower Central Rand Group orebodies the Main Reef Leader and the Main Reef.

A pronounced feature of the grade distribution at the Cooke shafts is the location of what were previously described as fan entry points into the basin. These pronounced fan shaped grade distributions on the grade plans are due in part to the presentation of the two different aged orebodies, the UE1A and A1, on the same plans; and the lack of palinspastic reconstruction of payshoots that terminate along these younger lateral movements.

The area covered by the original exploration pattern on the Cooke Shafts has now largely been mined out. Mining is now concentrating on pillars and areas on the periphery of the initial exploration area that are poorly explored from surface drilling.

Doornkop has been mining the Kimberley Reefs but attention is now focusing on the South Reef, which has been previously exploited on nearby operations. The South Reef comprises broad south-easterly trending shoots (palaeodepressions) separated by lower grade zones (palaeo-highs). One of these ore shoots, indicated by surface drilling and confirmed by recent stoping, runs through the Doornkop area.

Elandsrand BU and Deelkraal BU exploit the VCR, which unconformably overlies the Mondeor and Elsburg Formations of the Central Rand Group. These footwall sediments primarily comprise siliceous quartzites there are four major polymictic conglomerate zones within the Mondeor, which have supported minor stoping on Deelkraal. The VCR is overlain by the lava of the Alberton Formation, which forms the basal unit of the Klipriviersberg Group of the Ventersdorp Supergroup. The dip of the VCR at Deelkraal BU is relatively consistent at 24° although there is some postulation of a slight flattening of dip at depth at Elandsrand.

The VCR sits on a highly-incised unconformity surface exhibiting a marked palaeotopography. The unconformity (erosion) surface was covered with a residue of mature quartz pebble conglomerates (reef) preserved on fluvial terraces and slopes. These now reflect as local variations in the dip and strike of the reef. Terrace reef (being originally close to horizontal) has the attitude of the regional dip and it tends to be thicker and accompanied by higher gold accumulations. Terraces are preferentially mined. Slope reef is indicated where the attitude of the reef now departs significantly from the regional dip. Slope reef represents the inter-terrace slope areas, the reef is thin, has less conglomerate and less total gold. Slope reef gold values are generally below the paylimit.

The VCR is present throughout the Elandsrand BU lease area, but at Deelkraal BU there is a limit of deposition running roughly north-south through the centre of the lease area. The VCR is poorly developed to the west of this line. The facies and morphological models encompassing the Mining Assets have been developed through reef mapping in stopes and on-reef development mapping. They are used in the estimation of Mineral Resources to constrain the interpolation of grade into geologically homogenous areas.

Mondeor Conglomerate bands sub-crop beneath the VCR on the western side of Elandsrand BU and on Deelkraal BU. They have been mined in places underneath or close to their sub-crop on Deelkraal BU.

Structures present at Deelkraal BU and Elandsrand BU include faults, dykes and sills. The sills occur in the footwall in many areas adjacent to dykes; however, these only affect the reef horizon in old, mined out areas near Elandsrand BU. The faults and dykes are classified according to the relative geological ages and comprise Pre-VCR, Early Ventersdorp, Late Ventersdorp, Bushveld and Pilanesberg Structures.

The structural model at Elandsrand BU has been developed from information compiled over many years, from continual mapping of footwall haulages, cross-cuts, on-reef raises, winzes, development drives and stopes. In contrast at Deelkraal, where the low angle faulting is more common, a relatively poor structural database exists, as it was previously not consistently recorded. Ongoing mapping and re-interpretation is rectifying this situation and enabling the development of a more detailed model.





103

103

**Annexure 7****3.3.6*****Evander Operations***

Within the Evander Operations lease area the Kimberley Reef dips predominantly northwards. There are several distinct fault styles developed within the mine lease. Earliest faults tend to have thrust movements, resulting in duplication of the reef. These faults strike northwards to westwards and are generally consistent with thrust movement into the basin. Throws of up to 150m have been encountered within the mine workings. The predominant faulting within the mine is a series of extensional faults. The resulting shallow-dipping faults trend west-northwest and have up throws to the north. This is an extremely fortuitous situation as the successive up throws maintain the Kimberley Reef at a consistently shallow depth below surface throughout the main part of the Evander lease. Significant fault losses are, however, associated with these faults. There has been only minor lateral movement along these faults. Channels can normally be traced across them with only minor displacements.

Vertical and overturned Kimberley Reef is present in the BU No.6 area in the southeast corner of the mine. This structurally complex area represents a basin margin structure, in many ways analogous to the structural regimes observed on the Western Margin of Free State Goldfield. The vertically dipping reef sub-crops against the overlying Karoo Sequence rocks. Complex wrench faulting is also developed within the No.6 BU area.

Ventersdorp, Bushveld and Karoo age dykes and sills are present within the mining lease. Bushveld age intrusives occur as dykes and sills, Ventersdorp and Karoo intrusives occur as predominantly north trending dykes. By far the most problematic is a doleritic footwall sill that varies from 30m to 70m in thickness. In several areas this sill steps upwards and occupies the same stratigraphic position as the Kimberley Reef, in places splitting the reef into two separate components. Fortunately interference from the sill is generally localised in areas such as the southern portion of the previous Winkelhaak mine and specific areas in the western part of Kinross.

Gold in the Kimberley Reef is associated with heavy minerals on re-activation surfaces specifically associated with the more robust, clast supported oligomictic quartz pebble conglomerates, or in association with flyspeck carbon. The gold generally occurs in native form often associated with pyrite and carbon. Pyrite, chromite, rutile, zircon and leucoxene have been identified within the Kimberley Reef. Pyrite dominates the heavy mineral suite and displays several distinct forms. Pyrite grains displaying detrital characteristics are common. Rounded balls of porous pyrite are also recognised, as are secondary remobilised pyrites. These latter minerals may occupy fractures across pre-existing pebbles, as well as overgrowing existing detrital pyrites within the sand matrix. Uraninite is present within the Kimberley Reef, but in concentrations so low that routine sampling for uranium is not practiced.

Carbon is generally rare within the more robust Kimberley Reef, becoming common in the distal areas as flyspeck carbon on the footwall contact. This has an effect on gold grades. As the channel width of the reef decreases the gold accumulation (cmg/t) does not change significantly. This is attributed to high gold grades associated with the carbon.

**3.3.7*****Orkney Operations***

The Orkney Operation mining area is bounded to the east and north by the North West Operations owned by Durban Roodepoort Deep, Limited ("DRD"), to the west by AngloGold's Tau Lekoa and to the south by AngloGold's Vaal River Operations ("VRO") and the course of the Vaal River.

The major faults within the lease area are: the Nooitgedacht and Buffelsdoorn faults occurring in No.6 BU and No.7 BU areas; the Witkop Fault between No.6 BU and No.7 BU; the WK22 and No.3 BU Faults between No.7 BU and No.3 BU; the No.5 BU Fault; and the No.2 BU South Fault. The horsts and grabens are further disturbed by faults sympathetic to the major faults which typically have throws of tens of metres and further divide the reef into blocks of up to 100m in width. Drilling from access development can identify these brittle faults, as the dip of the stratigraphy is reasonably constant (15° to 20°).

The Vaal Reef is by far the most significant reef mined at the Orkney operations and is the major contributor to gold production. The reef strikes northeast, dipping to the southeast and is heavily faulted to form a series of graben structures. The dip is generally less than 30° but can vary locally in direction and magnitude to exceed 45°. Gold is present throughout the reef horizon; however it tends to be concentrated close to the basal contact where carbon commonly occurs as thin seams. Well-mineralised carbon seams occur most commonly in three stacked sequences.

The VCR is exploited solely at BU No.3, BU No.6 and BU No.7 and, like the Vaal Reef, can occur as a composite reef consisting of several distinct sedimentary packages. In an attempt to improve grade estimation in such packages, a terrace and slope-based geological model was developed by AngloGold and has been retained by the geologists now employed by Harmony. The model divides







104

104

**Annexure 7**

the orebody into a main channel; lower; middle and upper terraces and also involves delineation of certain higher-grade reworked channels. The reef is clearly identifiable and its location at the contact between the overlying Klipriviersberg Lavas and the underlying Witwatersrand Supergroup Rocks renders the footwall and hangingwall rocks distinct from the reef, except in areas where Elsburg conglomerates sub-outcrop against the VCR. The contrasting lithologies aids fault negotiation and have facilitated the use of three-dimensional seismic survey techniques to image the gross reef topography in the past.

The Elsburg Reefs are exploited at BU No.6 and No.7, usually in conjunction with the overlying VCR, against which it sub-outcrops along a northeast trending band, south of and sub-parallel to the Buffelsdoorn Fault. The sedimentological characteristics of the Elsburg Reefs in the region of the sub-outcrop are similar to those exhibited by the VCR.

**3.3.8*****Kalgold Operations***

The Kalgold Operation is situated on the Kraaipan granite-greenstone belt, which is a typical gold-bearing greenstone formation. It has undergone intense structural deformation that has led to its dislocation into separate units. Within the mining lease area six steeply dipping zones of mineralisation have been identified. The discrete mineralised ore zones are the result of the percolation of mineralised fluids into the Banded Ironstone Formation ("BIF") host rocks.

The zones comprise the A, A-West, D, Mealie Field, Watertank and Windmill zones and the mineral resources of the A, D, Windmill and Watertank Zone have been comprehensively evaluated. The D-Zone is the first area to be exploited by open pit mining over a strike length of 1,400m and an ore zone width of between 15m and 40m.

Gold mineralisation is associated with pyrite and pyrrhotite, which was developed as a replacement mineral within a BIF and also within extensional, cross-cutting quartz veins within the ironstone.

**3.3.9*****Harmony Australian Operations***

Gold mineralisation at the Mt. Magnet operation occurs in the southern tip of the Mt. Magnet Greenstone Belt in the Murchison Province of the Achaean Yilgarn cratonic block. The belt consists of a series of tholeiitic and komatiitic volcanics and associated ultramafic volcanics and mafic tuffs. Several folding events led to the formation of the Boogardie Synform and, after a major period of ductile deformation, selective fracturing of brittle rocks introduced gold mineralisation synchronous with certain deformation events. Shearing of the country rock usually provided a conduit for mineralising fluids.

The majority of the gold mineralisation is hosted by BIF that are cross-cut by faults, at or near the contact of ultramafic and mafic rocks with felsic intrusions. Fault zones and shears are generally north-south to north-northeast trending and selective fracturing appears to form a major trap-site for gold mineralisation. Crossing of several shear directions appear to enhance mineralisation, which is often characterised by an epigenetic pyrrhotite-pyrite alteration. At Hill 50, the bulk of the mineralisation is hosted in a thick sequence of intercalated sedimentary BIF with both komatiitic and tholeiitic volcanics and associated ultra-mafic volcanics and mafic tuffs. The mineralisation is characterised by pyrrhotite-pyrite wall rock alteration. The BIF's are locally offset by faults with offsets ranging from one to two metres to up to tens of metres.

At Morning Star, mineralisation is hosted within quartz-carbonate veins containing molybdenite, scheelite and stibnite in a series of pyritic, sericite-altered mafic and felsic schists. The gold mineralisation is strongly associated with large vein packages and detailed geological mapping has indicated that the mineralisation can be correlated from level to level with a high degree of confidence.

Mineralised zones are primarily defined on the basis of geological mapping while stope designs are also based on detailed sampling and mapping. Wire framing based on geological mapping and interpretation is routinely carried out and grade shells are then defined within the geological domains.

In the Cue area, approximately 85km north of Hill 50 and Morning Star, the Big Bell deposit is hosted in a steeply dipping and locally overturned northeast trending extension of the Achaean Meekatharra- Wydgee Greenstone belt. This belt forms the west limb of a north-plunging regional anticlinal structure. At Cue, towards the east of Big Bell, the anticlinal structure changes to a north-plunging regional synclinal structure. In the Big Bell area, three main zones

are recognised in the regional volcano-sedimentary sequence, a lower sequence of ultramafics, graphitic sediments and BIF, gradationally overlain by a felsic volcanic sequence of andesitic, dacitic and rhyolitic rocks and then by a sequence of mainly submarine basaltic flows.





105

105

**Annexure 7**

The free-milling gold mineralisation at Big Bell is mainly hosted by a sub-vertical series of potassium- altered metamorphic schists with some mineralisation occurring in hanging wall biotite schists. In the Cuddingwarra area, gold mineralisation is related to a major phase of porphyritic intrusive activity.

At South Kalgoorlie Operations gold mineralisation was discovered in the Archaean Norseman-Wiluna granite-greenstone terrain in the late 1890s consisting of extensive volcanic sedimentary rocks deposited in an extensional environment. The stratigraphy is characterised by mafic/ultramafic rocks and komatitic basalt flows with intercalated sediments of the Kalgoorlie Group, conformably overlain by a thick series of felsic volcanics and intercalated sedimentary rocks of the Black Flag Group. The discovery of gold led to the exploitation of major historic gold mines in the Kalgoorlie "Golden Mile" and to the south at Jubilee.

Jubilee forms part of a major 4km strike length mineralised system that includes the Celebration, Mutooroo, Hampton Boulder, Mt. Martin, Dawns Hope, White Hope and Golden Hope open pit and underground mines. There are many sub-parallel northsouth trending tectonic zones in the granite- greenstone terrain with a multitude of deposits occurring further towards the west near Coolgardie.

Mineralisation is hosted along brittle-ductile shear contacts between biotite schist and ultramafics (Mt. Marion), in brittle shear in granite (Trojan open pit), along the Boorara shear in felsic porphyry (Goldenridge open pit), in biotite-tremolite schist (Freddo open pit), in shears in quartz dolerite and gabbro (Scrubby Tank) or quartz diorite (Rose Hill) or in Archaean basalts or paleo-channels (Lake Cowan open pits).

At Mt. Marion, mineralisation is hosted in "lode gneiss" along the Kunanulling Shear, within a sub- vertical package of gneiss and ultramafics that is footwall as well as hangingwall lode and has a lower grade core. Mineralised zones are defined on the basis of geological mapping and drilling. Mineralisation occasionally extends from the hangingwall gneiss into the ultramafic hanging wall and appears to be moving further into the hangingwall with increasing depth. The footwall contact of mineralisation generally coincides with the footwall contact of the gneiss and is most consistent.

**3.3.10 Harmony Canadian Operations**

The orebodies at Bisset are located within the Red lake Archaen greenstone belt and comprise two major sets of shear related quartz veins occurring within a steeply dipping intrusive host. One set of veins consists of stockwork breccias and the other narrower, fault-controlled veins cross-cutting the stockwork. Gold mineralisation occurs in both sets of veins but is enriched at the intersection of the two vein types.

**3.4****Exploration Potential**

The majority of the operations are mature and well explored and as such SRK consider there to be limited opportunity for discovering any new mineralised horizons or areas within the existing property boundaries within South Africa. Some potential does however exist for the Target, Free Gold, Evander and Harmony Australia Operations:

- . the eastern extension in the Dreyerskuil Reefs at Target Mine;

- . the southern extension in Basal Reef at Bambanani BU, the northern extension of certain facies at Tshepong BU and ongoing surface drilling at Joel BU, which is designed to delineate extensions to the Joel North BU area;

- . the development of the Poplar and Rolspruit projects at the Evander Operations, where exploration has defined significant additional resources and are currently being investigated in the form of pre-feasibility and feasibility studies;

- . at Harmony Australian Operations there is significant potential for new discoveries in the vicinity of the existing areas and an extensive conceptual exploration programme based on detailed regional geological mapping is underway. This potential is enhanced by the consolidation of all available information in the hands of one organisation. The ore in the South Kalgoorlie area can, however be less free-milling than the Mt. Magnet & Cue ores, signalling a potentially higher risk with regard to the maintenance of the current metallurgical recoveries; and

the tenements in the South Kalgoorlie area are located just north of the well-known Kambalda nickel sulphide deposits where over a million tonnes of contained Ni metal has been produced to date. Portions of the tenements cover strike extensions of the Kambalda Dome stratigraphy and komatites along the Wildcatter's Shear Zone and are considered highly prospective for nickel sulphide deposits. A number of nickel sulphide deposits have been recognised on the Harmony South Kalgoorlie tenements.







106

106

## **Annexure 7**

### **4.**

## **MINERAL RESOURCES AND MINERAL RESERVES**

### **4.1**

#### **Introduction**

This section summarises the methods used by Avgold and Harmony to derive and classify the latest Mineral Resource and Mineral Reserve estimates for the Mining Assets. It also presents SRK's comments and opinions on the reasonableness of these estimates. In addition this section sets out SRK's view regarding any potential for proving up of further Mineral Resources and Mineral Reserves at the Mining Assets.

### **4.2**

#### **Review Procedures**

SRK has not re-estimated the Mineral Resources and Mineral Reserves as estimated by the Companies for each of the Mining Assets. SRK has, however, undertaken sufficient check calculations and where appropriate, made necessary adjustments to the estimates to derive the statements presented herein and supporting the respective LoM plans.

The tables in this section summarise the audit process in support of the presented Statements of Mineral Resources and Mineral Reserves. The terms and definitions are those given in the March 2000 South African Code for Reporting of Mineral Resources and Mineral Reserves. This is known as the SAMREC Code ("SAMREC") and is published by the South African Mineral Resource Committee under the auspices of The South African Institute of Mining and Metallurgy.

Avgold and Harmony both report Mineral Resources and Mineral Reserves in accordance with the SAMREC Code. Harmony uses stricter criteria to limit its Measured and Indicated Mineral Resources than other South African gold mining companies. The limit of the Indicated Mineral Resource is 60m from current stoping, whereas certain other South African gold mining companies classify Indicated Mineral Resource utilising confirmed drill intersections which may be at a distance considerably further than 60m.

Within the scale of current mining operations this approach does not affect short-term term planning, nor does it impact on the long-term potential for the operations with large Inferred Resources based on sound geological models. It does, however introduce a problem with respect to reporting SAMREC compliant financial valuations where only projections derived from Proved and Probable Mineral Reserve areas can be presented.

For this reason it is necessary to stress the confidence in the underlying resource models and to include Inferred Mineral Resources into certain of the base case LoM projection and associated cash flow models.

Further, in presenting the Mineral Resource and Mineral Reserve statements the following points apply:

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the Measured and Indicated Mineral Resources are inclusive of those Mineral Resources modified to produce Mineral Reserves. Accordingly Mineral Resource statements are sub-divided into those Mineral Resources which have been modified to produce Mineral Reserves (designated by the suffix 1) and those which have not (designated by suffix 2);

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Mineral Resources are quoted at an appropriate in-situ economic cut-off-grade with tonnages and grades based on the planned minimum mining width;

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Mineral Reserves for Target Mine are based on a gold price of US\$375/oz and ZAR:US\$ exchange rate of 8.87 (ZAR107,000/kg);

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all Mineral Reserves for the Harmony's South African Mining Assets are based on a gold price of US\$350/oz and ZAR:US\$ exchange rate of 8.26 (ZAR93,000/kg). Harmony's Australian Assets use a US\$350/oz and AUD:US\$ exchange rate of 1.49 (AUD523/ozt);

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all Mineral Resources and Mineral Reserves were estimated as part of the Companies annual planning cycle dated 1 July 2003, the statements as reported herein have been adjusted for depletion that has occurred during the six months that have elapsed and are now dated 1 January 2004;

- unless otherwise stated all Mineral Reserves and Mineral Resources are quoted as 100% and not attributable with respect to ownership;
- all Mineral Reserves quoted in terms of RoM grades and tonnage as delivered to the metallurgical processing facility and are therefore fully diluted;
- Mineral Reserve statements include only Measured and Indicated Mineral Resources modified to produce Mineral Reserves and planned for extraction in the LoM plans;
- Mineral Reserve sensitivities have been derived from application of the relevant cut-off-grades to the underlying block listings. Accordingly, these have not been based on detailed depletion schedules and should be considered as incremental changes to the Base Case; and
- all references to Mineral Resources and Mineral Reserves relate to the SRK estimates stated in accordance with the SAMREC Code.





107

107

**Annexure 7**

Surface sources at the Mining Assets comprise WRDs, Slimes Dams and other surface sources such as spillage and small stockpiles. WRDs are notoriously difficult to sample, given the range of particle sizes commonly present and the heterogeneity of grade. In the majority of instances, SRK has classified those WRDs with sufficient information as Indicated Mineral Resources. In instances where the grade and/or the density are known with insufficient confidence, SRK has classified these as Inferred Mineral Resources. In contrast to WRDs, slimes dams, in general tend to have more homogeneously distributed grades and the smaller particle size facilitates sampling. With adequate sampling and in-situ determinations, SRK consider that slimes dams as such may be classified as Measured Mineral Resources. In instances where the grade and/or the density are known with insufficient confidence, SRK has classified these as Indicated Mineral Resources.

**4.3****South African Deposits: Mineral Resource and Mineral Reserve Estimation Methodologies**

Mineral Resource and Mineral Reserve estimation and classification is dependent upon the quality and quantity of data, block definition, grade and tonnage estimation, grade control and reconciliation. Such parameters are considered by SRK to be typical of Witwatersrand Basin gold mines at most operations.

Unlike most other Witwatersrand deposits, the stacked nature of the reefs at Target Mine in combination with the bulk mining methods utilised, are conducive to three dimensional computerised geological modelling. As a result of this and the fact that a significant amount of drilling has been completed at Target Mine relative to other mines, the approach used to estimate the Mineral Resources and Reserves at Target Mine differs in some regards from that used at most other Witwatersrand mines.

The majority of resources in the Target North and Oribi areas have been estimated using standard two-dimensional classical statistical methods employed at other Witwatersrand mines where the reefs have been intersected by surface drilling only. At Loraine and to the immediate north of Target additional underground information has enabled a three-dimension computerised approach to be used similar to that employed at Target Mine.

Given the similar nature of the majority of the South African Mining Assets, the following sub-section summarises the general techniques commonly used by Avgold and Harmony for estimation.

**4.3.1*****Quality and Quantity of Data***

**Avgold:** The Mineral Resource at Target Mine is primarily based on underground exploration drilling. Limited surface drilled intersections also exist as well as chip sampling in areas of the mine with underground development. The underground exploration holes were drilled from a footwall decline on sections lines 50m apart. The holes were drilled on a fan pattern at 15° intervals resulting in drill coverage of between 15m and 80m. Due to the fan nature of the drilling the broader coverage occurs in stratigraphically higher reefs as well as more proximal and distal areas to the sub-crop. Over 35 individual reef horizons have been intersected within the Eldorado Fan between 20 and 200 drillhole intersections per reef. The use of underground drilling has resulted in a significantly larger amount of sampling data being available in areas not yet accessed by underground development compared to most other Witwatersrand deep-level operations.

The Mineral Resource at Target North and Oribi is primarily based on surface exploration drilling. At Loraine 33 underground exploration drillholes and small quantities of chip samples form the basis of the Mineral Resource. The surface drillholes in the Target North area have been drilled on an irregular pattern, forming a drillhole grid spacing of between approximately 500m in the south up to 2,000m in the north. In the Oribi area 7 surface boreholes have been drilled over a strike length of 10km. Due to the geometry and geological characteristics of the individual reefs and reef packages these surface drillhole grids do not necessarily apply to all reefs or reef packages.

Arithmetic means of the short deflections in each surface borehole have been used for the true thickness and gold accumulation value of that borehole. Long deflections were treated as separate intersections, however, data were declustered by taking the arithmetic mean of borehole values for the same reef falling within 100m of each other on plan.

In the case of surface drillholes, the core is halved using a diamond saw, one-half is retained as a geological record and one-half is assayed. For underground drillholes, the core diameter is considered to be too small to allow the core

to be split and to yield a sufficiently large sample to allow assaying and, in this instance, the entire core is assayed. Assaying on the exploration samples was undertaken using fire assay techniques by ISO accredited laboratories with the use of blanks, standards and check assays for quality control. Inter-laboratory checks were also performed with the full process having been independently audited by external consultants.







108

108

**Annexure 7**

Given the density of drillhole data, the assaying and quality control procedures applied, together with the operating history to date at Target Mine, in SRK's opinion the quality and quantity of the data available is sufficient to support the Mineral Resource and Reserve estimates as derived.

**Harmony:** The resource estimation process at all of the underground operations is based on surface drilling, underground drilling and underground channel sampling. Unless cropping out the reefs are initially explored by drilling from surface on regular 500m to 2,000m grids. Once underground access is available, infill development drilling may be undertaken from access haulages and cross-cuts to provide a 30m by 60m grid of intersections. Evaluation is then by extrapolation from or interpolation between stoping and development sampling. In the case of surface drillholes, the core is halved using a diamond saw, one-half is retained as a geological record and one-half is assayed. For underground drillholes, the core diameter is considered to be too small to allow the core to be split and to yield a sufficiently large sample to allow assaying and, in this instance, the entire core is assayed. Within the underground workings, exposures of the reef are channel sampled. Individual channels are cut from the wall rocks using a hammer and chisel or diamond saw and the cuttings are caught using steel pans. A detailed sampling record is kept showing the reef geometry at each section.

Current channel sampling standards comprise development sampling at 2m intervals and stope face sampling at 5m intervals. Channels are defined perpendicular to the reef plane and individual sample lengths of 10cm to 30cm are taken to reflect the internal geometry of the reef. The sample size collected is in the order of 0.3kg. Two adjacent samples spanning the footwall contact may be taken in order to double the sample volume of this part of the reef that frequently contains the highest grades. This is important where the reef is 'bottom-loaded', providing more confidence in the high-grade values at the footwall contact.

The Evander and West Wits operations use private assay laboratories. All other operations rely on mine owned and managed laboratories.

Two different assaying techniques are utilised at the Mining Assets. The Aztec Analysis is an automated technique for analysing underground chip samples using non-destructive energy dispersive X-Ray analysis ("EDAX") that gives rapid quantitative analyses for gold and uranium. Check assaying is carried out on a proportion of the samples, which are analysed by fire assay with gravimetric finish. The fire assay method is used for the analysis of reef and waste dump samples as well as for checking Aztec analysis results. The samples are dried, sorted, crushed and pulverised then approximately 180g flux is used for a 50g-sample aliquot. A gravimetric finish is used for reef samples and atomic absorption finish is used for waste samples.

As part of Quality Control and Quality Assurance procedures checks are conducted on the assay laboratories and sample preparation plants. Blank samples and repeat assays are part of the external check process undertaken regularly which ensures that the laboratory adheres to assaying standards and procedures.

In SRK's opinion, the long mining history and the quantity and quality of data upon which the Mineral Resource estimates at the Mining Assets are based, is sufficient to support the Mineral Resource and Mineral Reserve estimates as derived. All of the current operations comprise mature operating BUs and consequently Mineral Resource and Mineral Reserve estimates are based largely on underground stope development and pillar sampling.

The Companies are in the process of rationalising and updating their mining software systems. Currently a mixture of computer systems are being used for survey pegs, sampling data, measuring, geological structure, facies, geozones, ore reserve management and mine planning. These systems comprise different versions of commercial packages and proprietary systems. The proprietary systems are being phased out (for support reasons) in favour of the commercial products.

The majority of the Mining Assets have their sampling data in digital format. MS Excel spreadsheets are used for Mineral Reserve and Mineral Resource data management. Specifically "Optimiser" which is used to calculate optimum grade cut-off and "CLS" which is used to generate Mineral Resource and Reserve statements.

At Free Gold Operations, Joel uses a newly established computerised system, utilising a mining software package allowing the completion of all blocking, statistics, geostatistics and grade and tonnage estimation in a fully integrated evaluation system. This system is currently being developed and managed centrally with specialised support staff. Bambanani BU, West BU, Tshepong BU and Phakisa BU use more established 2D CAD computer systems, which

have been developed to suit the tabular nature of the Witwatersrand gold deposits. At all these operations all survey data and sampling information is captured digitally and stored in electronic database.





109

109

**Annexure 7****4.3.2*****Orebody and Block Definition***

**Avgold:** At Target Mine a computerised three-dimensional geological model of the reefs and interbedded quartzites has been developed using stratigraphic correlation between the boreholes. Underground geological mapping and high-resolution seismic surveys are also used to supplement the stratigraphic and structural data from the drilling. This enables the reef and quartzite models to be truncated against faults and dyke contacts maintaining the three-dimension volume integrity of the model.

The geological model is subsequently used to constrain a block model into which grades are interpolated. This model utilises a block size of 20m along strike, 10m normal to strike and 5m vertically. Volume integrity is maintained through the use of 2m by 1m by 1m sub-cells, which are assigned the grade of the parent block.

At Target North and Oribi the geometry of the orebodies is difficult to interpret with a high-level of confidence given the relative sparsity of the reef intersections from the surface boreholes. The Mineral Resources are as such appropriately classified as either Indicated or Inferred. Fans similar in geometry to the Eldorado Fan at Target Mine have therefore been postulated to exist at reasonable north- south intervals. The characteristics and geometry of this fan together with the borehole intersections have been used to define the limits of the Elsburgs and Dreyerskuil Reef orebodies.

For the Big Pebble Reefs the syncline has been sub-divided into four zones from west to east to account for the separation of the distal reefs. This enables the resource estimation process to account for the probability that in the west the reefs would be mined in a single cut, while in the east the reefs would be mined individually in separate cuts. In the case of the VCR the geological models have been based solely on the coverage of the surface borehole intersections on that reef.

The geological models developed as described above have been used as the basis of two-dimensional resource polygons constrained by surface borehole coverage and the regional structural model for each reef or reef package. Where more information is available at Loraine and immediately to the north of Target Mine, computerised three-dimensional geological models of the reefs and interbedded quartzites or total reef packages have been developed using stratigraphic correlation between the boreholes and underground mapping if available. In these cases the three-dimensional models have been used to constrain a block model into which grades are interpolated as at Target Mine.

**Harmony:** Once the geological structure of an area and reef have been defined, the resource is blocked out on 2-D plan projections using major geological features such as faults, facies boundaries, channel structures and payshoots to define zones of homogeneity. These initial macro- scale blocks are referred to as 'geozones'.

Mining blocks are determined once the geozones have been defined. Stopping is blocked out per panel in 30m mining blocks; development will be blocked out for 10m. Major geological features such as faults, facies boundaries and payshoots are used to define zones of homogeneity and to terminate blocks. In some circumstances, the intersection line between the reef and a certain access elevation (e.g. a mine level) may also be used.

The geozones are used to define and separate data populations within the sampling database for further statistical and geostatistical studies. Once geozones and mining blocks have been defined they are digitised for use in computer-aided grade and tonnage evaluation.

**4.3.3*****Grade and Tonnage Estimation***

**Avgold:** At Target Mine the assay data for each reef have been analysed statistically following the production of reef composites using the geological model. The reef grade populations exhibit positively skewed distributions therefore the cutting of high-grades has been applied to the dataset prior to grade estimation in order to limit the influence of these high grades. The individual reefs within the reef packages demonstrate variable statistical characteristics supporting their evaluation as separate entities.

The cut composites have been subject to geostatistical spatial analyses using semi-variograms calculated in a best-fit plane for the reefs. These analyses indicate the presence of two structures with minor ranges in the order of 40m to 100m and major ranges from 100m to 200m. A nugget effect of 20% has been modelled. As with the statistical

characteristics the individual reefs display marked geostatistical differences in range and anisotropy.







110

110

**Annexure 7**

Grade has been directly interpolated into the blocks by means of ordinary kriging using parameters derived from the semi-variogram analyses. Each individual reef horizon has been separately estimated. The search parameters in the plane of the reef correspond closely to the semi-variogram ranges. The search normal to the reef plane varies between 50m and 80m in order to accommodate the throw of the faults and the synclinal structure of the fan. A second longer range kriging run has been used to interpolate grades into peripheral blocks not assigned a grade by the initial run. Grade has also been interpolated into the intervening quartzite horizons in order to assess the diluting grade of this material when it is incorporated as internal dilution into the massive stopes.

In the case of the two-dimensional resource estimates the declustered gold accumulation data which falls within each resource polygon are plotted on a log-normal probability plot. If deemed necessary a third constant beta parameter is estimated and a three parameter log-normal distribution assumed. If necessary using the log-probability plots any high outliers are then cut to fit the distribution. The gold accumulation estimate (cmg/t) is then derived for each resource polygon using the lower value of the arithmetic mean and sichel 't' estimate.

In the case of the three-dimensional models at Loraine and Target North a similar methodology is used as at Target Mine. However, due to the sparser nature of the data, grade is interpolated into the blocks by means of a sichel 't' estimate using search radii derived from the variography of each reef horizon. In the case of Target North the semi-variograms used at Target Mine form the basis of the search radii, while at Loraine semi-variograms have been modelled using the limited underground chip sampling available (although this is not used in the estimation itself). A minimum of three samples is required for the block to be estimated. As at Target Mine, a second longer range run is used to interpolate grades into peripheral blocks not assigned a grade by the initial run.

For the two-dimensional polygons an average dip for the steeper west limb and shallower east limb of the syncline has been estimated, together with a proportional split between the two, from cross-sections to derive a true reef area for each polygon. The arithmetic mean of the declustered data is used to derive an average thickness and therefore a volume. If the thickness is below 100cm a minimum mining width of 100cm is used in this process.

Tonnage estimates are derived through the application of tonnage factors for each reef package as follows:

- Elsburg: 2.70t/m

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- Dreyerskuil: 2.76t/m

3

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- Big Pebble/Kimberley: 2.73t/m

3

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- VCR: 2.70t/m

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As the small-scale structure in the Target North, Loraine and Oribi is not as well-known as at Target Mine and the estimates are based on two-dimensional models, a 10% tonnage discount factor has been applied to all resources in these areas to account for reef losses.

**Harmony:** Resource estimation techniques at the Mining Assets follow the same basic principles; however different computer software packages are employed.

At Kudu & Sable BU, Nyala BU, Eland BU and St. Helena BU data capture and estimation is paper based.

Where data is captured digitally each mine uses its defined geozones to sub-divide the reef data into discrete populations that have distinct grade distribution characteristics. Statistical analyses of the metal accumulation values are undertaken so as to substantiate the different grade populations in each domain. The data will often be log transformed to allow a lognormal or compound lognormal model to be applied. In some cases other parameters such as channel width and stope width will be analysed, to look for trends that could be investigated further with

geostatistics.

Data are checked and validated and any extreme values investigated to ensure there are no transcription errors. Despiking and grade cutting techniques are used on some of the secondary reef data to assist with further statistical and geostatistical studies.

Point variograms are calculated and modelled from underground channel sample metal accumulation values (and borehole data) for each domain. The data generally provide well-structured, two component spherical variograms with high nugget effects (50% to 80%) and ranges of 10m to 20m and 60m to 90m, these variograms are usually isotropic. This indicates a high random variability in sample grades and an underlying spatial control on sample grades whose zone of influence extends for up to 90m in all directions.

Further variography is carried out on data to be used in the macro-kriging process. These data are used to construct variograms comprising regularised channel sample data, diamond drillhole intersections and underground drillhole intersections.





111

111

**Annexure 7**

The variograms from these datasets provide a larger scale control on block grade estimation. The large-block regularised data tends to give excellent structure with little or no nugget effect and produces larger ranges, which can exceed 1,500m.

At Tshepong BU, Phakisa BU, Bambanani BU and West BU kriging is undertaken separately for each geostatistical domain. Channel sample data is used to estimate grade into 10m by 10m blocks using ordinary kriging based on the point variograms and a search radius equivalent to the short range in the variograms. Only those blocks with a high statistical confidence (regression slope greater than 0.6) are evaluated by this method.

Next, 30m by 30m blocks are used to house values generated by a simple kriging process which incorporates the local area mean (based on the ordinary kriged values) into the estimate and therefore smoothes data more than the ordinary kriging, but gives more confidence to the kriged values in those blocks which were not estimated by the ordinary kriging process. The search radius used is approximately 30m and therefore restricts the 30m by 30m block estimates to the vicinity of well-sampled areas. Again, only those blocks with a high statistical confidence within a 3-by-3 neighbourhood search range are evaluated by this method.

A third method is used to extrapolate grades much further using the large-block regularised channel sample data and incorporating the diamond drillhole intersection data which is more dispersed. This kriging is based on 250m by 250m blocks and a large search radius. The data is then co-kriged. The blocks from each of the three block models are combined so as to result in high confidence estimates in the vicinity of the channel sampling using 10m by 10m and 30m by 30m blocks which contribute to the Measured Resource and well founded long range estimates which contribute to the Indicated and Inferred Resource.

The kriging technique utilised by Harmony and Joel BU differs to that stated above. Three prototype block models are created prior to grade estimation, a 15m by 15m Measured model, a 30m by 30m Indicated model and a 60m by 60m Inferred model. The kriged estimates of the Measured model are restricted by the range of the semi-variogram and including a minimum of 15 sample points within the search radius. The kriged estimates of the Indicated model are restricted by two times the range with a minimum of two sample points. In general the 'sichel' estimate technique and application of calculated additive constants is used for estimation of the Inferred model. The three grade models are then combined to form one overall grade model. Channel widths are also estimated using the same technique. Resource blocks are assigned grades from the block models using the respective software packages. Resource blocks are kept as an inventory listing with several attributes recorded for each. Availability and status record whether or not the ground has been abandoned, whether the area is currently accessible and the time required accessing a currently inaccessible area.

Each block is assigned a stoping width, which is based on the expected mining width in virgin ground, or otherwise the stoping widths encountered historically in the vicinity of that block which accounts for the hangingwall dilution often incurred at these mines. In addition, the square metres of the block are corrected for dip and discounted for fault losses on the basis of previously encountered factors and incorporating the results of a fractal analysis of fault frequency and displacement. The volume described by the resultant square metres and the stoping width is multiplied by the respective tonnes per cubic metre in order to estimate the block tonnage.

Harmony's Welkom and Orkney Operations, Eland BU, Kudu & Sable BU, Nyala BU and St. Helena BU do not use a computerised system for resource and reserve estimation. The Eland BU shaft pillar has been kriged using 30m by 30m blocks, using separate runs for each of the two facies identified in that area, namely the Geduld and the BCF. All other areas are estimated using either a weighting method or simple stretch averages. These methods are considered to be adequate given the high pillar content of the resource and therefore the high density of samples available. The virgin areas at Nyala BU have been estimated using a value contour technique.

Block listing data is generally managed using MS Excel, using company template spreadsheets that perform simple calculations and present data in common formats.

**4.3.4****Classification**

**Avgold:** The individual resource blocks have been classified on a block by block basis as Measured, Indicated or Inferred as defined by the SAMREC Code. At Target Mine blocks are classified as Measured Resources where the

drillhole spacing is less than that which equates to the point on the semi-variograms where the variance is two-thirds of the total sample variance. Indicated Resources extend beyond the Measured Resource to include all those remaining blocks estimated by the first interpolation run. Inferred Resources comprise blocks estimated by the second longer range interpolation run and also resource areas with very limited sample data.







112

112

**Annexure 7**

At Target North and Loraine where the resources have been modelled in three-dimensions Indicated Resources are defined as those blocks into which grade is interpolated in the first estimation run and Inferred Resources are defined as those blocks estimated by the second longer range interpolation run.

In the case of the resources modelled in two-dimensions the resource polygons, and therefore the basis of the classification, have generally been delineated based on borehole coverage. Indicated Resources are broadly defined as those blocks containing a reasonable coverage of surface borehole intersections (usually a minimum of 10 intersections on a minimum approximate borehole grid spacing of 1km). Inferred Resources are those containing fewer intersections and where the continuity of blocks has been inferred using geological interpretation to major structural features. The Inferred Resources are therefore generally situated in the far north of Target North and at Oribi or closer to Target Mine on reefs that have not been intersected by many surface boreholes.

SRK considers that given the quantity and quality of the sample data available, together with the grade and tonnage estimation methodology applied, the classification applied by Avgold is appropriate and in accordance with the SAMREC Code.

**Harmony:** The individual resource blocks have been classified as Measured, Indicated or Inferred as defined by the SAMREC Code.

Where paper estimation methods are employed resource blocks that are adjacent to sampled developments, including current production and ongoing sampling, are classified as Measured. Blocks that are generally close to sampled developments, but are themselves usually sampled by only a few underground drillholes, are classified as Indicated. The remaining blocks, remote from underground developments where the estimation of tonnage and grade is based upon extrapolation of known geological features such as payshoots/channels as well as faults, are thus classified as Inferred.

Classification of Indicated and Inferred Mineral Resources at Tshepong BU and Phakisa BU is based on the kriging variance applied to the resource block. This is used to derive percentage values, which represent the maximum theoretical difference between the estimated grade and the actual grade of a block at 95% confidence. The limit of the Measured blocks is determined by the extent of the simple kriged 30m by 30m blocks.

Harmony Freestate Operations, Joel BU, Bambanani BU, West BU, West Wits Operations and Evander Operations classify resource blocks based on the following criteria. Measured Mineral Resources are blocked out to 30m or against structures and payshoots and are adjacent to sampled stope. Indicated Mineral Resources are blocked out to 60m from sampled stope and within geozones. Inferred Mineral Resources are within large blocks defined by facies, structure and the mining lease boundaries.

SRK considers the Harmony interpretation of the Indicated and Inferred classification boundary to be conservative relative to the approach used at other Witwatersrand deep level gold operations. This has particular impact where an operation has large areas of Inferred Mineral Resources, which are structurally simple and have high payability, such as Joel BU, Bambanani BU, Elandsrand BU and Evander Operations. As the SAMREC Code states that Inferred Mineral Resources cannot be converted into Mineral Reserves this approach may in turn lead to conservative estimates of the Mineral Reserve at these operations.

**4.3.5*****Selective Mining Units***

**Avgold:** Theoretically the minimum selective mining unit ("SMU") applied at Target Mine is the individual 20m by 10m by 5m blocks used for the grade estimation. However, in practice the reserve is defined through the superimposition of practical stope designs on the block model. While the individual blocks are used to determine the margins of these stopes they are not planned to be mined in isolation but rather as aggregations of blocks within the stope design.

**Harmony:** The choice of SMU is dependent upon the mining method to be applied. In the case of narrow reef mining used at the Mining Assets, the SMU is an agglomeration of contiguous panels, each of dimension 30m by 30m. For practical reasons at this block size, mining of both pay and unpay material is unavoidable and the halting of stope faces is only triggered by unacceptably high levels of unpay ore being mined.

For remnant extraction, the pillar dimensions define the SMU. Due to the relatively small volumetric size of such remnant and/or pillar area, the sampling density available from previous mining activities facilitates a high degree of confidence for grade estimation.





113

113

**Annexure 7****4.3.6*****Grade Control and Reconciliation***

***Avgold:*** Grade control practices at Target Mine are based on the results of development chip sampling and underground infill drilling and are used primarily to aid stope definition especially in areas where the fan drilling has resulted in larger spaced sample coverage. In the areas where conventional narrow reef mining methods are applied such as in the Dreyerskuil reefs, stope face sampling and surveying is undertaken as is standard practice on other Witwatersrand mines. In the massive Elsburg stopes a cavity monitoring system is employed which assess the degree of stope overbreak and resulting dilution. Hoisted grade is reconciled back to the mined grade to derive a Shaft Call Factor ("SCF"). The grade reported by the mill is compared to the hoisted grade to derive a Plant Call Factor ("PCF"). These two factors are then combined to derive a Mine Call Factor ("MCF"). Over the last 11 months the MCF has been in excess of 100%.

SRK considers the grade control and reconciliation practices employed at Target Mine to be appropriate for the nature of the orebody and mining methods employed. The high mine call factor may well be a function of underestimation of the grade in the higher-grade proximal areas of the Eldorado fan as a result of the smoothing inherent in the grade interpolation procedure. In SRK's opinion this is likely to reduce over time as mining progresses to lower grade, more distal areas.

***Harmony:*** Grade control and reconciliation practices follow similar procedures to those applied elsewhere in Witwatersrand Basin gold mining operations. The reefs and the hangingwall and footwall lithologies are visually identifiable and channel sampling ensures that the face grade is monitored accordingly. As part of the reconciliation exercises, physical factors, including stope widths, dilution, MCFs and Block Factors ("BF"s) are monitored and recorded on a monthly basis. The results are used to reconcile Mineral Reserve estimates with actual mined tonnages and grades.

As stopes are mined, surveyors monitor the stope width and face advance to provide an accurate stope tonnage estimate. The channel samples taken within the stope are reconciled against the pre-mining grade estimate based on the kriging described above. The difference in gold metal is recorded as a BF, which is a combination of bias in the resource estimate and mining losses. BFs tend to approximate 100% and accordingly no further adjustment has been made.

Belt samplers at the shaft head also record grade and tonnage. These figures are compared back to the surveyed estimates on a monthly basis to give a SCF, which multiplied with the PCF gives the MCF. Generally SRK consider that the underlying grade control and reconciliation processes are appropriate and do not materially affect the underlying Mineral Resource estimates as presented herein.

**4.3.7*****Reserve Estimation***

***Avgold:*** The Mineral Resources at Target Mine together with the survey outlines of the existing stopes, excavations and development tunnels form the basis of the engineering design of the Mineral Reserves. The Mineral Reserves are based on the Measured and Indicated Resources that exceed a cut-off grade ("CoG"), that is determined for each mining method, have been the subject of engineering design and have consequently been classified into Proved and Probable Reserves.

Datamine is used for all GIS and 3-D modelling of the orebody outlines and stope design at Target Mine and the survey outlines are imported from StopeCAD. In terms of the mechanised section a mining method is assigned to a particular area of ground within a block and the design parameters applicable to the method are used as a basis for developing the stope outline. The stope design considers aspects such as maximum drill hole length, the angle of repose, location of drill drive and loading drive as well as backfill, ventilation and equipment resource constraints. The stope outline may in places not be coincident with the orebody outline and result in planned dilution and/or ore losses. Internal waste between reef packages is also incorporated into the stope design where necessary. Once the design is complete the material contained within the stope outline becomes an Engineered Resource and subsequent to the application of further factors associated with un-planned dilution and ore loss with for the Mineral Reserve. The Narrow Reef Mining ("NRM") reserves are determined in a similar but simpler manner in that an appropriate stoping

width is selected and the planned dilution represents the difference between this width and the channel width of the Mineral Resource.

A portion of the Inferred Resources has been modified to form the not in reserve ("NIR") category of material contained in the latter years of the LoM plan.

**Harmony:** The procedure for estimating Mineral Reserves involves the definition of appropriate SMU's, the application of appropriate survey factors based on tonnage, volume and grade reconciliation exercises, the use of cut-off-grade policies and technical-economic investigations leading through to the development of an appropriately detailed and engineered LoM plan.

Tables 4.1 through to 4.6 give the various mine planning parameters utilised in the derivation of cut-off-grades and the modification of Mineral Resources to Mineral Reserves for each mine separately.







114

114

**Annexure 7**

All factors relate solely to underground resources and primarily utilise BF, MCF, Stopping Width ("SW") and Milling Width ("MW"). The BF is a correction factor used to account for historical variance between the in-situ estimate of the mining block and the average block grade post-sampling during block depletion. The MCF is the estimated historical discrepancy between the gold estimated to have been broken from the stopping faces to that back allocated post-metallurgical metal accounting as received at the plant as a head grade. The SW is the average in-stope mining width achieved during extraction. Finally the MW is estimated as the total tonnage delivered to the plant from underground divided into the total stope area depleted over the same period. The difference between MW and SW expressed as a ratio to MW is the measure of dilution. Surface sources are processed directly and are generally not screened. As such no modifying factors are applicable for conversion to RoM grades. BUs that supply RoM material to the same metallurgical plant are assigned the same Metallurgical Recovery Factor ("MRF").

The modifying factors as given below are based on historical reconciliation exercises and as such are considered valid for the purpose of reporting Mineral Reserves for the Mining Assets. The seemingly large range in certain modifying factors is as a result of mining several different reef types and under different operating conditions combining virgin ground, remnant pillars and delivering ore to one or a selection of processing plants. The factors are determined by historical records over significant period of time. For new projects, factors have been selected on the basis of comparable operations working the same reefs.

**Table 4.1 Target Operations - Target Mine: Assumed Modifying Factors****Business Units****BF****MCF****(1)****Un-planned****Un-planned****Dilutant****Stope****Development****Grade****Dilution****Dilution****(%)****(%)****(%)****(%)****(g/t)**

Target

100

93.6

7

10

0

**(1)**

A certain quantity of dilution and ore loss is contained within the stope outlines and is not quantified. The dilution and MCF reflected above represent an allowance for additional dilution and ore loss respectively.

**Table 4.2 Free Gold Operations: Assumed Modifying Factors****Business Units****BF****MCF****SW**

**MW**

(%)

(%)

(cm)

(cm)

Tshepong BU

100

88

102

143

Phakisa BU

100

88

102

143

Bambanani BU

100

72

151

233

West BU

100

72

160

188

Eland BU

100

73

141

209

Kudu & Sable BU

100

73

167

214

Nyala BU

100

80

134

155

St. Helena BU

100

68

137

177

Joel BU

100

84

139

167

**Table 4.3 Harmony Free State Operations: Assumed Modifying Factors**

**Business Units**

**BF**

**MCF**

**SW**

**MW**

(%)

(%)

(cm)

(cm)

Harmony No.2 BU

100

77

178

188

Harmony No.3 BU

100

na

na

na

Harmony No.4 BU

100

na

na

na

Merriespruit No.1 BU

100

72

164

188

Merriespruit No.3 BU

100

71

202

217

Virginia No.2 BU

100

na

na

na

Unisel BU

100

77

179

236

Saaiplaas No.3 BU

100

78

158

175

Brand No.2 BU

100

na

na

na

Brand No.3 BU

100

78

193

223

Brand No.5 BU

100

78

201

265

Masimong No.4 BU

100

78

139

179

Masimong No.5 BU

100

78

131

168





115

115

**Annexure 7**

**Table 4.4 Welkom Operations: Assumed Modifying Factors**

**Business Units**

**BF**

**MCF**

**SW**

**MW**

(%)

(%)

(cm)

(cm)

No.1 BU

100

64

119

140

No.2 BU

100

64

140

154

No.3 BU

100

70

151

253

No.4 BU

100

60

150

158

No.6 BU

100

65

130

217

No.7 BU

100

75

150

189

**Table 4.5 West Wits Operations: Assumed Modifying Factors**

**Business Units**

**BF**

**MCF**

**SW**

**MW**

(%)

(%)



**(cm)**  
**(cm)**  
 Elandsrand BU  
 100  
 87  
 126  
 152  
 Deelkraal BU  
 100  
 93  
 170  
 227  
 Cooke 1 BU  
 100  
 83  
 172  
 205  
 Cooke 2 BU  
 100  
 72  
 144  
 177  
 Cooke 3 BU  
 100  
 73  
 159  
 195  
 Randfontein No.4 BU  
 100  
 na  
 na  
 na  
 Doornkop BU  
 100  
 93  
 244  
 366

**Table 4.6 Evander Operations: Assumed Modifying Factors**

**Business Units**

**BF**  
**MCF**  
**SW**  
**MW**  
 (%)  
 (%)  
**(cm)**  
**(cm)**  
 No.2 BU  
 100  
 75  
 162

209  
No.5 BU  
100  
75  
111  
177  
No.7 BU  
100  
75  
135  
217  
No.8 BU  
100  
70  
120  
160  
No.9 BU  
100  
65  
116  
163

**Table 4.7 Orkney Operations: Assumed Modifying Factors  
Business Units**

**BF**  
**MCF**  
**SW**  
**MW**  
(%)  
(%)  
(cm)  
(cm)  
No.2 BU  
100  
85  
164  
210  
No.3 BU  
100  
84  
200  
210  
No.4 BU  
100  
78  
120  
181  
No.6 BU  
100  
84  
154  
193

No.7 BU

100

91

112

152

#### **4.4**

##### **International Deposits: Mineral Resource and Mineral Reserve Estimation Methodologies**

The International Operations in Australia and Canada principally focus on small and shallow orebodies and orezones where the gold is hosted by banded iron formations and quartz veins are steeply dipping. The Mineral Resource and Mineral Reserve estimation methodology is similar at these operations and it is therefore not described separately. It should be noted that the procedures and methodologies discussed below are current only for the Harmony Australian Operations as Bisset, the only asset of Harmony's Canadian Operations, is currently on care and maintenance.

##### **4.4.1**

###### ***Quality and Quantity of Data***

A large quantity of data exists at the various operations that comprise a combination of historic and current drilling and sampling data. Drilling and sampling methods include open-hole, reverse circulation, diamond drilling, face and stockpile sampling. Limited information is available on historic quality assurance and quality control procedures and Harmony employs ongoing data validation procedures when completing the geological modelling and resource estimation. A check analysis is performed for every 20 sludge holes drilled. All current sampling takes place under geological control and, where applicable, older geological codes are converted to newer codes.





116

116

**Annexure 7****4.4.2*****Orebody Definition***

At the underground operations detailed underground geological and structural mapping is undertaken that forms the basis for geological modelling, the understanding of the ore genesis and the mapping of gaps within the sub-vertical ore shoots. In the open pits, results from reverse circulation, diamond and earlier open-hole (if available) drilling are used to define geological wire-frames and grade shells that conform to the geological boundaries. As a standard, the reverse circulation and diamond drilling is composited to standard 1m or 2m lengths. Top-cutting of grades is used as a standard.

**4.4.3*****Grade and Tonnage Estimation***

Mineral Resource estimation procedures are based on ordinary kriging or inverse distance methods. When using inverse distance methods for open pits inverse distance squared or inverse distance cubed weightings are used. The block models are based on information from different sampling and drilling support without extensive QA/QC control and monitoring. Where applicable, the search neighbourhoods for the inverse distance methods are based on the results of geological modelling.

In the open pit mines, optimised pit outlines are designed around the resource block models. In many of the orebodies there is a significant nugget effect and dense sampling grids are required to estimate resources with a high degree of confidence and the search neighbourhoods employed during estimation are therefore of critical importance.

Tonnage modelling is based on average dry bulk density values that are, in places, based on a limited number of samples but have shown to be realistic when compared to density values obtained from mining reconciliation between underground and open pits.

Mineral Resource models for many of the underground orebodies are not based on block models but on the projection of historical averages. At a number of the underground mines there is history of a large variation in the thickness of the undulating sub-vertical ore shoots in the vertical plane that is difficult to predict from the available drillhole spacing. It has been found that, in these cases, the downward projection of the average mine tonnages and grades obtained from extensive current mine development is more appropriate than generating a block model. In terms of the projection of tonnages, gaps in the mineralisation identified by geological mapping of current mine development, are taken into account in the model. SRK concurs that, at this stage, the method of downward plunge projection of tonnage and grade from well developed mine production levels provides the best method for resource modelling for the deeper portions of the mines.

**4.4.4*****Grade Control and Reconciliation***

Grade control drilling in the open pits consists of angled reverse circulation drilling and takes place at different drillhole spacing, locally down to a spacing of 5m by 5m. Reconciliation in the open pits is carried out on each pit level and compared with grade control drilling or sampling. Channel samples are taken and used as the basis of grade control and reconciliation at the underground operations whilst grab samples are taken at the surface stockpiles.

Reconciliation between production data and block models shows that tonnages and grade reconcile reasonably well over longer periods. However, on a local scale over short time periods there are significant deviations in the reconciliations, which is usual for inverse distance weighting estimation. The production results from open pits is also compared with the grade from the upper underground levels (where possible) and confirms the average gold grades indicated by the available sampling data.

**4.4.5*****Reserve Estimation***

In the underground mines, resources are converted to reserves by designing stopes on a panel-by-panel basis using different cut-off-grades, determining a practical extraction and adding a percentage for mining dilution. Stopes and development outlines are designed using computerised mine design software. Cross-sections, long-sections and plans are generated as required that reflect a combination of drilling results, assays and geology and interpretations and are used to reflect the stopes, development ends and Mineral Reserves.

In the open pit mines, an optimised pit outline is developed to represent the economically extractable reserves. The Mineral Resources are derived from engineered pit designs, based on the optimal pit outlines.

#### **4.5**

##### **Mineral Resource and Mineral Reserve Statements**

The Mineral Reserves quoted are sensitive to changing operating costs and gold price. Tables within each sub-section show the Mineral Reserves at eight different gold prices including the Base Case. These sensitivities are presented to give an indication of the changes relative to gold price. SRK has shown a range that relates the extremes in gold price (hence in-situ cut-off grades appropriate to satisfy the context of "potentially







117

117

**Annexure 7**

economically viable") over the past few years and into the future and to give an indication of the gold price required to report resources equivalent to 250cmg.t as per Harmony's Annual Report. In this way SRK does not consider the range to reflect the dynamics of international currency exchange and fluctuations in dollar based gold price.

Note that these sensitivities are approximations only and accordingly at different gold prices alternative mining strategies may be pursued to exploit payable material in a more optimal manner. In turn, these may also affect the operating cost structure and cut-off-grades owing to changes in scale of operation, reflecting the dynamic nature of the mining process.

At Target Mine the impact on the Mineral Reserve of different gold prices is not presented due to the complex, interactive mine planning methodology.

The Mineral Resource and Mineral Reserve statements as presented herein differ from those generated by the Companies due to the following:

- the Companies present Mineral Resources for the South African assets at an in-situ cut-off-grade of 250cmg/t or between 0g/t and 3g/t. SRK has reported Mineral Resources at in-situ cut-off-grades which are reflective of current macro-economic and specific technical-economic parameters at each of the individual BUs;

- SRK has adjusted the Companies Mineral Resource and Mineral Reserve Statements for depletion that has occurred during the six-months that have elapsed since their respective generation. The statements presented herein are dated 1 January 2004; and

- Mineral Reserve statements include only Measured and Indicated Mineral Resources modified to produce Mineral Reserves and planned for extraction as projected in the respective LoM plans.

In considering the Mineral Resource and Mineral Reserve statements SRK note the following:

- with respect to the classification of Mineral Reserves by Harmony SRK considers that at the majority of the South African operations the boundary between Indicated Mineral Resources and Inferred Mineral Resources is conservatively defined and that for primary reef units reclassification could increase Indicated Mineral Resources and potentially the Probable Mineral Reserves;

- the LoM plans in certain instances rely on significant contribution from the Inferred Mineral Resource category and reported at RoM tonnage and grades. Given the generally conservative classification potential exists to significantly increase the Indicated Mineral Resource and consequently the Probable Mineral Reserve. SRK has on a high-level basis determined the relative impact on value should mining operations extract only that material currently defined as Mineral Reserves. This assessment crudely assumes that all Inferred Mineral Resources are depleted in the later part of the respective LoM plans. The resulting NPVs should be viewed on a comparative basis only and by definition reflect a lower level of technical planning than the LoM plans as the base case projections presented by the Companies;

- Mineral Resources classified by the suffix (1) represent those groupings of Mineral Resources which have been used as a base for modification to produce Mineral Reserves or those Inferred Resources which have been modified to produce material included for depletion in the respective LoM plans. Conversion in this instance is dependent upon all modifying factors inclusive of MCF, dilution, extraction and other planning considerations. In certain instances, specifically where groupings of Mineral Resources contain a high portion of remnant pillars, only a relatively small portion of the reported Mineral Resource is currently planned for extraction. Where this is the case such as Free Gold Operations there is an apparent overall low conversion to Mineral Reserves;

- the Mineral Resources not modified to produce Mineral Reserves as defined by the suffix (2), generally include:

.  
reef horizons not currently planned to be extracted in the current LoM plans;

groupings of pillars and other resource blocks for which insufficient technical work has been completed to allow conversion to Mineral Reserves.

In such instances, opportunity also exists for future modification to Mineral Reserve status. In contrast, risks also exist that further technical assessments may render portions of these Mineral Resources to be excluded from the Mineral Resource base on technical grounds; and

- vamping tonnages and grades are not currently included in the following statements, SRK consider there to be insufficient investigations to base continued contribution at current levels of production and hence warrant inclusion in the Mineral Resource and Mineral Reserve statements as presented herein. This represents further potential for increasing both the Mineral Resource and Mineral Reserve statements; and

-  
the Mineral Resource statements as presented for Harmony Canada Operations have only been reviewed by SRK on a desk top basis alone. SRK note however, that the operation is currently under care and maintenance with no near term intent to recommence operations.





118

118

**Annexure 7**

**4.5.1**

***Target Operations***

**Table 4.8 Target Operations: Target Mine - Mineral Resource and Mineral Reserve Statement**

**Mineral Reserve Category**

**Mineral Resource Category**

**Tonnage**

**Grade**

**Gold**

**Tonnage**

**Grade**

**Gold**

**(kt)**

**(g/t)**

**(koz)**

**(kt)**

**(g/t)**

**(koz)**

**Proved**

**Measured**

- u/g (1)

5,190

7.4

1,227

- u/g (1)

5,545

9.4

1,674

**Subtotal**

**5,190**

**7.4**

**1,227**

**Subtotal**

**5,545**

**9.4**

**1,674**

**Probable**

**Indicated**

- u/g (1)

11,656

6.3

2,374

- u/g (1)

12,910

9.3

3,840

**Subtotal**

**11,656**

**6.3**

**2,374**  
**Subtotal**  
**12,910**  
**9.3**  
**3,840**  
**Total Reserves**  
**16,846**  
**6.6**  
**3,601**  
**Total**  
**18,455**  
**9.3**  
**5,514**  
**M+I+Inf in LoM**  
**Inferred**  
 - u/g (1)  
 3,098  
 6.4  
 641  
 - u/g (1)  
 6,720  
 7.5  
 1,630  
 - s/f (1)  
 11,980  
 0.6  
 227  
**Subtotal**  
**3,098**  
**6.4**  
**641**  
**Subtotal**  
**18,700**  
**3.1**  
**1,857**  
**Total in LoM Plan**  
**19,944**  
**6.6**  
**4,242**  
**TOTAL**  
**37,155**  
**6.2**  
**7,371**

The impact of different gold prices on the Mineral Reserve is not presented for the Target Mine. Given the number of mining methods employed and the sensitivity of these to changes in mining costs and potential revenues, a significant amount of re-design work would be required to produce the optimum mining layout and hence a Mineral Reserve estimate for each price. Further, given that a very high percentage of the Target Mine Mineral Resource is converted to Mineral Reserve in the current statement, there is limited potential for the Mineral Reserve to increase with a higher gold price, such as that used as the basis of the Mineral Reserve at Harmony. In addition, while any decrease in price would more likely change the ratio between the mining methods employed, and reduce the operating margins, there would again be less of an impact on the Mineral Reserve itself.

**Table 4.9 Target Operations: NFSEC - Mineral Resource and Mineral Reserve Statement**

**Mineral Reserve Category**

**Mineral Resource Category**

**Tonnage**

**Grade**

**Gold**

**Tonnage**

**Grade**

**Gold**

**(kt)**

**(g/t)**

**(koz)**

**(kt)**

**(g/t)**

**(koz)**

**Probable**

**Indicated**

u/g - Loraine

u/g - Loraine

11,190

6.5

2,338

u/g - Target North

u/g - Target North 69,950

7.0

15,676

**Subtotal**

**0**

**0.0**

**0**

**Subtotal**

**81,140**

**6.9**

**18,015**

**Total Reserves**

**0**

**0.0**

**0**

**Total**

**81,140**

**6.9**

**18,015**

**M + I + INF in LoM**

**Inferred**

u/g - Target North

u/g - Target North 52,200

8.4

14,073

u/g - Oribi

u/g - Oribi

46,890



6.5  
9,792  
**Subtotal**  
0  
0.0  
0  
**Subtotal**  
**99,090**  
7.5  
23,865  
**Total in LoM Plan**  
0  
0.0  
0  
**TOTAL**  
**180,230**  
7.2  
**41,880**





119

119

**Annexure 7**

**4.5.2**

*Free Gold Operations*

**Table 4.10 Free Gold Operations: Mineral Resource and Mineral Reserve Statement**

**Mineral Reserve Category**

**Mineral Resource Category**

**Tonnage**

**Grade**

**Gold**

**Tonnage**

**Grade**

**Gold**

**(kt)**

**(g/t)**

**(koz)**

**(kt)**

**(g/t)**

**(koz)**

**Proved**

**Measured**

- u/g (1)

15,688

8.1

4,082

- u/g (1)

26,252

12.9

10,930

- u/g (2)

507

11.0

179

- s/f (1)

2,687

0.5

43

- s/f (1)

2,694

0.5

44

**Subtotal**

**18,375**

**7.0**

**4,125**

**Subtotal**

**29,453**

**11.8**

**11,153**

**Probable**

Indicated

- u/g (1)

45,101

6.9

10,000

- u/g (1)

63,355

10.5

21,391

- u/g (2)

1,237

7.2

287

- s/f (1)

7,674

0.8

196

- s/f (1)

10,095

0.7

233

**Subtotal**

**52,775**

**6.0**

**10,196**

**Subtotal**

**74,688**

**9.1**

**21,911**

**Total Reserves**

**71,150**

**6.3**

**14,321**

**Total**

**104,141**

**9.9**

**33,064**

**M+I+Inf in LoM**

- u/g (1)

7,456

6.5

1,566

- u/g (1)

122,126

9.1

35,551

- u/g (2)

83,508

4.8

12,987

**Subtotal**

7,456  
 6.5  
 1,566  
**Subtotal**  
 205,634  
 7.3  
 48,538  
**Total in LoM Plan**

78,605  
 6.3  
 15,887  
**TOTAL**  
 309,774

8.2  
**81,602**

In addition to the stated Mineral Resources and Mineral Reserves, over the LoM period Free Gold Operations plan to deliver to the plant some 892kt of material recovered from vamping operations at an average grade of 4.5g/t. This material is included in the LoM plan projections, however has not been classified as either Mineral Resources or Mineral Reserves.

Table 4.11 summarises the sensitivity of the Mineral Resources and Mineral Reserves at a range of gold prices. The results exclude the material projected from vamping operations.

**Table 4.11 Free Gold Operations: Mineral Resource, Mineral Reserve and LoM plan Sensitivity**

**Gold Price**  
**(ZAR/kg)**

46,500  
 69,750  
 93,000 116,250 139,500 186,000

232,500  
 279,000

**Mineral Resources - Total**

Tonnage  
 (kt)

94,528  
 211,691  
**309,774** 363,861  
 547,743 969,333 1,180,394 1,221,461

Grade  
 (g/t)

9.1  
 9.0  
**8.2**  
 7.6  
 5.4  
 3.5  
 3.1  
 3.1

Metal  
 (koz)

27,768  
 61,478  
**81,602**

88,718  
95,662  
109,093  
118,732  
120,957

**Mineral Reserves - Total**

Tonnage  
(kt)

31,880  
52,532  
**71,150**  
77,356  
177,606 343,457  
347,242  
348,756

Grade  
(g/t)

8.7  
7.6  
**6.3**  
6.0  
2.8  
1.6  
1.6  
1.6

Metal  
(koz)

8,912  
12,752  
**14,321**  
14,857  
16,178  
17,980  
18,174  
18,237

**LoM Plan - Total**

Tonnage  
(kt)

32,857  
57,380  
**78,605**  
85,943  
187,279 354,446  
367,312  
369,227

Grade  
(g/t)

8.7  
7.6  
**6.3**  
6.0

3.0  
1.7  
1.7  
1.7  
Metal  
(koz)  
9,196  
13,928  
**15,887**  
16,551  
17,927  
19,767  
20,193  
20,275







120

120

**Annexure 7**

**4.5.3**

*Harmony Free State Operations*

**Table 4.12 Harmony Free State Operations: Mineral Resource and Mineral Reserve Statement**

**Mineral Reserve Category**

**Mineral Resource Category**

**Tonnage**

**Grade**

**Gold**

**Tonnage**

**Grade**

**Gold**

**(kt)**

**(g/t)**

**(koz)**

**(kt)**

**(g/t)**

**(koz)**

**Proved**

**Measured**

- u/g (1)

11,449

4.6

1,700

- u/g (1)

21,415

7.5

5,180

- u/g (2)

981

7.6

239

- s/f (1)

13,241

0.4

151

- s/f (1)

13,412

0.4

151

**Subtotal**

**24,690**

**2.3**

**1,851**

**Subtotal**

**35,808**

**4.8**

**5,570**

**Probable**

**Indicated**

- u/g (1)

11,946

4.7

1,792

- u/g (1)

15,413

7.3

3,636

- u/g (2)

174

7.3

41

- s/f (1)

6,003

0.6

114

- s/f (1)

6,080

0.6

114

**Subtotal**

**17,949**

**3.3**

**1,906**

**Subtotal**

**21,668**

**5.4**

**3,791**

**Total Reserves**

**42,638**

**2.7**

**3,758**

**Total**

**57,475**

**5.1**

**9,362**

**M+I+Inf in LoM**

- u/g (1)

18,949

4.6

2,774

- u/g (1)

37,980

6.3

7,645

- u/g (2)

22,423

6.0

4,348

**Subtotal**

**18,949**  
**4.6**  
**2,774**  
**Subtotal**  
**60,403**  
**6.2**  
**11,992**  
**Total in LoM Plan**  
**61,587**  
**3.3**  
**6,532**  
**TOTAL**  
**117,878**

**5.6**  
**21,354**

In addition to the stated Mineral Resources and Mineral Reserves, over the LoM period Harmony Freestate Operations plan to deliver to the plant some 1,431kt of material recovered from vamping operations at an average grade of 3.3g/t. This material is included in the LoM plan projections, however has not been classified as either Mineral Resources or Mineral Reserves.

Table 4.13 summarises the sensitivity of the Mineral Resources and Mineral Reserves at a range of gold prices. The results exclude the material projected from vamping operations.

**Table 4.13 Harmony Free State Operations: Mineral Resource, Mineral Reserve and LoM plan Sensitivity**

**Gold Price**

**(ZAR/kg)**

**46,500**

**69,750**

**93,000 116,250 139,500 186,000**

**232,500**

**279,000**

**Mineral Resources - Total**

Tonnage

(kt)

5,813

31,499

**117,878**

191,958 305,413 623,364

791,815

960,722

Grade

(g/t)

14.0

7.4

**5.6**

5.2

4.6

3.3

2.9

2.5

Metal

(koz)

2,621

7,488

**21,354**

32,245

45,410

66,133

73,260

76,741

**Mineral Reserves - Total**

Tonnage

(kt)

2,281

13,819

**42,638**

52,838

69,238 159,963

237,340

242,443

Grade

(g/t)

8.0

4.4

**2.7**

2.7

2.6

1.4

1.1

1.1

Metal

(koz)

584

1,956

**3,758**

4,537

5,887

7,430

8,434

8,619

**LoM Plan - Total**

Tonnage

(kt)

2,416

15,976

**61,587**

92,822 122,596 252,775

337,201

352,822

Grade

(g/t)

8.1

4.5

**3.3**  
3.2  
3.5  
2.0  
1.6  
1.6  
Metal  
(koz)  
627  
2,295  
**6,532**  
9,667  
13,620  
16,542  
17,822  
18,310







121

121

**Annexure 7**

**4.5.4**

*Welkom Operations*

**Table 4.14 Welkom Operations: Mineral Resource and Mineral Reserve Statement**

**Mineral Reserve Category**

**Mineral Resource Category**

**Tonnage**

**Grade**

**Gold**

**Tonnage**

**Grade**

**Gold**

**(kt)**

**(g/t)**

**(koz)**

**(kt)**

**(g/t)**

**(koz)**

**Proved**

**Measured**

- u/g (1)

1,426

4.5

205

- u/g (1)

1,486

9.4

449

- u/g (2)

5,825

9.1

1,700

**Subtotal**

**1,426**

**4.5**

**205**

**Subtotal**

**7,311**

**9.1**

**2,149**

**Probable**

**Indicated**

- u/g (1)

1,645

3.2

171

- u/g (1)

1,585

5.8

297  
 - u/g (2)  
 4,935  
 7.8  
 1,232  
**Subtotal**  
**1,645**  
 3.2  
 171  
**Subtotal**  
**6,520**  
 7.3  
 1,529  
**Total 3,071**  
 3.8  
 376  
**Total**  
**13,831**  
 8.3  
**3,678**  
**M+I+Inf in LoM Plan**  
**Inferred**  
 - u/g (2)  
 1,307  
 7.1  
 298  
**Subtotal**  
**0**  
**0.0**  
**0**  
**Subtotal**  
**1,307**  
 7.1  
 298  
**Total in LoM Plan**  
**3,071**  
 3.8  
 376  
**TOTAL**  
**15,138**  
 8.2  
**3,975**

In addition to the stated Mineral Resources and Mineral Reserves, over the LoM period Welkom Operations plan to deliver to the plant some 97kt of material recovered from vamping operations at an average grade of 4.8g/t. This material is included in the LoM plan projections, however has not been classified as either Mineral Resources or Mineral Reserves.

Table 4.15 summarises the sensitivity of the Mineral Resources and Mineral Reserves at a range of gold prices. The results exclude the material projected from vamping operations.

**Table 4.15 Welkom Operations: Mineral Resource, Mineral Reserve and LoM plan Sensitivity**  
**Gold Price**  
**(ZAR/kg)**

**46,500**

**69,750**

**93,000 116,250 139,500 186,000**

**232,500**

**279,000**

**Mineral Resources - Total**

Tonnage

(kt)

4,434

9,093

**15,138**

23,454

46,641

51,774

64,162

78,813

Grade

(g/t)

12.2

9.5

**8.2**

6.9

5.4

5.1

4.5

3.9

Metal

(koz)

1,741

2,782

**3,975**

5,167

8,068

8,545

9,232

9,845

**Mineral Reserves - Total**

Tonnage

(kt)

634

2,153

**3,071**

3,292

3,446

3,542

3,644

3,653

Grade

(g/t)

5.6

4.2

**3.8**

3.7

3.6

3.6

3.5

3.5

Metal

(koz)

115

291

**376**

393

401

405

408

408

**LoM Plan - Total**

Tonnage

(kt)

634

2,153

**3,071**

3,292

3,446

3,542

3,644

3,653

Grade

(g/t)

5.6

4.2

**3.8**

3.7

3.6

3.6

3.5

3.5

Metal

(koz)

115

291

**376**

393

401

405

408

408





122

122

**Annexure 7**

**4.5.5**

*West Wits Operations*

**Table 4.16 West Wits Operations: Mineral Resource and Mineral Reserve Statement**

**Mineral Reserve Category**

**Mineral Resource Category**

**Tonnage**

**Grade**

**Gold**

**Tonnage**

**Grade**

**Gold**

**(kt)**

**(g/t)**

**(koz)**

**(kt)**

**(g/t)**

**(koz)**

**Proved**

**Measured**

- u/g (1)

9,686

6.6

2,048

- u/g (1)

12,045

10.5

4,078

- u/g (2)

10,435

9.8

3,288

- s/f (1)

441

2.7

38

- s/f (1)

729

2.4

55

**Subtotal**

**10,127**

**6.4**

**2,086**

**Subtotal**

**23,208**

**9.9**

**7,422**

**Probable**



Indicated

- u/g (1)

14,612

8.1

3,814

- u/g (1)

18,947

11.7

7,143

- u/g (2)

5,540

9.1

1,624

- s/f (1)

2,201

1.1

75

- s/f (1)

5,530

0.8

147

**Subtotal**

**16,812**

**7.2**

**3,889**

**Subtotal**

**30,016**

**9.2**

**8,914**

**Total Reserves**

**26,939**

**6.9**

**5,974**

**Total**

**53,225**

**9.5**

**16,336**

**M+I+Inf in LoM**

- u/g (1)

39,814

6.0

7,695

- u/g (1)

66,724

8.3

17,744

- u/g (2)

3,063

4.4

430

**Subtotal**

39,814  
 6.0  
 7,695  
**Subtotal**  
 69,787  
 8.1  
 18,174  
**Total in LoM Plan**

66,754  
 6.4  
 13,670  
**TOTAL**  
 123,012  
 8.7  
 34,510

In addition to the stated Mineral Resources and Mineral Reserves, over the LoM period West Wits Operations plan to deliver to the plant some 5,714kt of material recovered from vamping operations at an average grade of 5.2g/t. This material is included in the LoM plan projections, however has not been classified as either Mineral Resources or Mineral Reserves.

Table 4.17 summarises the sensitivity of the Mineral Resources and Mineral Reserves at a range of gold prices. The results exclude the material projected from vamping operations.

**Table 4.17 West Wits Operations: Mineral Resource, Mineral Reserve and LoM plan Sensitivity**

**Gold Price**

(ZAR/kg)

46,500  
 69,750  
 93,000 116,250 139,500 186,000

232,500

279,000

**Mineral Resources - Total**

Tonnage

(kt)

23,812

60,825

123,012 362,200

577,241 890,124 1,026,596 1,104,682

Grade

(g/t)

14.9

10.8

8.7

4.6

3.7

2.9

2.8

2.7

Metal

(koz)

11,427

21,167

34,510

53,823  
 69,218  
 83,728  
 91,565  
 95,851

**Mineral Reserves - Total**

Tonnage  
 (kt)

8,695  
 19,084

**26,939**

47,766  
 56,738  
 65,399  
 71,807  
 75,688

Grade  
 (g/t)

11.0  
 8.2

**6.9**

4.5  
 4.2  
 3.9  
 3.7  
 3.6

Metal  
 (koz)

3,071  
 5,042

**5,974**

6,899  
 7,708  
 8,223  
 8,524  
 8,666

**LoM Plan - Total**

Tonnage  
 (kt)

15,373  
 35,356

**66,754** 126,908 179,626 223,788

256,426  
 269,957

Grade  
 (g/t)

10.0  
 7.6

**6.4**

4.4  
 3.8

3.4  
3.1  
3.0  
Metal  
(koz)  
4,928  
8,645  
**13,670**  
17,905  
21,843  
24,316  
25,942  
26,424





123

123

**Annexure 7**

**4.5.6**

*Evander Operations*

**Table 4.18 Evander Operations: Mineral Resource and Mineral Reserve Statement**

**Mineral Reserve Category**

**Mineral Resource Category**

**Tonnage**

**Grade**

**Gold**

**Tonnage**

**Grade**

**Gold**

**(kt)**

**(g/t)**

**(koz)**

**(kt)**

**(g/t)**

**(koz)**

**Proved**

**Measured**

- u/g (1)

3,112

5.5

550

- u/g (1)

4,102

10.7

1,405

- u/g (2)

854

11.2

307

**Subtotal**

**3,112**

**5.5**

**550**

**Subtotal**

**4,956**

**10.7**

**1,712**

**Probable**

**Indicated**

- u/g (1)

36,124

7.3

8,471

- u/g (1)

37,159

14.2

16,926  
 - u/g (2)  
 12,889  
 11.4  
 4,744  
 - s/f (2)  
 210,306  
 0.3  
 2,257  
**Subtotal**  
**36,124**  
 7.3  
**8,471**  
**Subtotal**  
**260,354**  
 2.9  
**23,927**  
**Total Reserves**  
**39,237**  
 7.2  
**9,021**  
**Total**  
**265,311**  
 3.0  
**25,639**  
**M+I+Inf in LoM**  
 - u/g (1)  
 4,715  
 5.2  
 789  
 - u/g (1)  
 17,466  
 9.9  
 5,532  
 - u/g (2)  
 43,337  
 10.2  
 14,232  
 - s/f (2)  
 1,290  
 0.3  
 13  
**Subtotal**  
**4,715**  
 5.2  
**789**  
**Subtotal**  
**62,093**  
 9.9  
**19,777**  
**Total in LoM Plan**



43,952  
 6.9  
 9,810  
**TOTAL**  
 327,404  
 4.3  
**45,416**

Table 4.18 include Mineral Reserves for the Rolspruit Project amounting to 25,951kt at an average grade of 7.9g/t, which is contained in the Probable Reserve category. A final decision to proceed with the Rolspruit Project has not been made and as such the Mineral Reserves and associated capital are excluded from the Evander TEPs, Section 12 and TEMs, Section 13.

In addition to the stated Mineral Resources and Mineral Reserves, over the LoM period Evander Operations plan to deliver to the plant some 1,525kt of material recovered from vamping operations at an average grade of 6.2g/t. This material is included in the LoM plan projections, however has not been classified as either Mineral Resources or Mineral Reserves.

Table 4.19 summarises the sensitivity of the Mineral Resources and Mineral Reserves at a range of gold prices. The results exclude the material projected from vamping operations.

**Table 4.19 Evander Operations: Mineral Resource, Mineral Reserve and LoM plan Sensitivity**

**Gold Price**

**(ZAR/kg)**

**46,500**

**69,750**

**93,000 116,250 139,500 186,000**

**232,500**

**279,000**

**Mineral Resources - Total**

**(1)**

Tonnage

(kt)

4,770

61,388

**327,404**

356,976 396,897 435,227

457,581

524,022

Grade

(g/t)

17.4

12.0

**4.3**

4.4

4.5

4.4

4.4

4.2

Metal

(koz)

2,665

23,627

**45,416**

51,016

57,172

61,671

64,256

70,294

**Mineral Reserves - Total**

Tonnage

(kt)

2,632

12,958

**39,237**

42,651

50,205

59,645

74,519

82,600

Grade

(g/t)

9.0

7.8

**7.2**

6.8

6.2

5.5

4.8

4.5

Metal

(koz)

761

3,267

**9,021**

9,355

10,021

10,570

11,529

11,855

**LoM Plan - Total**

Tonnage

(kt)

3,084

16,191

**43,952**

53,180

65,241

78,128

94,670

103,439

Grade

(g/t)

8.9

7.4

**6.9**

6.2  
5.5  
4.9  
4.4  
4.1  
Metal  
(koz)  
878  
3,877  
**9,810**  
10,657  
11,624  
12,362  
13,397  
13,749  
(1)

Sensitivities include a large contribution of surface sources that influence the collective grade at higher gold prices.





124

124

**Annexure 7**

**4.5.7**

*Orkney Operations*

**Table 4.20 Orkney Operations: Mineral Resource and Mineral Reserve Statement**

**Mineral Reserve Category**

**Mineral Resource Category**

**Tonnage**

**Grade**

**Gold**

**Tonnage**

**Grade**

**Gold**

**(kt)**

**(g/t)**

**(koz)**

**(kt)**

**(g/t)**

**(koz)**

**Proved**

**Measured**

- u/g (1)

4,457

4.6

653

- u/g (1)

5,712

6.3

1,160

- u/g (2)

17,294

8.4

4,655

**Subtotal**

**4,457**

**4.6**

**653**

**Subtotal**

**23,005**

**7.9**

**5,815**

**Probable**

**Indicated**

- u/g (1)

1,208

6.0

234

- u/g (1)

1,308

10.2

428
- u/g (2)
95,932
3.6
11,219
<b>Subtotal</b>
<b>1,208</b>
<b>6.0</b>
<b>234</b>
<b>Subtotal</b>
<b>97,240</b>
<b>3.7</b>
<b>11,647</b>
<b>Total Reserves</b>
<b>5,666</b>
<b>4.9</b>
<b>888</b>
<b>Total</b>
<b>120,245</b>
<b>4.5</b>
<b>17,462</b>
<b>M+I+Inf in LoM</b>
- u/g (2)
1,041
8.3
279
<b>Subtotal</b>
<b>0</b>
<b>0.0</b>
<b>0</b>
<b>Subtotal</b>
<b>1,041</b>
<b>8.3</b>
<b>279</b>
<b>Total in LOM Plan</b>
<b>5,666</b>
<b>4.9</b>
<b>888</b>
<b>TOTAL</b>
<b>121,286</b>
<b>4.5</b>
<b>17,740</b>

In addition to the stated Mineral Resources and Mineral Reserves, over the LoM period Orkney Operations plan to deliver to the plant some 90kt of material recovered from vamping operations at an average grade of 3.5g/t. This material is included in the LoM plan projections, however has not been classified as either Mineral Resources or Mineral Reserves.

Table 4.21 summarises the sensitivity of the Mineral Resources and Mineral Reserves at a range of gold prices. The results exclude the material projected from vamping operations.

**Table 4.21 Orkney Operations: Mineral Resource, Mineral Reserve and LoM plan Sensitivity**  
**Gold Price**  
**(ZAR/kg)**

**46,500**

**69,750**

**93,000 116,250 139,500 186,000**

**232,500**

**279,000**

**Mineral Resources - Total**

Tonnage

(kt)

10,855

38,039

**121,286** 153,090

210,426 293,081

308,011

334,616

Grade

(g/t)

11.1

7.1

**4.5**

4.2

3.7

3.4

3.3

3.3

Metal

(koz)

3,872

8,671

**17,740**

20,577

25,239

32,096

32,999

35,593

**Mineral Reserves - Total**

Tonnage

(kt)

1,125

3,443

**5,666**

6,978

16,612

19,779

21,865

24,974

Grade

(g/t)

7.3

5.8

**4.9**

4.5



2.7

2.5

2.4

2.2

Metal

(koz)

266

642

**888**

1,001

1,433

1,602

1,685

1,801

**LoM Plan - Total**

Tonnage

(kt)

1,125

3,443

**5,666**

6,978

16,612

19,779

21,865

24,974

Grade

(g/t)

7.3

5.8

**4.9**

4.5

2.7

2.5

2.4

2.2

Metal

(koz)

266

642

**888**

1,001

1,433

1,602

1,685

1,801





125

125

**Annexure 7**

**4.5.8**

*Kalgold Operation*

**Table 4.22 Kalgold Operations**

**(1)**

**: Mineral Resource and Mineral Reserve Statement**

**Mineral Reserve Category**

**Mineral Resource Category**

**Tonnage**

**Grade**

**Gold**

**Tonnage**

**Grade**

**Gold**

**(kt)**

**(g/t)**

**(koz)**

**(kt)**

**(g/t)**

**(koz)**

**Proved**

**Measured**

- s/f (1)

994

1.2

38

- s/f (1)

1,113

1.3

45

- o/p (1)

4,986

2.3

365

- o/p (1)

12,446

2.1

843

- o/p (2)

11,334

1.1

413

**Subtotal**

**5,980**

**2.1**

**403**

**Subtotal**

**24,893**

**1.6**

**1,301**  
**Probable**  
**Indicated**  
 - o/p (2)  
 4,485  
 1.5  
 217  
**Subtotal**  
**0**  
**0.0**  
**0**  
**Subtotal**  
**4,485**  
**1.5**  
**217**  
**Total Reserves**  
**5,980**  
**2.1**  
**403**  
**Total**  
**29,378**  
**1.6**  
**1,518**  
**M+I+Inf in LoM**  
 - o/p (2)  
 14,804  
 1.8  
 851  
**Subtotal**  
**0**  
**0.0**  
**0**  
**Subtotal**  
**14,804**  
**1.8**  
**851**  
**Total in LoM Plan**  
**5,980**  
**2.1**  
**403**  
**TOTAL**  
**44,182**  
**1.7**  
**2,369**  
 (1)

The contribution from Kalgold is subject to a current sale agreement which may see a 100% disposal of the asset in the near future.

**4.5.9**

*Harmony Australian Operations*

**Table 4.23**

**Harmony Australia Operations - Mt. Magnet & Cue: Mineral Resource and Mineral Reserve Statement**

**Mineral Reserve Category**

**Mineral Resource Category**

**Tonnage**

**Grade**

**Gold**

**Tonnage**

**Grade**

**Gold**

**(kt)**

**(g/t)**

**(koz)**

**(kt)**

**(g/t)**

**(koz)**

**Proved**

**Measured**

- u/g (1)

388

4.6

57

- u/g (1)

4,035

3.8

499

- s/f (1)

1,256

1.0

39

- s/f (1)

2,787

1.0

94

- o/p (1)

0

0.0

0

- o/p (1)

144

2.8

13

**Subtotal**

**1,643**

**1.8**

**96**

**Subtotal**

**6,966**

**2.7**

**606**

**Probable**

**Indicated**

- u/g (1)

3,413

5.7

624

- u/g (1)

2,114

12.4

846

- s/f (1)

1,027

0.9

31

- s/f (1)

776

1.0

24

- o/p (1)

581

3.2

59

- o/p (1)

16,748

2.3

1,213

**Subtotal**

**5,021**

**4.4**

**714**

**Subtotal**

**19,638**

**3.3**

**2,083**

**Total Reserves**

**6,664**

**3.8**

**811**

**Total**

**26,604**

**3.1**

**2,689**

**M+I+Inf in LoM**

- u/g (1)

3,021

6.5

632

- u/g (1)

10,310

5.5

1,834

- o/p (1)

3,918

1.9

243  
- o/p (1)  
10,798  
1.9  
663  
**Subtotal**  
**6,940**  
3.9  
875  
**Subtotal**  
**21,108**  
3.7  
2,497  
**Total in LoM Plan**  
**13,604**  
3.9  
1,685  
**TOTAL**  
**47,712**  
3.4  
5,186







126

126

**Annexure 7**

**Table 4.24**

**Harmony Australian Operations - South Kalgoorlie: Mineral Resource and Mineral Reserve Statement**

**Mineral Reserve Category**

**Mineral Resource Category**

**Tonnage**

**Grade**

**Gold**

**Tonnage**

**Grade**

**Gold**

**(kt)**

**(g/t)**

**(koz)**

**(kt)**

**(g/t)**

**(koz)**

**Proved**

**Measured**

- u/g (1)

664

4.8

102

- u/g (1)

1,041

5.1

172

- s/f (1)

428

0.8

11

- s/f (1)

2,140

1.0

70

- o/p (1)

113

2.0

7

- o/p (1)

2,870

2.4

224

**Subtotal**

**1,205**

**3.1**

**120**

**Subtotal**

**6,051**

**2.4**  
**465**  
**Probable**  
**Indicated**  
 - u/g (1)  
 561  
 4.3  
 77  
 - u/g (1)  
 1,419  
 4.1  
 186  
 - s/f (1)  
 0  
 0.0  
 0  
 - s/f (1)  
 937  
 0.7  
 22  
 - o/p (1)  
 829  
 2.5  
 68  
 - o/p (1)  
 33,636  
 1.7  
 1,829  
**Subtotal**  
**1,390**  
**3.2**  
**145**  
**Subtotal**  
**35,992**  
**1.8**  
**2,036**  
**Total Reserves**  
**2,595**  
**3.2**  
**265**  
**Total**  
**42,043**  
**1.9**  
**2,501**  
**M+I+Inf in LoM**  
**Inferred**  
 - u/g (1)  
 297  
 4.6  
 44  
 - u/g (1)

3,174  
 3.4  
 343  
 - s/f (1)  
 0  
 0.0  
 0  
 - s/f (1)  
 176  
 0.7  
 4  
 - o/p (1)  
 292  
 1.8  
 17  
 - o/p (1)  
 45,991  
 1.3  
 1,888  
**Subtotal**  
**589**  
**3.2**  
**61**  
**Subtotal**  
**49,341**  
**1.4**  
**2,235**  
**Total in LoM Plan**  
**3,184**  
**3.2**  
**326**  
**TOTAL**  
**91,384**  
**1.6**  
**4,737**  
**4.5.10 Harmony Canadian Operations**  
**Table 4.25 Harmony Canadian Operations: Mineral Resource and Mineral Reserve Statement**  
**Mineral Reserve Category**  
**Mineral Resource Category**  
**Tonnage**  
**Grade**  
**Gold**  
**Tonnage**  
**Grade**  
**Gold**  
**(kt)**  
**(g/t)**  
**(koz)**  
**(kt)**  
**(g/t)**  
**(koz)**

**Proved**  
**Measured**  
- u/g (1)  
- u/g (1)  
533  
7.3  
126  
**Subtotal**  
**Subtotal**  
**533**  
**7.3**  
**126**  
**Probable**  
**Indicated**  
- u/g (1)  
- u/g (1)  
755  
8.3  
202  
**Subtotal**  
**Subtotal**  
**755**  
8.3  
**202**  
**Total Reserves**  
**Total**  
**1,288**  
7.9  
**328**  
**M+I+Inf in LoM**  
**Inferred**  
- u/g (1)  
- u/g (1)  
817  
9.2  
241  
**Subtotal**  
**Subtotal**  
**817**  
9.2  
**241**  
**Total in LoM Plan**  
**TOTAL**  
**2,105**  
**8.4**  
**569**







127

127

**Annexure 7**

**4.5.11 Avgold**

**Table 4.26 Avgold: Mineral Resource and Mineral Reserve Statement**

**Mineral Reserve Category**

**Mineral Resource Category**

**Tonnage**

**Grade**

**Gold**

**Tonnage**

**Grade**

**Gold**

**(kt)**

**(g/t)**

**(koz)**

**(kt)**

**(g/t)**

**(koz)**

**Proved**

**Measured**

- u/g (1)

5,190

7.4

1,227

- u/g (1)

5,545

9.4

1,674

**Subtotal**

**5,190**

**7.4**

**1,227**

**Subtotal**

**5,545**

**9.4**

**1,674**

**Probable**

**Indicated**

- u/g (1)

11,656

6.3

2,374

- u/g (1)

12,910

9.3

3,840

- u/g (2)

81,140

6.9

18,015

**Subtotal**  
**11,656**  
**6.3**  
**2,374**  
**Subtotal**  
**94,050**  
**7.2**  
**21,855**  
**Total Reserves**  
**16,846**  
**6.6**  
**3,601**  
**Total**  
**99,595**  
**7.3**  
**23,529**  
**M+I+Inf in LoM**  
**Inferred**  
 - u/g (1)  
 3,098  
 6.4  
 641  
 - u/g (1)  
 6,720  
 7.5  
 1,630  
 - u/g (2)  
 99,090  
 7.5  
 23,865  
 - s/f (1)  
 0  
 0.0  
 0  
 - s/f (1)  
 11,980  
 0.6  
 227  
**Subtotal**  
**3,098**  
**6.4**  
**641**  
**Subtotal**  
**117,790**  
**6.8**  
**25,722**  
**Total**  
**19,944**  
**6.6**  
**4,242**  
**TOTAL**

217,385

7.0

49,251

*4.5.12 Harmony*

**Table 4.27 Harmony: Mineral Resource and Mineral Reserve Statement**

**Mineral Reserve Category**

**Mineral Resource Category**

**Tonnage**

**Grade**

**Gold**

**Tonnage**

**Grade**

**Gold**

**(kt)**

**(g/t)**

**(koz)**

**(kt)**

**(g/t)**

**(koz)**

**Proved**

**Measured**

- u/g (1)

46,869

6.2

9,398

- u/g (1)

76,621

9.7

23,998

- u/g (2)

35,895

9.0

10,369

- s/f (1)

19,047

0.5

320

- s/f (1)

22,875

0.6

459

- o/p (1)

5,099

2.3

372

- o/p (1)

15,460

2.2

1,080

- o/p (2)

11,334

1.1  
413  
**Subtotal**  
**71,015**  
4.4  
**10,090**  
**Subtotal**  
**162,185**  
7.0  
**36,319**  
**Probable**  
**Indicated**  
- u/g (1)  
114,610  
6.8  
25,184  
- u/g (1)  
142,056  
11.2  
51,055  
- u/g (2)  
120,707  
4.9  
19,147  
- s/f (1)  
16,904  
0.8  
416  
- s/f (1)  
23,418  
0.7  
540  
- s/f (2)  
210,306  
0.3  
2,257  
- o/p (1)  
1,410  
2.8  
127  
- o/p (1)  
50,383  
1.9  
3,041  
- o/p (2)  
4,485  
1.5  
217  
**Subtotal**  
**132,924**  
**6.0**

**25,726**  
**Subtotal**  
**551,357**  
**4.3**  
**76,257**  
**Total Reserves**  
**203,939**  
**5.5**  
**35,816**  
**Total**  
**713,541**  
**4.9 112,576**  
**M+I+Inf in LoM**  
**Inferred**  
 - u/g (1)  
 74,253  
 5.7  
 13,500  
 - u/g (1)  
 258,597  
 8.3  
 68,890  
 - u/g (2)  
 154,680  
 6.5  
 32,573  
 - s/f (1)  
 0  
 0.0  
 0  
 - s/f (1)  
 176  
 0.7  
 4  
 - s/f (2)  
 1,290  
 0.3  
 13  
 - o/p (1)  
 4,210  
 1.9  
 260  
 - o/p (1)  
 56,789  
 1.4  
 2,551  
 - o/p (2)  
 14,804  
 1.8  
 851  
**Subtotal**

78,463  
5.5  
13,760  
Subtotal  
486,335  
6.7 104,881  
Total  
282,401  
5.5  
49,576  
TOTAL  
1,199,876  
5.6 217,457







128

128

## **Annexure 7**

### **4.6**

#### **Mineral Resource and Mineral Reserve Potential**

The majority of the deep-level gold operations are mature and other than for re-classification of Inferred and Indicated Mineral Resources together with conversion of Mineral Resources currently classified by suffix (2) to Mineral Reserves, SRK considers there to be limited opportunity for significant increases in Mineral Resources or Mineral Reserves. Some potential does however exist for:

- outlining higher-grade components of areas currently classified as Inferred Mineral Resources and Indicated Mineral Resources;
- focusing exploration activity on all of the secondary reef horizons such as the Leader Reef and the "A" Reef, specifically the "B" Reef at Tshepong BU and secondary reefs at the West Wits Operations;
- exploration into the Jeannette mine and the Basal Reef, directly northeast of Tshepong BU; and
- further potential for increasing the Mineral Resource tonnage relies on the reductions in cut-off-grades.

### **5.**

## **MINING**

### **5.1**

#### **Introduction**

This section includes discussion and comment on the mining engineering and related aspects of the LoM plans associated with the Mining Assets. Specifically, comments are given on the mine planning process, mining methods, geotechnics, mine ventilation and the impact of the foregoing on future mining operations.

### **5.2**

#### **Mine Planning**

The mine planning process at the Mining Assets is dependent upon input from the geology/resource management departments. Responsibility is assigned for addition/revision and depletion sign-off on the Mineral Resource, which forms the basis for subsequent design, planning and extraction sequencing incorporated into the LoM plan. In the majority of instances this is completed using a combination of computerised geological modelling, mine planning and production scheduling utilising various in-house and external software packages.

The planning cycle commences with the ratification of key input parameters, prior to producing a SAMREC compliant Mineral Resource statement, adjusted for all resource depletion. On completion of the resource update, the planning process commences, incorporating:

- targets, objectives and guidelines that are defined by the Companies' respective corporate teams;
- detailed short-term (one year) operating plans extending stoping and development layouts from current mining face positions. Reliance is placed on historically achieved production parameters such as development rates, mining widths and dilution together with metal accounting factors such as mine call factors, ore losses and metallurgical recovery; and
- an extension to the short-term plan resulting in a three-year strategic plan detailing any planned production build-ups or mine expansion programmes. At Target Mine engineering design and computer scheduling software depletes the available Mineral Resources within the constraints of existing infrastructure. At Harmony's Mining Assets, beyond the three-year period, LoM projections are developed on a factorised depletion of the available Mineral Resources.

In conjunction with the above, a detailed (one year) operating and capital cost budget is subsequently produced and where appropriate extended for the LoM production schedule. The one-year budget is generally prepared on a monthly basis, extending into quarterly periods and annually thereafter. Of critical importance is the utilisation of historically achieved data for productivity and operating costs against which operating business units are benchmarked. Where this is not available, zero-based costing is applied. Specific capital projects are evaluated on individual merits to demonstrate the anticipated return on investment.

SRK consider that, despite being in line with general industry practice, a more progressive approach to planning would better assist in assessing the risk profiles and project value drivers of the various operations. SRK consider that future assessment should extend the business window beyond the current three years, to ensure that due recognition of

the longer-term risk environment is considered. Detailed planning generally only extends between one and three years for assets where no specific project capital is anticipated; with detailed planning profiles extending over the capital spend profiles for the specific capital projects. The LoM projections for each business unit vary between three and twenty years within the same Tax Entity. In the absence of detailed cost projections beyond the specific period, SRK has assessed the unit operating costs taking cognisance of increasing depth and distance from shaft infrastructure and a general allowance for age of infrastructure and associated additional maintenance costs. Labour (contributing between 40% and 50% of the total costs) has been assessed taking a view on the achievable productivity over the LoM period. Consumables have been split into a fixed and variable component and projected forward using cost drivers such as development meters and stoping area (accounting for variation in stoping width).





129

129

**Annexure 7****5.3****Overview of Mining Operations****5.3.1*****Target Operations - Target Mine***

The Target orebody is relatively complex comprising of a number of reefs of varying widths, grades and inclinations stacked above one another and separated by layers of quartzite. The LoM planning process is therefore critically dependent on geological input, specifically in terms of structure, geometry and distribution of reef packages and gold content. The main orebody comprises the Eldorado Fan, the Interfan and the Zuurbron Fan systems that strike north-south and the access decline system is located to the west.

The Elsburg Formation sub-crops against the Dreyerskuil Formation and the lowest reef in this group, the DK1A, is exploited by conventional deep-level gold mining techniques. The mining of the Dreyerskuil leads to over-stoping of the Elsburg Formation and the de-stressing of the ground to accommodate the long-hole drilling and large-scale stoping methods that are employed.

The LoM plan essentially comprises 5 main working areas:

- Block 1: located at the south of the Eldorado Fan formation and principally at the centre of the orebody;
- Block 2: located some 250m to the north of Block 1 and in the Eldorado Fan formation and is accessed from sub-levels driven off of the access ramp located in the east;
- Block 3: located within the Eldorado Fan formation to the north of the Damn Fault which forms the boundary between Block 2 and Block 3 and is estimated to have an average down throw of approximately 30m; and
- Block 4 and Block 5: located to the south of Block 1 and principally define the Interfan and Zuurbron Fan formations. The grade of the Mineral Resources in Block 4 and Block 5 is approximately 3g/t lower than that the Mineral Resources comprising Blocks 1 to 3. Consequently Block 4 and Block 5 only form only a minor tonnage and are currently scheduled for depletion later in the LoM plan.

Production and support activities for the underground operations are coordinated from a central, surface based, operations room, which is also responsible for emergency procedures. The control room is also used to monitor, operate and control the major plant such as the conveyor system, pump stations and refrigeration units.

***Access and Infrastructure:*** The No.1 Shaft is used for the transport of men, material and rock to and from surface to the 203L from where a single decline is installed to the 255L some 2,050m below surface. The decline splits at 255L into a conveyor decline and a vehicle decline, descending to the extent of development currently at the 282L, some 2,300m below surface. Two jaw crushers are located at the base of the declines directly beneath surge passes with approximately 4hrs production capacity. The crushers are fed by a vibrating feeder and a 200mm screen ensures only the oversize material is crushed. The undersize is directed straight to the conveyor system. Each crusher can operate at a throughput of some 310tph, which is significantly more than the operating capacity of the hoisting system. The conveyor system comprises six conveyors of various lengths over a distance of some 6km. The conveyor system is designed to operate at 2.5m/s to enable man riding on the 900mm wide belts. The design throughput of the system is 225tph and the conveyors tip rock into one of two 2,000t capacity storage facilities located adjacent to the main shaft on the 203L.

During 2003 the hoisting capacity of the shaft was increased by improving skip cycle time and payload and now hoists at a rate of 23-24 skips per hour (previously 20-21 skips per hour) with 9.5t skips (previously 9.1t) thus at an average hoisting time of 20hr/day the shaft capacity equates to 4,300tpd equivalent to some 125ktpm. Hoisting has only averaged 90ktpm during 2003 principally due to lower massive stope production than planned.

There are no dedicated facilities to separate ore and waste in terms of storage before the conveyor system, and if required one of the two main orepasses together with a crusher would need to be dedicated to effect separate waste transportation and hoisting. Operationally the existing facilities make waste separation impractical and therefore waste, that is not backfilled, is hoisted as dilution to ore.

Alternative access to surface, in the event of an emergency, is via the No.1C sub-vertical shaft on the 255L to the No.2 Shaft on the 208L located some 3km from No.1 Shaft. Access to the 255L from the workings is via the conveyor

decline and vehicle decline or the return airway decline. No.5 Shaft is utilised as a return airway. Materials and equipment are transported from the station on 203L to the underground working by an overhead mono-rail system that principally uses an electric drive unit and a diesel back-up. The mono-rail currently operates to the 255L although the second phase of the installation to the 282L is currently in progress. Utility vehicles are used to transfer material and equipment from the mono-







130

130

**Annexure 7**

rail station. The main declines are used to provide services, such as water, power, backfill slurry and also houses pump columns as well as being the main air intakes. Due to the limited need for compressed air there is no compressed air reticulation network in the mine and small compressor units are used where necessary. Communication is via a telephone network and radio communication via a leaky feeder system.

**Mining Methods:** Initial development and mining commenced in Block 1, located in the southern portion of the Eldorado Fan system. A cross-cut was developed from the main decline system to a ramp located to the east of the orebody which provides access across the centre of Block 1. The ramp is located in the east due to unfavourable ground conditions in the west. The mining methods employed at Target Mine comprise long-hole open stoping, drift and fill mining and Narrow Reef Mining ("NRM").

The long-hole open stoping methods are further classified into a number of stope types that are principally defined by stope size: massive open stoping ("MOS"); wide open stoping ("WOS"), dwarf open stoping ("DOS") and narrow open stoping ("NOS"):

- **MOS** is conducted in the upper parts of the orebody principally comprising the sub-crop of the Eldorado Fan against the Dreyerskuil Formation. The primary reef package comprising EA7A to EA13A forms the focus of the stope outlines. The DK1A is principally advanced as a de-stress cut before massive stoping of the primary reef package can commence. As the MOS advances into the areas where the DK1A has been extracted, the old workings occasionally collapse into the MOS resulting in large rocks and old mine support reporting to the drawpoints. In areas where the de-stress cut is not essential the DK1A reef is therefore added to the MOS and mined as one package. The MOS design comprises two levels, a lower drilling and loading level and an upper drilling level. The faces are advanced in sequence on a retreat basis (where possible) to limit hangingwall deterioration from undercutting;

- **WOS** is principally conducted in the main part of the block in areas where the thickness is greater than 10m and the dip greater than 20°. The dip of this area of the orebody in Block 1 varies between 25° to 30°. WOS is also applied to exploit the EA7A to EA13A reef zones which are typically mined in a sequence from the lowest stope upwards. Each stope is drilled and loaded from a single strike drive at the base of the orebody and generally on a retreat basis, although hangingwall drives and additional adjacent loading tunnels have been experimented with. On depletion of the stope backfill is placed prior to repeating the cycle at the next higher level. Block 1 WOS comprises four sequenced stopes the last of which is located adjacent to the bottom MOS. The development drives are developed within the shadow of the de-stressed zone of the NRM;

- **DOS** is a recent innovation and has principally arisen following a need to improve upon drift and fill mining, originally planned in areas where reef packages were not anticipated to be as thick as currently encountered. The DOS design is principally the same as the WOS; and

- **NOS** is planned to be utilised in thin (less than 3m), steeply dipping (greater than 45°) reef packages, these areas are principally confined to discrete EA1 to the EA3 reefs below the main reef package. The mining method uses an upper and lower strike drift to define the limits of the orebody for drilling. The lower drift is used for up-hole drilling and ore loading. No NOS has yet been undertaken.

Drift and fill stoping is undertaken by mechanised short-hole drilling methods utilising development jumbo rigs. The mining is fully trackless in both drilling and loading operations. Drift and Fill is employed in narrow (less than 10m) and shallow dipping (less than 20°) reefs and is principally confined to reefs to the east of the WOS blocks. The method of stoping is principally to develop drifts, up to 60m in length and some 5m in width, on an apparent dip in the orebody. The drift can be widened by a further 3m on a retreat basis before backfilling. Adjacent drifts are only mined after backfilling of the depleted stope is complete.

Production drilling in the open stopes is undertaken with Tamrock Solo rigs that drill 64mm or 76mm diameter holes of up to 30m in length. The principal blasting agent is ammonium nitrate and fuel oil ("ANFO") delivered by a mobile charging vehicle. Emulsion is also used where necessary. The ore is loaded and transported by LHDs into orepasses located in the main crosscut pillar of Block 1. Tramming distances for Block 1 are typically less than 150m and, as operations advance away from primary infrastructure, trucks will be introduced to tram ore from the further blocks

back to these orepasses. The ore is directed to permanent rock breakers and a 600mm grizzly located on the 278L before being fed to the crusher passes.

Fragmentation in the massive stopes is good providing there are no hangingwall problems. Recently, however big rocks associated with the relaxation of an upper stope through undercutting, are creating problems by breaking into the old NRM areas. Fragmentation issues are also enhanced by poor drilling practice. The future designs and stope schedules have been modified accordingly, specifically drilling to design specification.





131

131

**Annexure 7**

NRM is undertaken by conventional methods using short-hole hand held hydro-power driven rock drills for blast-hole drilling and scraper winches for cleaning; support is by the use of mine poles, elongates and packs. NRM is preferred on the narrow DK1A reef located at the base of the Dreyerskuil Formation and at the subcrop to the Elsburg Formation. The DK1A occurs on an anticline where the dips range between 0° along the anticline axis and 20° on the east and west limb.

All level development for the massive stopes is undertaken by trackless methods using electric- hydraulic jumbo drill rigs, LHDs, mechanised roofbolting machines and explosive charging vehicles. Dump trucks are used for cleaning development ends at longer distances to the ore passes or old stopes. All access and stope drives are excavated 4.5m by 4.5m in dimension to accommodate mechanised vehicles and the designed ventilation volumes. Development advance is typically 4m per round. Sundry development includes slot raises, ventilation passes and rock passes and is generally undertaken by contractors.

A typical force-exhaust ventilation system is used for development and normal support is in the form of split sets. Shotcrete and/or 6m rope anchors are installed in certain development ends and excavations where necessary.

Development waste backfilling has steadily increased over the last twelve months to its currently level of approximately 10ktpm. This assists the backfill requirement from the surface plant, which is limited to some 800m

3

/day of cemented fill and also reduces unnecessary dilution.

**Rock Engineering:** The main Eldorado Fan is situated between 2,200m and 2,500m below surface at which depths the principal stress will be of the order of 60Mpa. SRK is generally confident that the de-stressing approach and massive mining methods proposed by Avgold do not present any geotechnical risks more significant than those normally faced in operations at this depth utilising the mining methods proposed.

Further, SRK has assessed the stability of the massive open stope designs proposed by Avgold and is confident that it will be possible to maintain stable openings of this size at the required depth below surface.

Rock engineering input has been taken into account in the mine planning and sequencing. Numerical modelling is carried out on a routine basis and the rock engineering department is adequately staffed with well trained and experienced personnel.

A Code of Practice to combat rockfall and rockburst incidents has been prepared in terms of the Mine Health and Safety Act. This document identifies potential hazards and also strategies to counteract these.

While seismicity is not expected to be significant at Target, a seismic monitoring system is due to be installed and SRK consider this prudent.

**Ventilation:** The ventilation design at Target Mine is based on an objective to achieve:

- an average wet bulb temperature of 25.5°C;
- a maximum wet bulb temperature of 27.5°C; and
- 

a reduced presence of pollutants from diesel fumes to comply with the requirements of the Minerals Act. The original design was to limit total diesel equipment to some 3.6MW.

The mean summer wet bulb and dry bulb temperature is 17°C and 27°C, respectively, whilst the virgin rock temperature at the underground workings is some 51°C.

Main intake ventilation is via the conveyor and vehicle declines, of 21m

2

and 15m

2

cross-section areas

respectively. The return airway to surface is via No.5 Shaft that is connected to the return airway decline (27m

2

cross-sectional area) by both new and old raisebore holes together with airflow directed through old workings. The ventilation infrastructure limits the primary ventilation capacity to 250m

3

/sec.

Mine cooling is required and effected by primary bulk coolers, located on 255L adjacent to the refrigeration plant and to a lesser extent by secondary coolers, tertiary coolers and the use of chilled service water closer to the underground workings. The planned capacity of the refrigeration system is some 28MW compared to an original design of 24MW. The refrigeration capacity comprises five 3MW units and three 4.5MW units. A ninth unit has also been installed for maintenance and servicing requirements. Two of the 4.5MW are still being commissioned and are expected to be operational during January 2004.

The main fans are located at the head of No.5 Shaft and are assisted by a number of underground booster fans located at 208L and 255L. Secondary ventilation is effected through various fans, ventilation ducting, ventilation passes, regulators and controls principally on a force-exhaust basis.







132

132

**Annexure 7**

An increase in the number of working places and an increase in the total rated diesel capacity of the equipment at the mine (some 7.1MW versus the 3.6MW in the Feasibility Study) has led to a relaxation of the planned wet bulb temperature to some 27.5°C and an increase in the re-use of air in the workings. Current wet bulb temperatures experienced in the first quarter of 2004 average some 25.0°C and 27.7°C for development and stoping respectively. Once the two additional 4.5MW refrigeration plants are operational the cold water dam temperature is expected to decrease from the current 6.7°C to the 5°C originally planned; which should lead to an ability to maintain the new standard into the future.

**LoM Plan:** The latest LoM plan comprises ore from a combination of massive stoping, NRM and development ore. Ore from development contributes some 20% to the hoisted tonnage with the majority of the stoping tonnage derived from the three massive mining methods. NRM tonnage is planned to be undertaken according to the de-stressing requirements for the massive stoping programme.

The tonnage derived from massive mining stopes is planned to increase from 50ktpm to 75ktpm once additional stope faces are brought on stream. Individual MOS and WOS can at peak production produce in excess of 30ktpm in any one month; the average is between 15ktpm and 20ktpm on an ongoing basis, thus requiring several concurrent stoping areas to make-up the target production.

Although the conveyor and hoist system can in theory handle 125ktpm the tonnage in the mine plan has been capped at 117ktpm. Provision is made in the LoM plan for some 10ktpm of waste backfilling; however separate waste hoisting is not practical and additional waste reports as dilution to the ore stream. Depending on the success of the waste backfilling, the spare hoisting capacity may be taken up by waste not backfilled.

A mine recovery factor ("MRF") has been historically applied at some 92% to account for gold losses occurring during blasting operations. The MRF has, however consistently exceeded 100% during the last twelve months and for the year-to-date averages 110%. SRK consider that the high MRF is related to a positive Block Factor associated with the higher-grade massive stopes that have been mined during this period.

There should be minimal gold loss associated with blasting of a package of reefs in a massive mining method and only a small provision for un-planned ore losses (principally associated with under- breaking of the long-hole stopes) should be included in Mineral Reserve modifying factors. Investigation of the stope volume reconciliation's indicates that un-planned ore loss averages 4%.

**5.3.2****Free Gold Operations**

Free Gold Operations: comprise a complex of nine mature operating underground mines, namely Tshepong BU, Phakisa BU, Bambanani BU, West BU, Eland BU, Kudu & Sable BUs and Nyala BU, Joel BU, St. Helena BU, various surface sources and tailings re-treatment operations. The individual business units range in planned operational life between 3 years and 19 years thus classifying the collective Free Gold Operations as a long-life asset. Underground production is mainly sourced from shallow dipping tabular narrow orebodies, in particular, the Basal Reef supplemented by secondary orebodies such as the Leader Reef. The only exception to this is Joel BU, where production is sourced from the Beatrix-VS5 Composite Reef.

Access to and egress from the various reef horizons is via numerous surface shafts and various sub-vertical shafts at the deeper operations. The same access and egress is used for labour, material and production.

RoM ore is hoisted to surface and thereafter transported by conveyor, rail or road to one or more of the four metallurgical processing facilities (FS1 Plant, FS2 Plant, St. Helena Plant and Joel Plant). At shafts where the infrastructure permits waste to be hoisted separately, then it is conveyed to WRDs, generally situated close to shaft heads.

Mining methods at Free Gold Operations include variations on conventional narrow reef mining methods, such as scattered breast, down dip and remnant extraction. The longer-life BUs, Tshepong, Phakisa, Bambanani and Joel predominantly mine virgin ground at increasing depth with West BU, St. Helena BUs, Eland BU, Kudu & Sable BUs and Nyala BU extracting higher portions of remnants, including shaft pillars.

Mine ventilation systems at the Free Gold Operations are well established and have been extensively planned and operated in the past. Operating conditions vary in accordance with the scattered nature of the working places, the

operating depths and the virgin rock temperature ("VRT") and control of airflow. The VRT varies from the greatest value at Bambanani B U (62°) to the minimum value at Joel BU (35.6°). Refrigeration plants are installed at Bambanani BU, Tshepong BU and Joel BU.





133

133

**Annexure 7**

The control, containment and removal of fire generated toxins creates the greatest challenge to the ventilation team at Bambanani BU, this together with the sealing off old abandoned areas that no longer require cooling or ventilation but are currently getting both.

Geotechnical input at Free Gold Operations is typical of mining environments in the Free State Goldfield, where mining depths range from shallow-intermediate (Joel BU) to deep (Bambanani BU). Bambanani BU, Eland BU, Nyala BU, Kudu & Sable BUs are classed as seismically active operations with seismic monitoring systems installed and activity generally located in the vicinity of remnant operations and/or geological structures. External consultants ISSI supply all seismic systems, which are managed by GeoHydroSeis. Localised ground control issues include the impacts of a weak hangingwall member, the Khaki Shale on exposure and scaling in main orepasses. In such instances mine specific strategies have been implemented either through design modifications and/or remedial repairs.

**Tshepong BU:** Mining operations at Tshepong BU are conducted at average depths of 1,925m below surface and currently extend to 66L. The current LoM plan includes the sub-66L project, which involves the sinking of a twin decline system from 66L to 71L in order to access ground to the west of current operations. The sub-66L project is planned to commence during 2003 and be completed by 2007. Production build-up is the focal point of the latest LoM plan, following the introduction of Conops in the next two years and the additional production on completion of the sub-66L project.

**Phakisa BU:** The shaft at Phakisa BU was sunk to 79L and subsequently mothballed by AngloGold. Free Gold plans to complete the work and has initiated a project to complete sinking of the shaft by a further 178m to 81L. The shaft will be equipped to hoist men and material from surface to enable mining to be conducted to 77L and to allow additional rock hoisting to 55L, utilising an underground Koepe hoist. The ore and waste will be transferred at this level to Nyala BU for hoisting to surface. Project capital expenditure over the life of the BU is estimated to be ZAR540m and planned to commence in the second quarter of 2004.

**Bambanani BU:** Bambanani BU's mining operations extend between 1,200m and 3,000m below surface. Access to the deeper levels is via a surface shaft and then by a sub-vertical shaft, which extends to the lowermost 107L. Mining conditions are considered to be difficult due to low mining flexibility, distance of workings from the shaft, seismicity and high VRT's. The mine is prone to fires, a number of which are currently active and affecting production at both Bambanani BU and West BU.

**West BU:** The West BU, which was mothballed by AngloGold during the latter half of calendar 2001, was re-commissioned in 2002. Mining operations at West BU are small-scale and focused on Basal Reef pillars and some mining of the Leader Reef.

**Eland BU, Kudu & Sable BUs and Nyala BU:** The Eland BU and Nyala BU are interlinked on a number of levels and have connections with Tshepong BU, Welkom Operations and President Brand. Mining operations occur at average depths of 1,700m below surface and are focused on the extraction of remnant pillars and shaft pillars. The tramming distance and production continuity from scattered remnants at these mines offers the most challenging aspects to counter against rising operating costs.

**St. Helena BUs:** St. Helena BU comprises three operating BUs: No.2 BU, No.4 BU and No.8 BU. No.2 BU is currently operating on a marginal basis and is undergoing investigation as to its sustainable contribution in the immediate future. Mining is principally focused on remnant mining operations from Basal Reef pillars and a small contribution from the LDR at an average production rate of 50ktpm, this production is significantly below the shaft hoisting capacity. Mining is conducted at some 1,500m below surface.

The extensive historical mining areas, accessed via kilometres of interlinked tunnels, excavations and connections between the Free Gold and Welkom BUs led to an elevated risk of fire and an increase in illegal mining activity, and allegedly the two are linked. Management believe there to be a high number of illegal miners operating at the mine, which creates its own operational issues. Counter-measures are being given serious consideration, however due to the extensive nature of the abandoned underground workings, in which the activities are taking place and taking cognisance of a high-level of collusion, policing these illegal activities is considered to be extremely difficult.

**Joel BU:** Joel BU has two shafts: South BU and North BU. Currently mining operations are conducted solely from South BU at an average depth of 1,000m below surface, where a three-barrel decline system extends to the 117L. A

holing to North BU from 100L provides a second means of egress. North BU was partially sunk to 20m below 145L and the primary sinking equipment is still in place.

The LoM plan assumes commencement of the installation of hoisting facilities in the North BU during 2004, to be operational by 2005. Access to ground below 121L is currently achieved via a winze from South BU in order to confirm grades. Although production is small the working places are far from the shaft and the transport of men, material and rock is complicated via the belted inclines.







134

134

### **Annexure 7**

The Mineral Reserves as reported in Section 4 and depleted to generate the cash flows presented in Section 12 and Section 13 are deemed by SRK to be appropriate and both technically and economically achievable, however certain aspects mainly relating to operational management may impact individually or collectively on the execution of mining operations at Free Gold Operations, as follows:

- 
- minimising the risk of further underground fires at Bambanani BU and West BU and managing appropriate fire mitigation measures at the other highly scattered remnant operations, particularly where illegal mining is known to occur;
- timely completion of the four main capital projects, namely:
  - .
  - the completion of the sub-66L project at Tshepong BU, which will enable access to ore from the deeper levels;
  - .
  - the completion of the Phakisa Project;
  - .
  - the completion of the upgrade to the shaft at Nyala BU to enable the extraction of the shaft pillar and the hoisting of rock to surface from the Phakisa Project; and
  - .
  - the completion and commissioning of Joel BU's North shaft;
  - 
  - continuation of infrastructure rehabilitation programmes, specifically to address ventilation conditions and orepass integrity at Bambanani BU. Development waste is hoisted with mined ore;
  - continued vigilance with respect to minimising seismic activity, specifically with respect to:
    - .
    - remnant extraction at Bambanani BU; and
    - .
    - shaft pillar extraction programmes at the Nyala BU;
    - 
    - the achievement of additional unit cost reductions at Free Gold Operations above those realised through post the formation of Free Gold; and
    - 
    - the realisation of the planned productivity improvements associated with the introduction of Conops, which is still subject to negotiation with the NUM.

#### **5.3.3**

#### ***Harmony Free State Operations***

Harmony Free State Operations comprise a complex of nine mature operating mines: Brand BU No.1/3, Brand No.5 BU, Harmony No2 BU, Merriespruit No1 BU, Merriespruit No.3, BU Masimong No.4 BU, Masimong No.5 BU, Saaiplaas No.3 BU and Unisel No.1 BU, which are managed as individual business units. Collectively Harmony Free State Operations will continue for 15 years, thus classifying Harmony Free State Operation as a long-life asset. Underground production is mainly sourced from shallow dipping tabular narrow orebodies, principally the Basal Reef and Leader Reef, with increasing contributions from the 'A' Reef, 'B' Reef and Middle Reef as the mines near depletion. The RoM contribution from specific reefs plays an important role in achieving the planned cash flows taking cognisance of the variation in insitu grade and the highly channelised nature of the secondary reef horizons. Access to and egress from the reef horizons is from surface shafts. The shafts are utilised for men, materials and production. Mining operations are conducted at depths between 1,500m and 2,200m below surface. Mining is undertaken at Harmony Free State Operations both in virgin areas and through the extraction of various remnants and pillars and the proportion of remnant to virgin mining varies between 20% and 40% at the different mines. Current underground mining is being conducted at some 426ktpm. Access for rock hoisting and the provision of ventilation, services, men and materials is provided through each of the surface shafts although the ore from Brand

BU No.3 is transported underground to Brand BU No.1 for hoisting to surface as mining is being conducted on the shaft pillar. Underground waste is generally separated from the ore however where this is not the case the proportion of waste is relatively low.

Mining operations at Harmony Free State Operations are conducted principally by conventional narrow stoping methods with tracked haulages on a 2-shift basis although a move to Conops is also being considered. Stope production is supplemented by vamping of old gold and contractors are typically employed for this and for other non-core activities such as the provision of permanent support. No mining is currently being conducted at Brand No.2 BU, however contract mining is currently being considered.

The operations are mature and small-scale projects and investigations are predominately focused on extending mining life and/or lowering the cost of production at the various mines. Increased production is being planned from reefs considered to be secondary to the Basal Reef at certain BUs; these reefs include "A" Reef, "B" Reef, Leader Reef and Middle Reef.

The Masimong BU Expansion Project provides for the increase in production and grade at the Masimong No.5 BU through the development of a significant area of Basal Reef to the east and west





135

135

**Annexure 7**

of the current workings. No material increase to the primary infrastructure is required and development of the new raise lines is anticipated to commence within the next two to three years.

A limited number of surface sources of ore exist at the Harmony Free State Operations in the form of WRDs and tailings dams and these are processed at production levels dictated by economic conditions. Ore is transported by a number of modes to one of the three process plants, Central Plant, Virginia Plant and the Saaiplaas Plant.

Mine ventilation systems at Harmony Free State Operations are well established and have been extensively planned and operated in the past. Due to the low tonnages the ventilation infrastructure is considered adequate for the relatively shallow operations, thus SRK consider there to be no material ventilation issues.

Due to the shallow depths of operations, seismicity and rock mechanics aspects are, in general, not considered to be a serious concern and seismic events although experienced are infrequent. The extraction of the Harmony No.2 BU shaft pillar is in progress and total extraction is currently planned. Mining is being undertaken in conjunction with sufficient geotechnical consideration and design and the area is being monitored by an ISSI seismic system. Although the seismic impacts are adequately recognised by management and external consultants have reviewed the mining practice, the high extraction ratio still presents a risk to the planned extraction.

The Mineral Reserves as reported in Section 4 and depleted to generate the cash flows presented in Section 12 and Section 13 are deemed by SRK to be appropriate and both technically and economically achievable, however certain aspects mainly relating to operational management may impact individually or collectively on the execution of mining operations at Harmony Free State Operations, as follows:

- achievement of planned production, which historically has fallen short at the operations where the contribution from remnant areas is material;
- maintaining the planned blend of primary reef extraction to secondary reefs, both in terms of ore tonnage and head grade; and
- achievement of planned development targets to ensure that sufficient flexibility is achieved, specifically for the highly channelised reefs, which have historically proven difficult to work in terms of sustaining the planned grade over the budgeted period.

**5.3.4*****Welkom Operations***

Welkom Operations has six operating BUs: No.1 BU, No.2 BU, No.3 BU, No.4 BU, No.6 BU and No.7 BU. Mining operations at Welkom Operations occur at average depths of between 1,000m and 1,200m below surface and, collectively, have a life of eight years, thus classifying Welkom Operations as a medium-life asset.

Underground production is mainly sourced from shallow dipping tabular narrow orebodies; in particular the Basal Reef with smaller quantities from the higher-grade channels of the Leader Reef located some 15m above the Basal Reef. Access to the reef horizons, including men, materials and production is currently from surface shafts and sub-vertical shafts. RoM ore at all operations is hoisted to surface and thereafter transported directly to Free Gold Operations FS1 Plant. Underground waste is not separated from the ore due to the economic viability of re-equipping waste handling facilities and the relatively low development tonnage. RoM ore delivered to the plant from contractor operations is treated separately for apportionment purposes. The trucks are weighed and the ore delivered is sampled on the conveyor belt to provide an estimate of the gold on surface for each BU.

Mining at Welkom Operations is undertaken by variations on conventional narrow reef mining methods including breast and "undercut" mining. The latter is utilised by Welkom Operations to enable mining in areas where the strong quartzite middling between the Basal Reef and the weak Khaki Shale is less adequate. At BU No.1, where the majority of production is and will continue to be concentrated, the undercut mining method is responsible for some 60% of total production. Core mining activity at BU No.1 is conducted directly by Welkom Operations, while at all other BUs contractors undertake mining and reclamation activities. Mine ventilation systems at Welkom Operations are well established and have been extensively planned and operated in the past. Due to the low tonnages and the large

volumes of air that are being circulated in the various sections, the air ratios are considerably greater than industry norms. In SRK's opinion, the installed ventilation and refrigeration infrastructure is adequate to meet all planned requirements.

Fires at Welkom Operations are considered by SRK to represent a material issue and whilst causes are reported as being unknown, the presence of illegal miners is believed to increase the risk of fires. Illegal mining is an increasing phenomenon in Free State Goldfield and is particularly concentrated in high carbon rich remnant panels as found within the Welkom Operations.







136

136

**Annexure 7**

SRK and ISSI, which are retained on a contractual basis, provide geotechnical input at Welkom Operations. ISSI provide a seismic monitoring service and SRK is responsible for geotechnical input in all other respects. The main geotechnical issues at Welkom Operations include those typically associated with remnant mining operations and the influence of the weak Khaki Shale.

Mining on the Basal Reef at Welkom Operations is characterised by a largely mined-out orebody extending over vast areas, the extraction of numerous small and highly stressed remnant pillars, an environment of intense faulting and numerous intrusive features, the moderate depth of the workings and the concomitant high levels of induced stress. The primary rock engineering issues are thus those related to the protection of personnel and infrastructure and the maintenance of acceptable levels of production in the face of sometimes fairly adverse mining conditions.

A thin quartzitic layer and then weak Khaki Shale, which varies in thickness from a few centimetres up to many metres, overlie the Basal Reef. This weak and talcose horizon has the capacity to yield, transferring stress away for immediate abutments. Depending on the thickness and integrity of the Basal quartzite middling this creates hangingwall control problems in the areas where it is undercut, which vary from moderate to severe. In such situations mining discipline is critical to ensure safe working conditions and sustained production with minimal dilution.

The Mineral Reserves as reported in Section 4 and depleted to generate the cash flows presented in Section 12 and Section 13 are deemed by SRK to be appropriate and both technically and economically achievable, however certain aspects mainly relating to operational management may impact individually or collectively on the execution of mining operations at Welkom Operations, as follows:

- minimising the impacts of illegal miners and potential fire risks; and
- minimising economic risk through further cost control.

**5.3.5*****West Wits Operations***

West Wits Operations comprise a complex of six mature mines: Elandsrand BU, Deelkraal BU, Cooke No.1 BU, Cooke No.2 BU, Cooke No.3 BU and Doornkop BU, which are managed as individual business units. Underground operations at the Cooke No.4 BU and the open pit mining at Lindum have ceased. The West Wits operations have a collective life of 19 years, thus classifying West Wits Operations as a long-life asset.

Underground production is mainly sourced from shallow dipping tabular narrow orebodies, including the Elsberg Reef and Upper Elsberg Reef, VCR and Kimberley Reef. Mining operations at Elandsrand BU and Deelkraal BU focus on extraction of VCR, those at the Cooke BUs are principally on the Elsberg and Upper Elsberg Reefs and the Kimberley Reef at Doornkop BU. Access to the reef horizons including men, material and production is from surface shafts. Mining operations at the Elandsrand BU have been conducted at depths between 1,600m and 2,800m below surface with future production planned at some 3,300m below surface and 2,750m below surface at Deelkraal BU. At the Cooke BUs and Doornkop BU, mining has historically been conducted between some 600m and 1,260m below surface. Mining is undertaken at West Wits Operations both in virgin areas and through the extraction of various remnants and pillars, although the proportion of remnant to virgin mining varies from some 50% - 80% at the different mines.

Current underground mining is being conducted at some 433ktpm. Access for rock hoisting and the provision of ventilation, services, men and materials are provided through each of the surface shafts. Underground waste is generally separated from the ore, although waste development in the remnant mining areas is relatively low. Mining operations at West Wits Operations are conducted principally by conventional narrow stope methods with tracked haulages on a 2-shift basis. A move to continuous operations ("Conops") is being considered at a number of mines and negotiations are currently being conducted with the NUM. A semi-trackless mining method is practiced at Cooke No.3 BU, which accounts for only some 10% of the production at this BU. The method combines conventional stope with LHD and truck cleaning on reef drives as opposed to tracked haulages. It is reported that the method is being phased out for cost reasons. A trackless and semi-trackless mining method is practiced at Doornkop BU which in total accounts for some 40% of the mine's production. Stope production is supplemented by vamping operations and contractors are typically employed for this and for other non-core activities, such as the installation of permanent support.

A number of projects exist to extend mining life and/or lower the cost of production at the various mines including: a shaft deepening project at Elandsrand; the development to the Kimberley Reef at Cooke No.1 BU in three target areas with expected raise development in the next six months; and the Doornkop feasibility study. The sub-Shaft Deepening Project at Doornkop BU involves the





137

137

**Annexure 7**

deepening of the main shaft from 132L to 212L; this following the completion of a raise bore hole and the re-equipping of the sub-vertical shaft. The project is anticipated to take between four and five years to complete. A number of surface sources exist at the West Wits Operations in the form of WRDs and tailings dams. Production from surface sources typically accounts for a third of the total rock currently processed and contributes 10% of the total gold produced. The Deelkraal Plant is dedicated to processing the surface sources and certain waste development from the underground operations at West Wits Operations. Ore is transported by a number of modes to one of the three process plants dedicated for ore treatment: Elandsrand Plant, Cooke Plant and the Doornkop Plant. Mine ventilation systems at West Wits Operations are well established and have been extensively planned and operated in the past. Due to the low tonnages the ventilation infrastructure is considered adequate, however the depth at a number of the shafts and the scattered nature of the remnant mining activities requires that ventilation and refrigeration management remains a core activity.

Seismicity and rock mechanics aspects are of a particular concern at Elandsrand BU and Deelkraal BU due principally to the greater depth of mining. Mining at Elandsrand is being conducted on a sequential grid basis, which has successfully improved regional stability. Current stope support consists of pre-stressed elongated timber props and approximately 50% of all stopes are backfilled. The width of stabilising pillars for future mining is based on the assumption that all stopes will be backfilled, although it is not apparent that there is sufficient backfill to achieve this objective. The staffing level and qualification appears adequate at Elandsrand BU and a system of geophones is used to monitor seismicity at the mine. Although a sequential grid design should be fully utilised at Deelkraal BU scattered and long-wall mining is still being used in conjunction with large mining spans. SRK consider that inadequate regional support is the main cause for an increase in seismicity at the mine. On certain levels on the VCR footwall, SRK consider the development is too close to the reef and this is likely to lead to a deterioration of the excavations during over stoping activities. Precautions need to be taken.

The Mineral Reserves as reported in Section 4 and depleted to generate the cash flows presented in Section 12 and Section 13 are deemed by SRK to be appropriate and both technically and economically achievable, however certain aspects mainly relating to operational management may impact individually or collectively on the execution of mining operations at West Wits Operations, as follows:

- the lowering of working costs, improvement in productivity and increased mining flexibility;

- the realisation of the planned productivity improvements associated with the introduction of Conops which is subject to negotiation with and approval by the NUM;

- ensuring that sufficient backfill is able to be placed in the stopes at the Elandsrand to adhere to the planned mine design with regard to regional stability when mining at increased depth. If insufficient backfill is placed then SRK consider that the width of the stabilising pillars should be reviewed;

- ensuring that the move to a sequential grid mining is made at Deelkraal and a greater emphasis is placed on the incorporation of geotechnical considerations with regard to the planning and design is made; and

- controlling capital expenditure and the timely completion of the sub-Shaft Deepening Project at Doornkop BU and other projects.

**5.3.6*****Evander Operations***

Evander Operations comprise a complex of six mature shafts: Evander No.2 BU, Evander No.5 BU, Evander No.7 BU, Evander No.8 BU and Evander No.9 BU, which are managed as business units and the Rolspuit and Poplar projects. Operations at the Evander No.3 BU have ceased and any remaining mining from the No.1 BU and No.3 BU areas is affected through No.2 BU. The Evander Operations have a combined life of 15 years, thus classifying Evander Operations as a long-life asset.

Underground production is sourced from the shallow dipping tabular narrow orebodies comprising the Kimberley Reef. Numerous sills and dykes complicate mining layouts, whilst the reef dips typically at some 20° to 25° at most of the BUs increasing to some 40° in certain areas at Evander No.8 BU. Mining at Evander Operations, in general, is relatively shallow and conducted at depths between 500m and 2,000m below surface. The deepest mining is principally undertaken at Evander No.8 BU from the No.2 BU decline area. Mining is undertaken at Evander BUs both in virgin areas and through the extraction of various remnants and pillars. The proportion of remnant to virgin mining varies from some 30% to 60% at the different BUs.







138

138

**Annexure 7**

Current underground mining is being conducted at some 185ktpm (ore and waste) with production from No.8 BU contributing the most at some 60ktpm of ore. Access for rock hoisting and the provision of ventilation, services, men and materials is provided through each of the surface shafts although rock from No.8 BU is transported underground on 15L for hoisting at No.7 BU, located adjacent to the process plant. Underground waste is generally separated from the ore, although waste development in the remnant mining areas is relatively low.

Mining operations at Evander Operations are conducted by conventional narrow stoping methods with tracked haulages on a two-shift basis, although a move to Conops is also being considered at a number of the sections. Stope production is supplemented by vamping operations and contractors are typically employed for this and for other non-core activities such as the provision of permanent support. Mining is characterised by scattered workings often a long distance from the shaft stations and in general, old and poorly maintained shaft and engineering infrastructure and insufficient engineering spares. At a number of BUs there is a reliance on single pumping columns and systems. A principal project at Evander Operations is the Rolspruit Deep's Project, which considers the exploitation of deeper resources of the Kimberley Reef adjacent to No.8 BU, through either the installation of a twin shaft system, from surface or a twin sub-vertical shaft system at No.8 BU. Harmony undertook a project feasibility study commencing July 2002, based on the provision of a men and material shaft and a rock and ventilation shaft to 267L, some 2,670m below surface, to exploit eight ore zones between 1,890m and 2,590m below surface at some 200ktpm (ore and waste) over some 15 years. The study estimated capital expenditure of some ZAR5,200m and projected an IRR of some 9% and 12% post and pre-tax, respectively. The project is considered to be marginal, but of relatively low technical risk, hence the consideration of the twin sub-vertical shaft alternative from No.8 BU as an optimisation. The incremental value at the Base Case discount factor to the Evander Tax Entity is negligible and the project go-ahead will be directly linked to the availability of funding.

The Poplar Project considers the green-fields development through installation of a twin shaft system to some 1,200m below surface to access ore some 20km from the existing Evander Operations. SRK consider the level of this study to be conceptual.

Surface sources at Evander Operations are only processed to enable the plants to operate efficiently. Ore is transported to either the Kinross or Winkelhaak process plants for treatment.

Mine ventilation systems at Evander Operations are well established and have been extensively planned and operated in the past. Due to the low tonnages the ventilation infrastructure is considered adequate and in conjunction with the relatively shallow operations, ventilation concerns are considered limited.

Seismicity and rock mechanics aspects are in general, due to the shallow depths, not considered to be a serious concern and seismic events, although experienced, are infrequent. The partial extraction of the Evander BU No.8 shaft pillar and the over-stoping of the decline area to the north can be considered to be a risk in terms of seismicity at the mine. A risk assessment has been conducted on the overall strategy and SRK consider that in order to ensure that the planned extraction is achieved a greater emphasis needs to be placed on the individual stope sequencing and strategy. The Mineral Reserves as reported in Section 4 and depleted to generate the cash flows presented in Section 12 and Section 13 are deemed by SRK to be appropriate and both technically and economically achievable, however certain aspects mainly relating to operational management may impact individually or collectively on the execution of mining operations at Evander Operations, as follows:

- improving profitability through the lowering of working costs and improvement in productivity;

the realisation of the planned productivity improvements associated with the introduction of Conops, which is subject to negotiation with and approval by the NUM;

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- a more detailed strategy with regard to the partial mining of the shaft pillar at Evander No.8 BU and the influence of geological structures on ground control and seismicity;

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the commitment of sufficient funds to improve the spares and maintenance situation at the various shafts and a focus on improved maintenance practices, particularly with respect to No.2 BU, No.5 BU and No.8 BU; and

-

a positive decision on the development of the Rolspruit and Poplar projects subsequent to the completion of the necessary feasibility studies.

### **5.3.7**

#### ***Orkney Operations***

Orkney Operations comprise a complex of six mature BUs: No.1, BU No.2 BU, No.3 BU, No.4 BU, No.6 BU and No.7 BU, which are managed as a business unit. No.5 BU was closed in July 2002, principally due to depletion of reserves and for seismic reasons. These operations have a combined life of eight years, thus classifying Orkney Operations as a medium-life asset.





139

139

**Annexure 7**

Underground production is mainly sourced from shallow dipping tabular narrow orebodies, including the Vaal Reef, VCR and Elsburg Reefs. Mining operations at No.1 BU, No.2 BU and No.4 BU focus on extraction of the Vaal Reef, the VCR at No.3 BU and the VCR and Elsburg Reefs at No.6 BU and No.7 BU. Access to the reef horizons for men, material and production is via surface shafts. Production at Orkney Operations, particularly on the Vaal Reef, is mainly derived from the extraction of a host of remnant pillars. By their nature these are small, isolated, scattered and difficult pieces of ground situated at great depth and surrounded by significant mined-out areas.

Mining is undertaken at average depths of between 1,600m and 2,000m below surface. Access for rock hoisting and the provision of ventilation, services, men and materials is provided through each of the surface shafts. Underground waste is not separated from the ore due to the economic viability of re-equipping waste handling facilities and the relatively low development tonnage. Orkney Operations currently has no surface rights to dump waste material and as such would have to seek permission from AngloGold to utilise their WRDs in the event of Orkney Operation's management implementing waste separation.

Orkney Operations and VRO's BUs are interlinked on a number of levels and as a consequence share access ways. In certain instances VRO supply other production services including, compressed air, water and power. RoM ore is transported from the individual shafts to the No.1 Gold Plant via VRO's surface transport network. RoM ore from No.6 BU areas is hoisted at the No.7 BU where it is fed directly by conveyor into the plant.

At Orkney Operations Harmony has entered into various agreements with VRO, which govern right of access, in addition to toll treatment the supply/sharing of production services. Further, major critical spares are pooled between the two groups, however both parties maintain, at their own cost, monitoring systems for emergencies such as fire, flood and seismic events.

Mining methods at Orkney Operations include scattered breast mining methods, up-dip mining, remnant extraction, pillar mining and vamping. Contractor operators are utilised for non-core activities such as development, support and vamping, with stoping undertaken by Orkney Operations personnel. Stope support is with conventional sticks and packs, however at No.2 BU backfill is utilised which is supplied by VRO.

Mine ventilation systems at Orkney Operations are well established and have been extensively planned and operated in the past. Due to the low tonnages and the large volumes of air that are being circulated in the various sections, the air ratios are considerably greater than industry norms. In SRK's opinion, the installed ventilation and refrigeration infrastructure is adequate to meet all planned requirements.

GeoHydroSeis, Rockcon Services and SRK are retained on a contractual basis to provide geotechnical input at Orkney Operations. GeoHydroSeis provide a seismic monitoring service. Rockcon Services are responsible for geotechnical input to No.6 BU, No.7 BU and a portion of No.3 BU. SRK is responsible for geotechnical input in all other areas. The main strategic rock engineering issue faced by management at Orkney Operation's is the maintenance of acceptable levels of production out of highly stressed, seismically active pillars and remnants. Shaft pillar extraction is in progress at No.2 BU and No.4 BU.

The Mineral Reserves as reported in Section 4 and depleted to generate the cash flows presented in Section 12 and Section 13 are deemed by SRK to be appropriate and both technically and economically achievable, however certain aspects mainly relating to operational management may impact individually or collectively on the execution of mining operations at Orkney Operations, as follows:

- continued vigilance with respect to minimising seismic activity;

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- ensuring economic viability during the latter half of the LoM plan at significantly reduced production rates when only No.6 BU and No.7 BU are operating; and

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- continuation of and adherence to the current agreements between Orkney Operations and VRO so as to ensure uninterrupted production.

Other than increases in Mineral Reserves due to reduction in operating costs and increased extraction, SRK consider there to be no other significant opportunities at Orkney Operations.

**5.3.8**

***Kalgold Operation***

Kalgold Operations comprise an open pit mine that has a life of approximately four years, thus classifying Kalgold Operations as a short-life asset.

Several steeply dipping ore zones exist at Kalgold Operations and current mining operations are focused on the D-Zone, which has a strike length of 1,400m and a width between 15m and 40m







140

140

**Annexure 7**

Mining operations are conducted by normal open pit methods by the use of excavators and trucks. The ore mining and waste stripping is undertaken by a contractor. The current term of the contract is five years commencing in 2001 and the contractor is reimbursed on a rate per cubic metre. Ore is trucked to the plant from either the North-pit or South-pit and stockpiled according to various grade categories before being blended for treatment. The short-term and strategic stockpiles are re-handled using a wheel loader.

The business plan is based on a pit optimisation that seeks to maximise the NPV of the D-Zone. It is planned to make the high-wall steeper following the installation of support anchors enabling access to more high-grade ore. Waste stripping requirements are elevated in the first six months of the plan beyond which stripping requirements will reduce to levels comparable with historical values. A number of ramp modifications to the pit exits and location of switchbacks are planned by Kalgold Operations in order to reduce waste hauling costs. The final pit depth is currently planned at some 155m and 235m below surface for the North-pit and South-pit, respectively and further mining of the orebody by underground methods may be considered.

The Mineral Reserves as reported in Section 4 and depleted to generate the cash flows presented in Section 12 and Section 13 are deemed by SRK to be appropriate and both technically and economically achievable, however certain aspects mainly relating to operational management may impact individually or collectively on the execution of mining operations at Kalgold Operations, as follows:

- improvement in working costs and productivity;
- maintenance of slope stability and ensuring a continuous supply of ore at the planned grade; and
- the observance to strict grade control guidelines and ore reserve management.

**5.3.9*****Harmony Australian Operations***

Harmony Australian Operations comprise two principal operations, namely Mt. Magnet & Cue and South Kalgoorlie, mining from various underground and open pit mines. The Mt. Magnet operations comprise a number of open pits, decline operations at Morning Star and Hill 50 and the processing of surface stockpiles. Open pit, underground and surface stockpiles are treated at similar production rates. The Cue operation comprises a number of open pits at Big Bell, Cuddingwarra, Golden Crown and Tuckabianna. The Big Bell underground operation was recently closed. These operations have a combined life of approximately seven years, thus classifying Mt. Magnet & Cue operations as a medium-life asset.

The South Kalgoorlie Operations comprise the Jubilee and New Celebration facilities, the Mt. Marion underground mine and various open pits. These operations have a combined life of three years, thus classifying South Kalgoorlie operations as a short-life asset.

At Mt. Magnet underground mining is the principal contributor to gold production with open pit mining restricted to the near surface oxidised resources. The underground and open pit mines are contractor operated, however mine personnel undertaken the planning and mine design. The side slopes of the open pit mines are steep, at some 60° to 70°. A divergence in plan has resulted through problems with the licensing and approvals at one of the open pits although alternative production has been sourced. Underground access is via separate declines at the Morning Star and Hill 50 mines, installed at a gradient of 1 in 7 and accessed from portals close to the base of the open pits. The pit bottoms are 900m and 1,000m deep, respectively. An up-hole benching method is employed at both mines in the steeply dipping orebodies from levels installed at 25m vertical intervals at Morning Star and 30m at Hill 50. The ore is loaded by LHDs into trucks that transport the ore to surface, which is then stockpiled before treatment. The depleted stopes are backfilled with development waste. Operations at Hill 50 are currently restricted due to a collapse of a main return airway and this together with a planned vertical advance rate of 100m per year underground production are currently below budget.

The numerous open pit mines at Cue are considered small and have short lives. Contractors are employed to mine the ore and waste and RoM ore is transported from the mine to the plant using road trains.

The Jubilee and New Celebration operations have been combined to form South Kalgoorlie Operations. Ore contribution is split: 75% from open pit mining; 20% from underground mining; and the remainder from the low-grade surface stockpiles. The underground steeply dipping orebody at Mt. Marion is accessed via a decline from

surface and extends along strike some 250m to 300m. A sub-level caving system has recently been introduced utilising mechanised drilling and loading equipment producing at 45ktpm. The average mining depth is relatively shallow at some 500m below surface; however mineralisation has been demonstrated to some 1,000m below surface. The planned future conditions and production rates are comparable to that currently achieved and no material concerns are noted by SRK.





141

141

**Annexure 7**

Open pit mining at South Kalgoorlie is concentrated at the Trojan and Golden Ridge. Mineral Reserves at Trojan will be depleted during 2003. Numerous un-planned slips and failures at Golden Ridge are resulting in significant under-performance in terms of ore production and flatter slope angles, necessitated by the failures, have resulted in significant additional stripping.

Mine ventilation systems at the underground operations at Mt. Magnet and Mt. Marion are well established and have been extensively planned and operated in the past. Apart from unexpected airway failures, thought to be associated with seismicity, no material ventilation concerns are anticipated by SRK. The increasing depth of operations coupled with high extraction ratios and massive mining methods have led, it is reported, to a number of seismic events at the underground operations and a focus on control and monitoring is being made in an effort to limit adverse production impacts. Seismicity and rock mechanics aspects are, considered by SRK to be, of a low risk although the costs of increased support may impact on profitability.

The Mineral Reserves as reported in Section 4 and depleted to generate the cash flows presented in Section 12 and Section 13 are deemed by SRK to be appropriate and both technically and economically achievable; however certain aspects mainly relating to operational management may impact individually or collectively on the execution of mining operations at Harmony Australian Operations to diligently manage production, cost, safety and dilution aspects at the Mt. Magnet underground operations at the deeper mining levels.

**5.4****Contribution to LoM Production**

The following table presents the projected contribution of various production sources to the individual LoM plans for each operation making up the total Mineral Reserves for the Mining Assets.

**Table 5.1 Mining Assets: Production Contribution to LoM Plans****MINING ASSETS****Tonnage****Grade****Content****(kt)****(g/t)****(koz)****Total Target Operations - Target Mine**

LoM Ore ug

19,944

6.6

4,242

**Total to Plant****19,944****6.6****4,242****Total Free Gold Operations**

LoM Ore ug

68,244

7.1

15,647

LoM Vamping

892

4.5

129

LoM SS

10,361

0.7

240

**Total to Plant**

**79,497**

**6.3**

**16,016**

**Total Harmony Free State Operations**

LoM Ore ug

42,343

4.6

6,267

LoM Vamping

1,431

3.3

152

LoM SS

19,244

0.4

265

**Total to Plant**

**63,018**

**3.3**

**6,684**

**Total Welkom Operations**

LoM Ore ug

3,071

3.8

376

LoM Vamping

97

4.8

15

**Total to Plant**

**3,168**

**3.8**

**391**

**Total West Wits Operations**

LoM Ore ug

64,112

6.6

13,557

LoM Vamping

5,714

5.2

955

LoM SS

2,642

1.3

112

**Total to Plant**

**72,468**

**6.3**

**14,625**

**Total Evander Operations**

LoM Ore ug

18,001

5.5

3,182

LoM Vamping

1,525

6.2

304

**Total to Plant**

**19,520**

**5.6**

**3,486**







142

142

**Annexure 7**

**MINING ASSETS**

**Tonnage**

**Grade**

**Content**

**(kt)**

**(g/t)**

**(koz)**

**Total Orkney Operations**

LoM Ore ug

5,666

4.9

888

LoM Vamping

90

3.5

10

**Total to Plant**

**5,756**

**4.9**

**898**

**Total Kalgold Operations**

**(1)**

LoM Ore op

4,986

2.3

365

LoM SS

994

1.2

38

**Total to Plant**

**5,980**

**2.1**

**403**

**Total Mt. Magnet Operations**

LoM Ore ug

6,822

6.0

1,313

LoM Ore op

4,500

2.1

302

LoM SS

2,282

1.0

70

**Total to Plant**

13,604

3.9

1,685

**Total South Kalgoolie Operations**

LoM Ore ug

1,522

4.6

223

LoM Ore op

1,233

2.3

92

LoM SS

428

0.8

11

**Total to Plant**

3,184

3.2

326

(1)

The contribution from Kalgold is subject to a current sale agreement which may see a 100% disposal of the asset in the near future.

6.

**METALLURGY**

6.1

**Introduction**

This section includes discussion and comment on the metallurgical processing aspects associated with the Mining Assets. Specifically, detail and comment is given on the process metallurgy and process engineering aspects relating to plant capacity, metallurgical performance and metal accounting practices as incorporated in the LoM plans.

6.2

**Processing Facilities**

Metallurgical processing facilities at the Mining Assets include fifteen operating plants in South Africa with a combined milling and treatment capacity of 2,660ktpm and 2,760ktpm, respectively, plus four operating plants in Australia with a combined milling capacity of 660ktpm. The plants currently process ore from underground and open pit mining operations, low-grade stockpiles, WRDs, reclaimed slime and a variety of other surface accumulations. Schematic flow diagrams for each of three primary plant types that are operated by the Companies are provided in Figures 6.1 to 6.3 inclusive at the end of this Section.

6.2.1

**Target Operations - Target Mine**

Target Plant was commissioned towards the end of 2001 and currently treats only underground ore. The process route comprises primary crushing, open circuit primary SAG milling, secondary ball milling closed with hydrocyclones, thickening, cyanide leaching, CIP adsorption, elution, electrowinning, smelting and tailings disposal. The milling circuit incorporates gravity concentration, the concentrates from which are processed via intensive cyanidation and electrowinning. Gold bullion is despatched to the Rand Refinery.

Target Plant was designed with a capacity of 105ktpm (1,260ktpa). Certain sections of the plant were sized for a future expansion to 160ktpm (1,920ktpa), however this capacity is not required for the current LoM plan. Maximum projected LoM throughput (1,285ktpa) slightly exceeds the design capacity. The ability of the plant to operate continuously at the design capacity has not yet been proven, largely due to ore supply constraints. Irrespective of the feed from mining activities, it is noted that the SAG mill feed rate and the ball mill product size has rarely achieved design specification. The reasons for this are still receiving attention but indications are that feed characteristics and

the proportion of waste in the feed differ from design assumptions. Notwithstanding the coarser milled product size, overall recovery has generally exceeded design expectations. This has partly been assisted by the higher than planned grades being realised but in the main shows recovery to be less sensitive to grind than originally anticipated. This significantly compensates for the below specification mill performance. The risk of not achieving projected throughput, albeit at a coarser milled product size, is considered to be low.





143

143

**Annexure 7**

Overall leach/CIP recovery, as already mentioned, generally exceeds design expectations, despite the leach component being significantly lower than expected. The reasons for the lower leach recovery are receiving attention, with initial indications suggesting the presence of a mild reversible preg robber in the ore. Overall recovery has however; consistently exceeded the projection of approximately 97% and this is likely to continue, with a slight drop off as the head grade reduces towards the end of the mine life.

Plant housekeeping was observed to be of a high standard. Being new, the plant is generally in good condition both mechanically and structurally and subject to adequate ongoing maintenance should meet the LoM requirements.

**6.2.2*****Free Gold Operations***

FS1 Plant processes underground ore, waste rock and various surface accumulations, delivered by either road or rail. The plant was commissioned in 1986 and comprises three independent modules, each consisting of four feed silos, two RoM mills, two conventional thickeners, cyanide leach, carbon in pulp ("CIP") adsorption, AARL elution, zinc precipitation and smelting. Loaded carbon is also received from Joel for elution and regeneration.

The fully autogenous reef milling capacity is 390ktpm. It is proposed to increase mill throughput to 440ktpm through the addition of steel ball grinding media, at which stage leach/CIP becomes limiting. Maximum projected LoM throughput 5,006ktpa. Projected gold recoveries from metal contained in reef and waste of 97% and 88% respectively, with due consideration for head grade effect over the LoM period, are in line with recent performance.

SRK consider the plant to be generally in good condition both mechanically and structurally and subject to adequate ongoing maintenance should meet the LoM requirements. FS1 plant is projected to be in use until 2023 when underground operations cease.

FS2 Plant is largely dedicated to the treatment of surface sources, although it does toll treat reef on behalf of Welkom Operations and also processes ore from Eland BU and Kudu & Sable BU. The plant was commissioned in the early 1950s and employs conventional technology of that era comprising crushing, ball and pebble milling, thickening, leaching, filtration, zinc precipitation and smelting.

FS2 has a reef milling capacity of 300ktpm, which reduces to its current operating capacity of approximately 270ktpm when processing reef and waste. Maximum projected LoM throughput of 3,240ktpa of reef and waste (milling) and 3,600ktpa of reef, waste and slimes (treatment). Overall recovery is a function of the mix of feed ore, as surface sources tend to have a lower recovery than underground reef. SRK consider that the projected reef recoveries of approximately 95%, WRD recoveries of approximately 80% and slime recoveries of approximately 60% are appropriate considering the recent operating performance.

Considering its age, FS2 appears to be in a fair condition, both mechanically and structurally. Filter maintenance is good but this will have to be sustained if current efficiencies are to be maintained. FS2 is projected to be in use until 2007 when surface operations cease. Providing that routine maintenance is sustained, SRK consider the plant is in adequate condition to meet the requirements of the LoM projections.

Joel Plant processes underground ore and waste rock both of which are delivered to the plant by road. Joel Plant was commissioned in 1987 with a circuit comprising conventional RoM milling, leach, CIP adsorption, elution, electrowinning and smelting. Due to the observed "preg robbing" characteristics of the ore, the leach and adsorption circuit was reconfigured as a CIL circuit to realise improved metallurgical recoveries. In a recent development, elution has been discontinued at Joel Plant and loaded carbon is transported to FS1 for elution.

Joel Plant was originally designed as a fully autogenous reef mill with a capacity of 120ktpm. Following certain modifications the reef capacity was increased to 150ktpm with the mills running semi-autogenously. Current operating capacity, including waste, is approximately 120ktpm with the potential to increase to 135ktpm. Maximum projected LoM throughput is 1,458ktpa. Projected reef and WRD recoveries of approximately 95% and 87% respectively are in line with recent performance with due allowance for the impact of head grade variation over the LoM period.

Generally the plant is considered to be in good condition both mechanically and structurally although the level of housekeeping offers room for improvement. Joel Plant is projected to be in use until 2014 when underground operations cease.







144

144

**Annexure 7**

St. Helena Plant was commissioned in 1978. Older plant facilities, which began operating in the 1950s, have since been demolished. The current circuit comprises RoM milling, thickening, leaching, filtration, zinc precipitation and smelting.

Presently only two of the five original milling circuits are operational. On the basis of semi-autogenous operation, current reef milling capacity is approximately 100ktpm, which reduces to the present operating capacity of approximately 90ktpm processing reef and waste. Maximum projected LoM throughput is 1,120ktpa. St. Helena Plant will process a range of surface sources in its remaining life, for which varying recoveries projected to be between 50% and 90% are considered appropriate by SRK.

The plant is generally in good condition although there are signs of corrosion, particularly in the leach area. Planned filter overhauls have fallen behind schedule and will have to be reinstated if current efficiencies are to be maintained. St. Helena Plant is planned to be in use until 2006 when surface operations cease. Providing that routine maintenance is sustained, SRK consider the plant is in adequate condition to meet the requirements of the LoM projections.

**6.2.3*****Harmony Free State Operations***

Central Plant processes underground ore and it is planned to utilise spare treatment capacity to process reclaimed slime in the future. The plant was commissioned in 1986 and comprises RoM milling, thickening, cyanide leaching, CIP adsorption, elution and electrowinning. Loaded carbon is received from Virginia and Saaiplaas Plants for elution and regeneration. Following commissioning of the Harmony refinery, smelting was discontinued and cathode slime is now processed at Central Plant to refined gold products.

The plant was designed to mill 150ktpm of reef at moderate steel addition and has demonstrated an operating reef milling capacity of 180ktpm at higher steel addition. Installed treatment capacity equates to 240ktpm and this differential will be used to process reclaimed slime. Maximum projected reef and slime LoM throughput is 2,160ktpa of reef and waste and 2,880ktpa for treatment including slimes. Projected reef recoveries of approximately 95% are in line with recent performance. Recoveries of 55% are anticipated on the reclaimed slime component of the feed and SRK consider this recovery to be achievable.

Central Plant is planned to be in use until 2014 when underground operations cease. Generally the plant is considered to be in good condition both mechanically and structurally and providing that routine maintenance is sustained, SRK consider the plant is in adequate condition to meet the requirements of the LoM projections.

Saaiplaas Plant processes underground ore and it is planned to utilise spare treatment capacity to process reclaimed slime in future. The plant was commissioned in the late 1950s employing conventional technology of that era. In the early 1980s RoM milling was introduced and part of the leach was converted to a carousel CIL circuit earlier this year. Loaded carbon is transported to Central Plant for elution and regeneration.

Saaiplaas Plant has a reef milling capacity of 150ktpm and installed treatment capacity of 220ktpm. Spare treatment capacity will be used to process reclaimed slime. Maximum projected reef and slime LoM throughput is 1,800ktpa of reef and waste and 2,663ktpa for treatment including slimes. Projected reef recoveries of 95% to 96% are in line with recent performance. Recoveries of 55% are anticipated on the reclaimed slime component of the feed and 88% on the WRD. SRK consider these recoveries to be achievable.

Saaiplaas Plant is planned to be in use until 2018 when underground operations cease. Generally the plant is considered to be in good condition both mechanically and structurally and providing that routine maintenance is sustained, SRK consider the plant is in adequate condition to meet the requirements of the LoM projections.

Virginia Plant processes underground ore and waste. The plant was commissioned in 1986 and comprises RoM milling, thickening, cyanide leaching and CIP adsorption. Local elution and electrowinning facilities have been decommissioned and loaded carbon is transported to Central Plant for elution and regeneration.

The plant was designed to mill 150ktpm of reef at moderate steel addition and has demonstrated an operating reef milling capacity of 180ktpm at higher steel addition. Virginia has a current operating capacity of approximately 165ktpm processing reef and waste. Maximum projected LoM throughput is 1,944ktpa. Projected reef and waste recoveries of approximately 96% and 85%, respectively, are in line with recent performance.





145

145

**Annexure 7**

The mills are generally in good condition although certain structural steelwork is showing signs of corrosion. Leach tanks are not in good condition and there have been recent failures. The installation of in-house leach reactors has consequently been necessary to enhance leach kinetics and maintain dissolution. The CIP circuit, being a converted uranium leach circuit, is showing its age and is not in good condition. Both the leach and CIP circuits will have to be refurbished or replaced if extended operations are intended. A capital allowance of ZAR10m has been included to complete the work deemed necessary by SRK to sustain the projected plant performance. Virginia Plant is required until 2012 when underground operations cease. Providing that routine maintenance is sustained and the capital is expended as provisioned, SRK consider the plant is in adequate condition to meet the requirements of the LoM projections.

**6.2.4*****Welkom Operations***

RoM ore from Welkom Operations is processed at Freegold Operation's FS2 Plant. FS2 Plant has a nominal reef milling capacity of 300ktpm. Freegold Operations use excess capacity to treat its own material. Ore is delivered to FS2 Plant by road.

**6.2.5*****West Wits Operations***

Ore is delivered to Elandsrand Plant by conveyor from Elandsrand BU and by road from Deelkraal BU. Elandsrand Plant also operates a waste washing section, with washed fines joining the reef feed and oversize being stockpiled. The plant was commissioned in 1978 and comprises RoM milling, thickening, cyanide leaching and CIP adsorption. A pumpcell CIP circuit was commissioned as an upgrade in 1999. Loaded carbon is transported some 50km to the Cooke Plant for elution and regeneration. A portion of the tailings is cycloned ahead of disposal to produce backfill. Elandsrand Plant has a maximum reef milling capacity of 190ktpm. Maximum projected LoM throughput is 1775ktpa. Projected reef recoveries of 96% are in line with recent performance and taking cognisance of the projected increase in head grade over the LoM period.

Elandsrand Plant is required until 2023 when underground operations cease. Generally the plant is in excellent condition both mechanically and structurally and providing that routine maintenance is sustained, SRK consider the plant is in adequate condition to meet the requirements of the LoM projections.

Deelkraal Plant was commissioned in 1978 with a circuit comprising RoM milling, thickening, leaching, filtration, zinc precipitation and smelting. A portion of the tailings is cycloned ahead of disposal to produce backfill.

Deelkraal Plant has a design reef milling capacity of 135ktpm and a current operating capacity of 105ktpm when processing waste, largely limited by the condition of the filter plant. In recent years, Deelkraal Plant has primarily treated waste, with Deelkraal underground ore having been transported to the Elandsrand Plant for treatment. It is planned to commission a new 60ktpm pumpcell CIP plant to process Deelkraal BU underground ore from 2004. This decision is partly motivated by the need for backfill at Deelkraal BU. An appropriate capital allowance has been included in the strategic plan for the CIP conversion. Maximum projected LoM throughput is 720ktpa. Projected reef recoveries of 92% should be achievable following the conversion to CIP.

The plant is generally in a fair condition, with the exception of the filter plant and general maintenance will have to be reviewed/improved to prevent disruptions over the LoM period. The Deelkraal Plant is required until 2009 when underground operations cease. Providing that routine maintenance is sustained, SRK consider the plant is in adequate condition to meet the requirements of the LoM projections.

Cooke Plant processes only underground ore delivered from Cooke No.1 BU, No.2 BU and No.3 BU and the Doornkop BU. The plant was commissioned in 1977 as a Gold and Uranium plant. Uranium operations ceased in 1989 and parts of the Uranium plant were utilised to convert from filtration and zinc precipitation to CIP/CIL. The current operation comprises RoM milling, thickening and cyanidation in a hybrid CIP/CIL circuit, elution and electrowinning. Loaded carbon from Doornkop Plant is added to the CIL circuit for further loading and loaded carbon from Elandsrand Plant is separately eluted and regenerated. Electrowon gold slime is transferred to the Harmony refinery.

The plant was designed as a 250ktpm gold and uranium plant, the capacity of which was increased to 300ktpm in 1982 with 280ktpm mill capacity as the current limit. Maximum projected LoM throughput is 3,173ktpa. Projected reef recoveries of 96% to 97% are in good agreement with current performance. The Cooke Plant is planned to be used until 2022. Generally the plant is considered to be in good condition both mechanically and structurally and subject to adequate ongoing maintenance should meet the LoM requirements.







146

146

**Annexure 7**

Doornkop Plant is currently dedicated to processing waste rock and other surface accumulations. The plant was commissioned in 1985 and comprises RoM milling, thickening, cyanide leaching and CIP adsorption. Loaded carbon is transported to Cooke Plant for further loading ahead of elution and regeneration.

Doornkop Plant was commissioned with an initial reef milling capacity of 100ktpm. This was expanded to its current reef milling capacity of 225ktpm in 1987, which equates to a waste milling capacity of around 200ktpm. Maximum projected LoM throughput is 2,220ktpa. In line with recent performance, recoveries are projected at approximately 90%.

The plant is required until the final quarter of FYE 2005.

Generally the plant is considered to be in very good condition both mechanically and structurally and subject to adequate ongoing maintenance should meet the LoM requirements.

**6.2.6*****Evander Operations***

Winkelhaak Plant was commissioned in 1958. Only two RoM mills, a thickener and transfer pumping facilities to pump pulp to Kinross Plant are still operational. The Kinross Plant was commissioned in 1967 and comprised three RoM mills followed by conventional leach, filtration and zinc precipitation. In the early 1980s, two further mills were added and the treatment section was modified to incorporate CIP adsorption, elution and electrowinning.

The Winkelhaak Plant and Kinross Plant largely treat underground reef with minor waste inclusion. The Winkelhaak Plant has a reef milling capacity of 68ktpm whilst the reef milling capacity of the Kinross Plant is 160ktpm. The Kinross Plant treatment capacity of 200ktpm limits overall throughput. Maximum projected LoM throughput of 2,428ktpa. Projected reef recoveries of 96% to 97% are in line with recent achievements.

Winkelhaak Plant and Kinross Plant are planned to be used until 2013 and 2018 respectively and are planned to operate close to capacity. Both Winkelhaak Plant and Kinross Plant require some attention in the shaft conveyor and mill feed silo areas if continued operation is intended. The Kinross Plant is otherwise showing its age and will require ongoing attention. Some ZAR6m has been budgeted in the next financial year to cover the needed repairs, however the plants will still need to be better maintained if planned operations are to be met when running at full capacity.

**6.2.7*****Orkney Operations***

RoM ore from Orkney Operations is toll processed at VRO's No.1 Gold Plant. Ore is transported to No.1 Gold Plant by rail from all but Orkney No.2 BU and Orkney No.7 BU, which is conveyed directly to the plant. The circuit comprises two semi autogenous mills, one closed by a hydrocyclone and the other closed by a linear screen, a single closed circuit ball mill, thickening, pre-leaching, carousel CIL adsorption, residue disposal, acid washing of loaded carbon, Zadra elution and electrowinning. Cathode gold is stripped from the washable stainless steel cathodes and transported at the risk of Harmony to No.8 Gold Plant for smelting. Eluted carbon is thermally reactivated before being recycled to the CIL adsorption circuit. Any mill gold recovered during relining is also transported to No.8 Gold Plant for smelting. Gold due to Harmony is determined from metal accounting procedures.

The No.1 Gold Plant has a nominal milling capacity of 180ktpm, and contractually ore from Orkney Operations is processed at a maximum of 6ktpd. VRO are able to use any unutilised milling capacity for processing other material, typically waste rock. In addition, the plant has greater treatment capacity than milling capacity, which allows for the processing of an additional 50ktpm of reclaimed slimes.

In the event of prolonged stoppages, breakdowns or other outages and with Harmony's written consent, the ore may be processed at one or a combination of VRO's other gold plants. Such processing is subject to the provision that process efficiency and throughput would not be lower than that achievable in No.1 Gold Plant.

Various agreements between Harmony and VRO govern supply and quality of RoM ore and gold apportionment. Further, SRK has been informed by Harmony that VRO takes ownership and assumes liability for the treatment, stockpiling and rehabilitation of all residues emanating from No.1 Plant. This includes environmental liability, but specifically excludes Harmony from participating in the recovery of gold or other minerals from secondary processing of residues.

**6.2.8**

***Kalgold Operations***

Kalgold Plant processes open pit ore. The plant was commissioned in 1998 and comprises three stage crushing, ball milling, thickening, leaching, CIL adsorption, elution, electrowinning and smelting.





147

147

**Annexure 7**

Kalgold Plant was designed to treat 85ktpm and has recently commissioned a third ball mill and additional leach tanks which has increased capacity to 135ktpm. Maximum projected LoM throughput is 1,363ktpa. Variable recovery is experienced in treating the open pit ore and the trend in recent years has been for recoveries to drop to approximately 81%. The recent expansions will result in similar mill product size distribution but will increase the leach residence time. Recoveries are expected to improve slightly to 82% based on performance over the past three years.

Kalgold Plant is generally in good condition; both mechanically and structurally and subject to adequate ongoing planned maintenance should meet the LoM requirements.

**6.2.9*****Harmony Australian Operations***

Checker Plant processes underground ore, open pit ore, low-grade ore from surface stockpiles and tailings from previous operations at Hill 50. Ore from the various sources is separately stockpiled on the RoM pad and reclaimed by a front-end loader to a blend specification, usually on the basis of hardness. The process route comprises two stage jaw crushing, ore blending, primary SAG milling with recycle pebble crushing, closed circuit secondary ball milling, closed circuit tertiary ball milling, cyanide leach enhanced by oxide injection, CIP adsorption, split AARL elution, electrowinning, smelting and tailings disposal. The milling circuit includes centrifugal gravity concentration, the concentrates of which are forwarded to intensive cyanidation in an InLine Leach Reactor ahead of solution electrowinning.

Checker Plant was commissioned in 1989 and designed to treat 125ktpm, however the capacity was increased to 225ktpm in 1999. Projected reef recoveries of 93% are in good agreement with current performance.

Generally the plant is considered to be in good condition both mechanically and structurally and subject to adequate ongoing planned maintenance should meet the LoM requirements.

Big Bell Plant processes underground and open pit ore and is currently in the process of closure. Ore is stockpiled on the RoM pad and reclaimed by a front-end loader to achieve the desired blend on the basis of grade and ore type. The process route comprises gyratory crushing, primary SAG milling with recycle pebble crushing, secondary ball milling closed by hydrocyclones, cyanide leach enhanced by oxygen injection, CIP adsorption, pressure Zadra elution, electrowinning, smelting and tailings disposal.

Plant capacity is 250ktpm on softer oxidised ore and 170ktpm on harder primary ore. Gold recovery is typically 85%. New Celebration Plant processes underground ore, open pit ore and low-grade ore from surface stockpiles. Ore from the various sources is separately stockpiled on the RoM pad and reclaimed by a front-end loader to achieve a required blend. The process route comprises primary jaw crushing, secondary and tertiary cone crushing closed by screens, ball milling closed by hydrocyclones, thickening, cyanide leaching, CIP adsorption, split AARL elution, electrowinning and smelting.

New Celebration Plant was commissioned in 1986 and has a design treatment capacity of 125ktpm on blended ore. Projected reef recoveries of 92% are in good agreement with current performance.

Generally the plant is considered to be in good condition both mechanically and structurally and subject to adequate ongoing maintenance should meet the LoM requirements.

Jubilee Plant processes underground ore, open pit ore and low-grade ore from surface stockpiles. Ore from the various sources is separately stockpiled on the RoM pad and reclaimed by a front-end loader to achieve a required blend. The process route comprises primary jaw crushing, secondary and tertiary cone crushing closed by screens, primary SAG milling, closed circuit secondary ball milling, cyanide leaching, CIP adsorption, split AARL elution, electrowinning, smelting and tailings disposal.

Jubilee Plant was commissioned in 1987 and has a design treatment capacity of 110ktpm on blended ore. Projected reef recoveries are slightly below the 92% achieved at the New Celebration Plant.

Generally the plant is considered to be in good condition both mechanically and structurally and subject to adequate ongoing planned maintenance should meet the LoM requirements.

***6.2.10 Harmony Canadian Operations***

The Bisset Plant is currently on care and maintenance.





148

148

**Annexure 7****6.3****Sampling, Analysis, Gold Accounting and Security****6.3.1*****Avgold***

At the Target Mine, adequate attention is generally given to sampling, sample preparation and metal accounting. A regularly calibrated mass flow system installed on the thickener underflow serves as the principal measurement of plant feed tonnage. A single idler belt weightometer installed on the ore silo feed conveyor serves as a check. Thickener underflow is automatically sampled ahead of leach and CIP and gold content in the leach feed is determined as the product of the thickener underflow grade and mass flow. Gravity gold content is determined from a volumetric measurement and grade of the solution sent to electrowinning after intensive cyanidation. Plant head content is determined as the sum of leach feed content and gravity gold content. A manual sample of the SAG mill discharge serves as a check as does the calculated head grade reconstituted from the gold recovery plus residue content. Final residue is automatically sampled with gold content in the residue being determined as the product of the residue grade and the thickener underflow tonnage.

The previous mine analytical function has been privatised. The laboratory employs fire assay with gravimetric finish for gold analysis, with all samples being parted. Internal laboratory controls are fairly standard including check assaying of certified reference materials. In terms of external quality control, four laboratories in the Free State participate in a round robin sample exchange.

Whilst metal accountability shows fairly high variability at the monthly level, longer-term accountability is acceptable, albeit with room for improvement.

A full security audit was beyond the scope of this review. The security system was however noted to include state of the art monitoring and access control technology and to rely strongly on procedural compliance. In an environment where theft is known to be prevalent, ongoing vigilance and upgrading of systems and procedures will be important. Security facilities and procedures at the process plants of the Mining Assets are considered to be well directed at attempting to minimise the risk of theft.

Security facilities and procedures at the process plants of the Mining Assets are considered to be well directed at attempting to minimise the risk of theft. Notwithstanding the above comment, all forward projections are based on historically achieved Mine Call Factors which will ultimately include any historical gold loss through theft, with the security in place this situation is not deemed to deteriorate and as such the projections are considered valid.

**6.3.2*****Harmony***

Generally across the group adequate attention is given to sampling and sample preparation. Whilst there are accounting anomalies that require further investigation, good accounting procedures are largely in place. All plant feed sources are individually sampled. Underground ore is generally sampled at the shaft head or on the main plant feed conveyor with the aid of Go-Belt samplers. Waste rock is generally sampled from a plant feed conveyor with Go-Belt samplers. Where manual samples are taken, particularly in the case of third party samples, detailed procedures have been laid down and are followed. Daily composites of Go-Belt and other bulk samples are prepared in dedicated sample preparation plants.

Plant head and residue samples are almost exclusively taken automatically with cross-stream pulp cutters or in-stream poppet samplers, composites are accumulated and prepared in the standard way. In most cases, actual gold recovered is apportioned to the various sources in proportion to the estimated content in each source after allowance has been made for any differential metallurgical recovery. The latter is determined from bottle roll tests on monthly composite samples.

Because of the fact that many of the plants treat numerous ore types from different sources, metal accounting is often the subject of some debate, specifically when final gold allocations are made back to each source. SRK consider that there may be inherent inaccuracies in gold allocation which may ultimately impact on the planning factors such as MCF. However, at a collective tax entity level, the allocated gains and losses cancel each other out and over extended time periods the individual BUs feeding the plants will be allocated with the appropriately estimated recovered gold.



A full security audit was beyond the scope of this review. SRK notes that whilst security measures are in place at the Mining Assets, these vary in both management focus and the applied technology. In general, however, mine management is continuing to refine security measures. Security facilities and procedures at the process plants of the Mining Assets are considered to be well directed at attempting to minimise the risk of theft.





149

149

**Annexure 7****6.4****Plant Clean-Up**

There are two aspects to gold lock up that need to be considered. Firstly any change in the in-plant gold inventory and secondly the recovery of lock up gold when the plants are finally closed and cleaned up. The quantity of clean-up gold that can be anticipated on closure of a plant is uncertain. Reported figures for South African plants have shown an order of magnitude difference, varying between 0.04% and 0.40% of the total gold produced through the plant during its life. Factors affecting the quantity of gold that is eventually recovered are plant age, installed treatment route, plant layout and detailed design features, plant operational management and the procedure and efficiency of the plant clean-up.

The recorded figures confirm that plants incorporating large crushing and milling circuits will release more gold on closure than compact RoM milling plants. Prediction of the quantity of gold that is likely to be recovered is difficult and will always be subjective. As a guideline, SRK has assumed 0.15% for older crushing and milling plants, 0.10% for more recent, relatively clean plants and 0.04% for RoM milling plants. Where low-level waste has been processed in the latter years of a plants life, significant gold purging is likely to have occurred and lower gold accumulations can be expected.

It is considered that parameters derived from South African experience would considerably overstate the clean-up gold potential of Western Australian processing plants, largely due to their more recent design, shorter operating history and more compact plant layout. SRK has accordingly made no allowance for the recovery of lock up gold in these instances. Estimated clean-up gold for the Mining Assets operations is shown in Table 6.1.

**Table 6.1 Mining Assets: Clean-up Gold Estimates****Operation****Clean-up Gold****(koz)**

Target Operations - Target Mine

7

Free Gold Operations

103

Harmony Free State Operations

22

Welkom Operations

0

West Wits Operations

76

Evander Operations

19

Orkney Operations

0

Kalgold Operations

(1)

1

Mt. Magnet &amp; Cue Operations

0

South Kalgoorlie Operations

0

**Total****228****Avgold**

7

**Harmony**

**221**

(1)

The contribution from Kalgold is subject to a current sale agreement which may see a 100% disposal of the asset in the near future.





150

150

**Annexure 7**

**Figure 6.1 Avgold/Harmony: Schematic Flow Diagram of a Typical Carbon in Pulp Plant**







151

151

**Annexure 7**

**Figure 6.2 Avgold/Harmony: Schematic Flow Diagram of a Typical Carbon in Leach Plant**





152

152

**Annexure 7**

**Figure 6.3 Avgold/Harmony: Schematic Flow Diagram of a Typical Filtration and Zinc Precipitation Plant**







153

153

**Annexure 7****7.****TAILINGS****7.1****Introduction**

This section includes discussion and comment on the tailings engineering aspects associated with the Mining Assets. Specifically, detail and comment is focused on the design, construction, geotechnical integrity, remaining capacity and management practices governing the tailings facilities. Key source data for the review comprised the engineering design constraints, where available, as prepared by the appointed tailings dam review consultants at each of the operations (including in certain cases SRK). Site-specific issues are summarised below.

**7.2****Target Operations - Target Mine**

The Target Operation currently comprises a single tailings dam divided into two compartments known as Dam 1 (the northern section) and Dam 2 (the southern section). The tailings dam is currently built up to an average height of approximately 34m above the surrounding original ground level. By the end of 2020 the tailings dam is likely to rise a further 9.5m. The average height above the original ground level will then be 44m, which is acceptable.

During the last inspection, undertaken during March 2003, an improvement was observed to the general condition of the dam walls, in that the level of toe seepage had reduced from that noted in previous inspections; however this may be attributed to a spell of prevailing drier weather as opposed to successful implementation of a remedial programme. The current LoM plan projects 19.9Mt of processed/tailings material evenly spread over the next 17-year period. The Mine has indicated that 40% of the total tailings stream will be placed back underground as backfill in order to support stoped-out areas required for continued mining operations. SRK note, however, that 40% has not always been achieved and has been low as 20% (therefore 16.0Mt reporting to the tailings). For review purposes SRK has assumed a conservative 20% level of backfill placement to assess tonnage loading on the tailings dam. With 20% reporting to underground, the rate of rise ("RoR") on an annual basis ranges between 0.4m/yr and 0.6m/yr. These rates are not perceived by SRK as being excessive; in fact by normal standards can be considered low. The tailings dam has however exhibited toe seepage emissions, and is likely to display further seepage in the future, specifically during seasons with above average rainfall; as such strict monitoring control must be implemented throughout the year. As a general rule of thumb, SRK consider that a tailings facility with no toe seepage emissions should operate at a RoR of 1.5m/yr without any associated stability problems. As Target has exhibited seepage, it is not advisable to increase the RoR beyond 0.8m/yr without undertaking a detailed stability analysis.

**7.3****Free Gold Operations**

Free Gold Operations currently include four tailings dam complexes, namely FS North, FS South, St. Helena and Joel Slimes Dams, which facilitate deposition of residue from FS1 Plant, FS2 Plant, St. Helena Plant and Joel Plant. FS North includes seven tailings dams, two of which are operational (FS North 1 and FS North 2), with the other five (FS North 3B, FS North 4, FS North 5 and FS North 6) being dormant. FS North facilitates tailings deposition from FS2 Plant, which includes material treated on behalf of Free Gold Operations and Welkom Operations. FS South includes nine tailings dams, five of which are operational (FS South 1, FS South 2, FS South 4, FS South 8W and FS South 8E), with the other four (FS South 3, FS South 5, FS South 6, FS South 7 and President Brand C) being dormant. FS South facilitates tailings deposition from FS1 Plant and also toll deposition from President Steyn.

The St. Helena tailings dam comprises a single facility known as Dam 4, although very little deposition is taking place on the dam at present, St. Helena plant is planned to treat surface sources for the next three years.

Joel Slimes Dam is also a single facility, which is currently operational, comprising an unlined facility where deposition occurs in accordance with appropriate rates of rise and design specifications.

The current LoM plans for collective Free Gold Operations require a total placement of approximately 89.0Mt. The total remaining capacity as at 31 December 2003 is projected at some 123.8Mt, which is adequate to meet the overall requirements of the LoM plan. At the individual facilities this may require certain re-routing of tailings from the current configuration incurring additional costs for pipes, valves and pumping.

The tailings dam complexes are currently operated managed and controlled in a responsible and diligent manner, although maintenance is needed on the solution trenches and paddocks of a number of dams. Noticeable seepage was observed along the common contact and southern sides of South 8E and South 8W dams, as well as along the perimeter toe-line of the St. Helena tailings dam, both should be investigated. No impairment to the integrity of the dams is anticipated, provided that practices, levels of management and control are maintained at a high-level of diligence with all necessary remedial measures undertaken in a timely manner.





154

154

## **Annexure 7**

### **7.4**

#### **Harmony Free State Operations**

The Harmony Free State Operations comprise the Harmony, Saaiplaas and Merriespruit tailings facilities. The Harmony facility comprises three dams, the H1, H2 and H4 tailings dams, of which only H4 is currently active. The Saaiplaas tailings facilities principally comprise two complexes, which include a total of six dams situated to the east of Welkom of which only three are currently active. The Merriespruit tailings facilities principally comprise five active tailings dams, No.30 (V10), No.30A (V10), No.4b, No.5b, No.5a, situated to the south-east and south-west of Virginia of which only five are currently active.

The current LoM plan for Harmony Free State Operations requires a total placement of some 63.0Mt. The remaining capacity at 31 December 2003 is projected at some 65.2Mt, which is adequate to meet the overall requirements of the LoM plan. At the individual facilities this will require some re-routing of tailings from the current configuration, specifically from the Saaiplaas Plant and is likely to lead to additional costs for pipes, valves and pumping.

The tailings dam complexes are currently operated managed and controlled in a responsible and diligent manner, although maintenance is needed to the solution trenches and paddocks of a number of dams. No impairment to the integrity of the dams is anticipated, provided that practices and levels of management and control are maintained at a high-level of diligence with all necessary remedial measures undertaken in a timely manner.

### **7.5**

#### **Welkom Operations**

In line with the toll processing arrangements, Welkom Operations are not responsible for tailings dam deposition.

### **7.6**

#### **West Wits Operations**

The West Wits Operations comprise the Elandsrand, Deelkraal, Cooke and Doornkop tailings facilities. The Elandsrand facility comprises two dams located on a hillside with one down slope from the other; both are currently active. The Deelkraal tailings facility also comprises two dams located on a hillside with one down slope from the other; and both are currently active. The Cooke and Doornkop facilities each comprise a single dam both of which are active.

The current LoM plan for Elandsrand and Deelkraal requires a total placement of some 27.3Mt. The remaining capacity as at 31 December 2003 is projected at some 38.2Mt, which is adequate to meet the overall requirements of the LoM plan.

The current LoM plan for Cooke and Doornkop operations requires a total placement of some 45.2Mt. The remaining capacity as at 31 December 2003 is projected at some 51.4Mt, which is adequate to meet the overall requirements of the LoM plan. The RoR for the Doornkop dam is forecast in excess of 2m/yr however considering that the LoM for the Doornkop facilities is less than two years SRK consider that this can be managed.

The tailings dam complexes are currently operated managed and controlled in a responsible and diligent manner, although maintenance is needed to the solution trenches and paddocks at some of dams. No impairment to the integrity of the dams is anticipated, provided current practices and levels of management and control are maintained with all necessary remedial measures undertaken in a timely manner.

### **7.7**

#### **Evander Operations**

The Evander Operations comprise the Winkelhaak and Kinross tailings facilities. The Winkelhaak facility comprises four dams, No.1, No.2, No.3 and No.4, located in a cluster of which two dams, No.3 and No.4, are currently active. The Kinross tailings facility comprises three dams located on a gently sloping hillside and all are currently active.

The current LoM plan for Evander Operations requires a total placement of some 19.5Mt. The remaining capacity as at 31 December 2003 is projected at some 25.2Mt, which is adequate to meet the overall requirements of the LoM plan. A high RoR in excess of 2m/yr is forecast at the Winkelhaak No.4 dam although SRK consider that, in conjunction with sufficient monitoring, this can be managed.

The tailings dam complexes are currently operated managed and controlled in a responsible and diligent manner, although maintenance is needed to the solution trenches and paddocks at some of dams. No impairment to the

integrity of the dams is anticipated, provided current practices and levels of management and control are maintained with all necessary remedial measures undertaken in a timely manner.

**7.8**

**Orkney Operations**

In line with the toll processing arrangements, Orkney Operations are not responsible for tailings dam deposition.







155

155

## **Annexure 7**

### **7.9**

#### **Kalgold Operation**

The Kalgold Operation comprises a single tailings dam that was commissioned in 1998 subsequent to the replacement of the heap leach operation with a CIL plant. The current LoM plan for Kalgold Operations requires a total placement of some 6.0Mt. The remaining capacity at 31 December 2003 is projected at some 6.2Mt, which is adequate to meet the overall requirements of the LoM plan.

The tailings dam complex is currently operated, managed and controlled in a responsible and diligent manner and no impairment to the integrity of the dam is anticipated, provided current practices and levels of management and control are maintained with all necessary measures undertaken in a timely manner.

#### **7.10 Harmony Australian Operations**

Checker Plant un-thickened tailings are pumped to one of two operating tailing storage facilities. Both uses the paddock system where tailings is deposited by spigotting around the perimeter to form a beach with supernatant water reclaimed by a central decant tower. An under drain in the new dam is also used for water collection. Walls are raised by upstream lifts using waste rock as the construction material. Analyses of water from bores around the periphery of the dam are reported to be within applicable limits for pH, total dissolved solids, weak acid dissociable cyanide and prescribed heavy metals. The first tailing storage facility at the modern Mt. Magnet operations has finished its service life with trials underway on capping the surface to test methods for rehabilitation.

The current LoM plan for the Checker Plant requires a total placement of some 13.6Mt. Cell No.3 of the current tailings storage facility as at 31 December 2003 is projected to have a service life until 2009 when raised to its design height. This is marginal to meet the overall requirements of the LoM plan.

Big Bell Plant is planned to discontinue operations shortly though the tailings design is based on the underflow from the tailings screen being pumped to the tailings storage facility which is divided into two cells, for deposition of solids and reclamation of water for re-use in the plant.

New Celebration Plant and Jubilee Plant un-thickened tailings are pumped to separate operating tailings storage facilities. Both uses the paddock system where tailings are deposited by spigotting around the perimeter to form a beach with supernatant water reclaimed by a central decant tower. Mine waste was used for the initial starter walls with upstream construction using dried tailings.

The current LoM plan for New Celebration requires a total placement of some 0.1Mt. The remaining capacity of the tailings dams at 31 December 2003 is adequate to meet the overall requirements of the LoM plan.

The current LoM plan for Jubilee requires a total placement of some 3.1Mt. The remaining capacity of the tailings dams at 31 December 2003 is projected at some 4.8Mt when using the Golden Hope North pit, which is adequate to meet the overall requirements of the LoM plan.

The tailings storage facilities are currently operated managed and controlled according to standard gold mining industry practice in Western Australia. No impairment to the integrity of the dams is anticipated, provided acceptable levels of management and control are maintained with all necessary remedial measures undertaken in a timely manner.

#### **7.11 Harmony Canadian Operations**

Harmony's Canadian Operations are currently mothballed and as such no assessment has been undertaken of the Tailing Facilities as no future production is currently planned.

#### **7.12 LoM Tailings Deposition Assessment**

Table 7.1 summarises the LoM deposition projections and comparable available capacities for each of the operations. Cognisance should be taken that the total deposition includes material that is treated on toll basis; this material is not included in the Companies total LoM projections. Collectively, the Companies toll treats some 10.2Mt from external sources.





156

156

**Annexure 7**

**Table 7.1 Mining Assets: Assessments of Tailings Storage Capacity for LoM Plans Operations**

**LoM Deposition**

**Available Capacity**

**Surplus/Shortfall**

(Mt)

(Mt)

(%)

**Target Operations - Target Mine**

(1)

Target Plant and Active Dams

15,955

19,932

**Subtotal Target Operations**

**15,955**

**19,932**

**25**

**Free Gold Operations**

(2)(3)

FS1 Plant and Active Dams

62,894

84,581

FS2 Plant and Active Dams

12,600

22,391

St. Helena Plant and Active Dams

1,913

3,950

Joel Plant and Active Dams

11,557

12,902

**Subtotal Free Gold Operations**

**88,964**

**123,824**

**39**

**Harmony Free State Operations**

Central Plant and Active Dams

22,553

21,867

Virginia Plant and Active Dams

11,018

24,139

Saaiplaas Plant and Active Dams

29,447

19,182

**Subtotal Harmony Free State Operations**

**63,018**

**65,188**

**3**

**West Wits Operations**

Cooke Plant and Active Dams

42,771

15,342

Doornkop Plant and Active Dams

2,381

36,070

Elandsrand Plant and Active Dams

23,374

21,544

Deelkraal Plant Active Dams

3,942

16,613

**Subtotal West Wits Operations**

**72,468**

**89,569**

**24**

**Evander Operations**

Kinross Plant and Active Dams

19,526

25,204

**Subtotal Evander Operations**

**19,526**

**25,204**

**29**

**Kalgold Operation**

Kalgold Plant and Active Dams

5,980

6,200

**Subtotal Kalgold Operations**

**5,980**

**6,200**

**4**

**International Operations**

Checker Plant and Active Dams

13,604

12,981

Big Bell Plant and Active Dams

na

na

Jubilee Plant and Active Dams

3,121

4,808

New Celebration Plant and Active Dams

63

63

(1)

Assumes 20% to Backfill - LoM plant throughput 19.9Mt.

(2)

Includes Welkom Operations.

(3)

Includes Toll Treatment from non-Harmony mines.

Where additional capital expenditure is required to sustain tailings operations in relation to the LoM projections as presented, such capital expenditure has been allowed for in the individual Tax Entity valuations.

**8.**

## **ENGINEERING INFRASTRUCTURE AND CAPITAL PROJECTS**

**8.1**

### **Introduction**

This section includes discussion and comment on the infrastructure and related aspects of the LoM plans associated with the Mining Assets. Specifically, detail and comment is focused on the existing on-mine infrastructure and capital expenditure programmes necessary for execution of the LoM plans, as presented.

**8.2**

### **Engineering Infrastructure of the Mining Assets**

Engineering infrastructure at the Mining Assets includes a wide range of operating technology, which varies in age and extent of mechanisation.

Underground mining operations comprise access infrastructure to convey personnel, materials and equipment to and from the working areas and associated services to support mining operations. Horizontal infrastructure includes cross-cut haulages, footwall haulage levels and declines/inclines. Infrastructure required for ore flow and services include ore and waste passes, conveyor belts, high speed rail







157

157

**Annexure 7**

conveyances, crushing stations, ore bins, loading stations, water dams, pump stations, backfill stations, backfill transportation and placement systems, secondary ventilation and refrigeration plant, workshops and power and water reticulation systems. Surface infrastructure includes headgears and winding systems, primary ventilation and refrigeration plants, process facilities, office blocks and training centres, workshops and stores, lamp rooms, change houses and accommodation. At the Mining Assets there are also a number of services and supply centres. These include compressed air supply stations and minor workshops for small repairs to plant and equipment.

Notwithstanding the age of the general infrastructure, SRK consider that all surface and underground infrastructure is reasonably maintained and equipped. In conjunction with planned maintenance programmes including specific remedial action, the current infrastructure is considered by SRK to be adequate to satisfy the requirements of the LoM plans. Further, the power generation and distribution systems, water sourcing and reticulation systems are appropriate for operations as envisaged in the individual LoM plans. Where this has not been the case SRK has allocated appropriate capital provision, which have been included in the TEPs as presented in Section 12.

**8.3****LoM Capital Expenditures Programmes**

The capital expenditure programmes are the Companies' current projections for the Mining Assets. SRK has reviewed these estimates and consider them appropriate as inputs to the valuation, as incorporated at Tax Entity level. The accuracy of these estimates are of the order of  $\pm 15\%$  for the major capital projects, as expected of feasibility level studies and for the provisions for ongoing capital SRK consider these to be in the order of  $\pm 25\%$ .

Table 8.1 summarises the latest capital requirements for the Mining Assets, excluding off-mine exploration costs.

Where appropriate the estimates have been modified by SRK to include any additional capital requirements as identified in Section 5 through to Section 7. SRK note that all capital estimates are exclusive of financing charges and unless otherwise stated are considered by SRK to be adequate to meet the requirements of the current LoM plan.

Capital projects at the Mining Assets are principally aimed at sustaining the integrity of primary infrastructure required for the underground operations. As described in Section 5 through to Section 7 these include the following:

- **at Target Mine:** All major capital projects have now been commissioned and as such no additional specific project capital is projected/required to exploit the Mineral Reserves as depleted in the LoM plan. A provision amount is however included amounting to approximately 7% of the direct operating costs or equivalent to R32/t milled. This amount is considerably higher, in unit rate per tonne terms, compared to other Free State operations, however reflects the level of mechanisation and required fleet replacement during the 18-year mine life;

- **at Free Gold Operations:**

- .

the sub-66L project at Tshepong BU will enable access to the deeper levels. It includes the development of a twin decline system to 71L, planned to commence during 2003 and commissioned at design throughput by 2007;

- .

the completion of 178m (vertical) of shaft sinking to the 81L at Phakisa BU and the necessary equipping of the shaft as a men, material and rock hoisting facility at some 150ktpa, this following the installation of a Koepe hoist on the 55L for the transfer of ore and waste to Nyala BU for hoisting to surface. The project is scheduled to commence in the second quarter 2004;

- .

infrastructural improvements at Bambanani BU and West BU;

- .

the installation of hoisting facilities at Joel North BU to support mining operations below 121L. This is planned to be fully commissioned by 2005; and

- .

shaft pillar mining at Nyala BU following associated modification to the shaft hoisting installation;

- **at Harmony Free State Operations:**

- .

the Masimong expansion project at No.5 BU to access high-grade areas of Basal Reef to east and west of the current workings. The capital is required to extend flat-end haulage development utilising the existing shaft capacity;

- **at Welkom Operations:** no future capital expenditures are currently forecast;

- **at West Wits Operations:**

.

the South Reef Project at Doornkop BU includes the deepening of the main shaft to 212L and re-equipping of the sub-vertical shaft and is expected to attain maximum production by 2009; and

.

the Sub-shaft Project at Elandsrand BU accessing ore from 102L to 113L which is projected to be complete by 2007;





158

158

**Annexure 7**

-

**at Evander Operations:** no specific capital projects are planned, however the majority of shafts have continued ongoing capital provisioned amounting to ZAR608m, which includes provision for the plants of ZAR6.4m. The Roslpruit Project, currently excluded from the Base Case valuation, considers the green- fields development of an extension to the Kimberley Reef, adjacent to No.8 BU, through installation of a twin shaft system from surface or from underground. The feasibility study as completed by Harmony projects capital expenditure requirements of ZAR5.2billion;

-

**at Orkney Operations:** capital projections are generally of a routine nature and primarily reflect capital development and/or provisions for unforeseen expenditures;

-

**at the Kalgold Operations:** capital projections are generally of a routine nature and primarily reflect capital development and/or provisions for unforeseen expenditures;

-

**at the Harmony Australian Operations:** capital projections are project related and focused towards exploration and underground development at the underground operations and also includes certain mine closure related costs; and

-

**at the Harmony Canadian Operations:** no capital expenditure is currently forecast with Bisset being placed on care and maintenance.

The total estimated capital expenditure for the Mining Assets over the LoM period are summarised in Table 8.1.

**Table 8.1 Mining Assets: Estimated Capital Expenditures**

**Operations**

**Capital Expenditure**

**(ZARm)**

Target Operations - Target Mine

582

Free Gold Operations

1,756

Harmony Free State Operations

370

Welkom Operations

0

West Wits Operations

1,734

Evander Operations

555

Orkney Operations

33

Kalgold Operations

(1)

0

Mt. Magnet & Cue Operations

204

South Kalgoorlie Operations

26

**Total**

**5,262**

**Avgold**

**582**

**Harmony**

**4,680**

(1)

The contribution from Kalgold is subject to a current sale agreement which may see a 100% disposal of the asset in the near future.

**9.**

## **HUMAN RESOURCES**

**9.1**

### **Introduction**

This section includes discussion and comment on the human resources related aspects associated with the Mining Assets. Specifically, information as provided by the Companies is included on the current organisational structures and operational management, recruitment, training, productivity initiatives and remuneration policies, industrial relations and productivity projections.

**9.2**

### **Legislation**

Various regulatory authorities, in addition to mining and labour codes, govern labour legislation in South Africa. In general these are well-established and in conjunction with the Companies operating policies, form the cornerstone of human resource management.

During 1999, many changes and initiatives took effect, primarily in response to the recently promulgated provisions of South African labour legislation. The Labour Relations Act regulates the relationship between employees and trade unions, establishes dispute resolution mechanisms, promotes collective bargaining and protects employees from unfair dismissal. Separation may be carried out on the basis of genuine economic, technological, structural or similar needs of an employer. Consultation, with full disclosure of relevant information, is required with trade unions prior to employers effecting separation programmes. The other major statutes in force in South Africa are:

- the Basic Conditions of Employment Act, which prescribes minimum conditions of employment, excluding wages;







159

159

**Annexure 7**

- the Occupational Diseases in the Mines and Work Act;

-

the Compensation of Occupational Injury and Diseases Act, which provides a mechanism for compensating employees who have been incapacitated as a result of injury or disease arising from the performance of work;

-

the Occupational Health and Safety Act and Mine Health and Safety Act, which impose a duty on employers to provide a safe and healthy working environment;

-

the Employment Equity Act, which prohibits unfair discrimination and places an obligation on employers to implement affirmative action measures. In this instance Employment Equity forums have been established with all unions in an effort not only to give effect to the Employment Equity Act, but also to address, through appropriate policies and procedures, the total development of human resources; and

- the Skills Development Act, which seeks to enable the development of the skills of the local workforce.

Through a process of negotiation with regulatory authorities and representative bodies, including organised labour, mine management has initiated various programmes to ensure compliance with the various regulatory statutes. The Companies have informed SRK that, with respect to the revised legislation, the Mining Assets are materially compliant and that pro-active involvement to seek appropriate exemptions through a negotiated process will be pursued.

**9.3**

**Organisational Structures and Operational Management**

SRK has been informed that the organisational structure currently in place, together with operational management, will remain until such time as planned shaft closures occur, following which, downsizing will be assessed. The Mining Assets are adequately resourced with the appropriate levels of technically qualified and experienced personnel in production and related support functions. Table 9.1 gives the historical and the 2004 manpower requirements or Total Employees Costed ("TEC") for the Mining Assets.

**Table 9.1 Mining Assets: Historical TECs**

**Mining Operations**

**2001**

**2002**

**2003**

**2004**

**(1)**

**(No.)**

**(No.)**

**(No.)**

**(No.)**

Target Operations - Target Mine

1,177

1,355

1,119

1,088

Free Gold Operations

20,368

14,722

16,106

17,119

Harmony Free State Operations

15,668

12,776

11,178

12,673

Welkom Operations

1,492

1,786

2,348

2,179

West Wits Operations

17,640

16,907

15,110

14,131

Evander Operations

8,805

8,639

6,906

7,203

Orkney Operations

6,579

6,174

5,854

4,696

Kalgold Operations

453

444

230

223

Harmony Australia Operations

882

882

882

882

**Total**

**73,064**

**63,685**

**59,733**

**60,194**

**Avgold**

**1,177**

**1,355**

**1,119**

**1,088**

**Harmony**

**71,887**

**62,330**

**58,614**

**59,106**

(1)

2004 reports six-month actual TECs to December 2003.

**9.4**

**Recruitment, Training, Productivity Initiatives and Remuneration Policies**

Recruitment, training, productivity initiatives and remuneration policies are, in general, typical of operating practices and strategies as implemented within the South African gold mining industry.

-

**training:** Training initiatives have focused on the development of both technical and managerial skills of senior and middle management. At the operational level, training initiatives include mine managements commitment to the Adult Basic Education and Training ("ABET") initiatives;

-

**productivity initiatives:** Mine management continually reviews and implements various productivity initiatives which reflect the operational conditions and remuneration policies within the individual labour markets; and

-

**remuneration policies:** Levels generally comply with industry-wide salary scales. In addition to basic components, employees receive additional entitlements, which are related to accommodation and medical and employee benefit plans in the form of pension/provident schemes.





160

160

**Annexure 7****9.5****Industrial Relations**

The Companies 2004 business plans require some 57,235 mine workers with approximately 80% being members of registered trade unions. Industrial relations at the Mining Assets are managed in accordance with key driving factors. These include the prevailing legislative requirements, regulatory bodies, labour representation, collective bargaining arrangements and regional/operational specific employee-employer agreements.

Historically, trade unions in South Africa have had, due to links with political parties, a significant influence over social and political reform as well as the collective bargaining process. Presently the situation is manageable; however, it is uncertain whether labour disruptions will be used to advocate such political causes in the future.

Mine management has embarked on a process involving all labour representatives (unions and management) to ensure appropriate and timely interaction to resolve industrial relations issues, including communication and joint decision-making, bonus strategies and procedures. Depending on fluctuations in the US\$ gold price and exchange rates together with the rising (above CPI) cost of employment due to recent wage negotiations, future workforce reductions may be required. In this instance, SRK consider that appropriate procedures are in place and, other than periodic action during wage negotiations, consider industrial relations risks to be manageable.

**9.6****Productivity Assumptions**

Productivity initiatives are primarily focused on restructuring of staffing structures and working practices as part of the Companies' overall strategy. This strategy is based on the recent success of both the "*Harmony Way*" and Avgold's normal operating principles. The importance of maintaining economic production levels, where labour cost contributes significantly in a highly regulated labour market (South Africa Region) is the principal focus and is recognised in all strategies. Labour cost constitutes between 40% and 60% of the total working costs.

Table 9.2 gives historical and projected productivity indices for the Mining Assets.

**Table 9.2 Mining Assets: Historical Productivity Initiatives****Statistic****2001****2002****2003****2004****(2)****Centares**

Target Operations - Taregt Mine

(m

2

/TEC/month)

na

na

na

na

Free Gold Operations

(m

2

/TEC/month)

4.3

4.5

5.0

5.0

Harmony Free State Operations

(m  
2  
/TEC/month)  
3.8  
4.8  
5.7  
5.6  
Welkom Operations  
(m  
2  
/TEC/month)  
4.1  
1.8  
3.7  
4.5  
West Wits Operations  
(m  
2  
/TEC/month)  
4.1  
4.7  
4.4  
4.4  
Evander Operations  
(m  
2  
/TEC/month)  
4.1  
3.9  
4.2  
4.2  
Orkney Operations  
(m  
2  
/TEC/month)  
4.4  
2.2  
4.4  
4.9  
**Tonnes Milled**  
Target Operations - Target Mine  
(t/TEC/month)  
35  
48  
31  
83  
Free Gold Operations  
(t/TEC/month)  
35  
49  
48

44

Harmony Free State Operations

(t/TEC/month)

28

30

40

39

Welkom Operations

(t/TEC/month)

19

10

20

24

West Wits Operations

(t/TEC/month)

33

40

43

46

Evander Operations

(t/TEC/month)

23

23

26

26

Orkney Operations

(t/TEC/month)

26

13

25

28

Kalgold Operations

(1)

(t/TEC/month)

176

180

392

519

Harmony Australia Operations

(t/TEC/month)

103

452

675

481

**Gold Production**

Target Operations - Target Mine

(g/TEC/month)

105

316

262

917



Free Gold Operations

(g/TEC/month)

153

197

186

171

Harmony Free State Operations

(g/TEC/month)

114

124

142

135

Welkom Operations

(g/TEC/month)

97

51

69

86

West Wits Operations

(g/TEC/month)

124

159

147

144

Evander Operations

(g/TEC/month)

135

125

135

135

Orkney Operations

(g/TEC/month)

184

97

180

178

Kalgold Operations

(1)

(g/TEC/month)

282

363

839

1,063

Harmony Australia Operations

(g/TEC/month)

164

743

1,498

1,136

(1)

The contribution from Kalgold is subject to a current sale agreement which may see a 100% disposal of the asset in the near future.

(2)

2004 reports six-month actual results to December 2003.





161

161

**Annexure 7**

Future production is in part reliant upon the achievement of productivity initiatives currently underway at Free Gold Operations. Termed Continuous Operations ("Conops"), this initiative seeks to increase the amount of labour time at the working face by increasing the number of shifts from the current eleven day fortnight to the maximum allowed, taking due cognisance of all legal requirements and statutory conditions. Conops broadly projects an increase of between 20% and 30% in production (by measure of tonnes milled) for an increase of between 10% and 15% in labour costs. Note that labour costs are approximately 50% of the total operating expenditures.

Conops is currently in place at Harmonys' Orkney and Welkom Operations, however the intention is to implement Conops at all the Companies' South African operations, commencing with Free Gold Operations.

**9.7****Separation Liability**

The total separation liability for the Mining Assets has been estimated by application of an average unit separation cost multiplied by the projected TEC at the time of either downsizing or closure.

Table 9.3 summarises the estimated separation costs to be expended on either closure or down sizing of the Mining Assets.

**Table 9.3 Tax Entities: Separation Costs****Tax Entities****Terminal Separation Benefits Liability****(ZARm)**

Target Tax Entity

10

Free Gold Tax Entity

200

Joel Tax Entity

18

Harmony Free State Tax Entity

188

Harmony Welkom Tax Entity

32

Randfontein Tax Entity

272

Evander Tax Entity

104

Harmony Orkney Tax Entity

72

Kalgold Tax Entity

(1)

8

Mt. Magnet &amp; Cue Tax Entity

0

South Kalgoorlie Tax Entity

0

**Total****904****Harmony****894****Avgold****10**

(1)

The contribution from Kalgold is subject to a current sale agreement which may see a 100% disposal of the asset in the near future.

## **10. HEALTH AND SAFETY**

### **10.1 Introduction**

This section includes discussion and comment on the safety and health related aspects associated with the Mining Assets. Current and historical health and safety statistics are presented with discussion on the more significant measures in progress to deal with identified risks.

### **10.2 Legislation**

Health and safety in South Africa is governed by various regulatory bodies and mining and labour legislation. In general these are well established and, in conjunction with management's operating policies, form the cornerstone of health and safety management. Key legislation changes as noted in the various operating regions are summarised below.

In South Africa, following publication of the Leon Commission Report in 1994 all aspects of health and safety on mines is governed by the Mine Health and Safety Act No.29 of 1996 ("the Mine Health and Safety Act") which came into effect on 15 January 1997. The Mine Health and Safety Act was the result of intensive discussion and consultations between Government, employees and employee representatives over an extended period of time and, whilst leaving room for self-regulation, also provides for strict control by Government. In complying with the Mine Health and Safety Act, mine management has established risk management and medical surveillance systems in addition to the health and safety committees to which workplace representatives have been elected. In summary this provides for various health and safety measures and provides for employee participation in these matters with stated objectives, *inter alia*:

- to protect the health and safety of persons at mines;

to require employers and employees to identify hazards and eliminate, control and minimise the risks relating to health and safety at mines;

-







162

162

**Annexure 7**

- to ensure compliance with both domestic and international law and regulations on health and safety at mines;

-

to provide for employee participation in matters of health and safety through health and safety representatives and health and safety committees at mines;

- to provide for effective monitoring of health and safety and working conditions at mines;

- to provide for enforcement of health and safety measures at mines;

- to provide for investigations and inquiries to improve health and safety at mines;

- to promote:

.

a health and safety culture in the mining industry; and

.

training in health and safety in the mining industry; and

- co-operation and consultation on health and safety between the regulatory bodies, employers, employees and their representatives.

With respect to the Harmony Australian Operations, they are operated in accordance with the relevant regulatory codes and practices governing Australian mining operations.

**10.3 Statistics**

Table 10.1 presents safety statistics for the Mining Assets and includes the total number of fatalities, fatality rate and the lost time injury frequency rate ("LTIFR") for 2001 to 2003 inclusive. Table 10.2 presents similar statistics for the Companies.

The overall safety performance of the Mining Assets during calendar 2003 (measured against performance during calendar 2002) is summarised as: a decrease in the number of fatalities by 16%; a decrease in the fatality rate by 30% and a decrease in the LTIFR by 10%.

**Table 10.1 Mining Assets: Historical Safety Statistics**

**Statistics**

**2001**

**2002**

**2003**

**2004**

**(2)**

**Fatalities (no.)**

Target Operations - Target Mine

2

0

0

0

Free Gold Operations

11

10

6

5

Harmony Free State Operations

9

8

2

6

Welkom Operations

4

1  
2  
0  
West Wits Operations  
12  
20  
20  
5  
Evander Operations  
5  
6  
4  
3  
Orkney Operations  
10  
7  
4  
2  
Kalgold Operations  
(1)  
0  
0  
0  
0  
Harmony Australian Operations  
0  
0  
0  
0  
**Fatality Rate (fatalities per mmhrs)**  
Target Operations - Target Mine  
0.35  
0.00  
0.00  
0.00  
Free Gold Operations  
0.35  
0.24  
0.15  
0.25  
Harmony Free State Operations  
0.26  
0.27  
0.07  
0.51  
Welkom Operations  
0.92  
0.35  
0.35  
0  
West Wits Operations

0.32  
0.47  
0.54  
0.23  
Evander Operations  
0.27  
0.33  
0.23  
0.41  
Orkney Operations  
0.56  
0.48  
0.48  
0.45  
Kalgold Operations  
(1)  
0.00  
0.00  
0.00  
0.00  
Harmony Australian Operations  
0.00  
0.00  
0.00  
0.00  
**LTIFR** (mmhrs)  
Target Operations - Target Mine  
9  
9  
11  
6  
Free Gold Operations  
17  
15  
15  
20  
Harmony Free State Operations  
35  
26  
24  
21  
Welkom Operations  
17  
12  
12  
15  
West Wits Operations  
24  
23  
23  
22

Evander Operations

22

24

34

30

Orkney Operations

28

24

24

15

Kalgold Operations

(1)

7

13

4

9

Harmony Australian Operations

na

15

2

15

(1)

The contribution from Kalgold is subject to a current sale agreement which may see a 100% disposal of the asset in the near future.

(2)

2004 reports six-month actuals to December 2003.





163

163

## **Annexure 7**

### **10.4 Health and Safety Management**

Health and safety management of the Mining Assets is focused on the development of company wide health and safety policies, taking cognisance of the legislation and regulatory environment. The Companies' Health and Safety policies are broadly aligned and state that the Companies will endeavour to:

- 
- comply with all applicable laws, regulations and standards and where adequate laws do not exist, develop and apply standards that reflect the Companies commitment to safety and health;
- 
- manage risk by implementing systems to identify, assess, monitor and control hazards and to review performance;
- 
- maintain a consultative process with employees through Health and Safety Representatives and Committees in all aspects related to safety and occupational health;
- 
- provide employees with information, instruction, training and supervision which is necessary to enable them to perform their work safely and without risk to health;
- 
- actively practice a comprehensive Risk Management Safety Programme aimed at continuous improvement of safety and occupational health;
- 
- protect property, equipment, materials and natural assets from damage by fires, explosions, pollution, contamination or any other down grading incident;
- support relevant occupational health and safety research;
- 
- actively participate in the Environmental Management Programmes and compliance with the requirements of its' Nuclear Licence;
- keep abreast of new developments and technology.

The Companies have informed SRK that all health and safety departments adhere to both the provisions of the Mine, Health and Safety Act and the Minerals Act with full-time, as well as part-time safety representatives employed at all the Mining Assets. In accordance with the provisions of the Mine, Health and Safety Act, a number of baseline risk assessments, continuous risk assessments and physical conditions ratings are conducted. Managerial instructions, emergency procedures and codes of practice are reasonably in place. Specific health and safety hazards identified include water, dust, fire, seismicity and falls of ground, explosions, insufficient emergency power equipment and occupational hygiene issues.

The HIV/AIDS infection rate of approximately 28% at the Companies' South African operations is representative of South Africa's mining industry. In order to mitigate against the likely impact and consequence of the occurrence of HIV/AIDS, the Companies have embarked on the following activities:

- awareness programmes in all operating regions;
- company wide wellness programmes;
- medical assistance to repatriated employees; and
- separation packages for employees who wish to return home.

Further, actuarial assessments by the Companies indicate that the cost of addressing the disease at the Mining Assets may peak at approximately 2% of the total cost of production, which equates to approximately US\$4/oz. At current levels of infection and taking cognisance of remedial action taken, the net cost has been estimated by the Companies at approximately US\$1.20/oz. This cost has, however not been included into the cash flow projections for each Tax Entity for the purpose of valuation, as presented in Section 13 primarily because there is no specific measure at this time to ascertain the accuracy of the Companies estimates.

Measured against the Ontario benchmarks for fatality rates of 0.15/mmhrs and LTIFR of 7.50/mmhrs the Companies currently operate at some 50% of this target. Whilst this does, in part, reflect the impact of deep level gold mining in

South Africa, current fatality statistics are considered to be unacceptably high.

**10.5 Future Considerations**

The Mining Assets will continue to be exposed to commonplace mining hazards such as water, dust, fire, seismicity, falls of ground ("FoG"), explosions, occupational hygiene issues and materials handling and transportation. Increased vigilance and focus is required in respect to:

- potential increases in the FoG as the proportion of production sourced from remnant mining areas increases on certain of the older Mining Assets;
- potential increases in seismicity as the mining extent increases and operations progress deeper;
- the potential impacts of HIV/AIDS on the labour force, should the present rate of industry-wide infection not be curtailed.







164

164

**Annexure 7****11. ENVIRONMENTAL****11.1 Introduction**

The following section includes discussion and comment on the environmental and water management aspects of the Mining Assets. Specifically, detail and comment is included on the status of the environmental issues, environmental legislation and permitting, environmental management systems and environmental liabilities.

**11.2 South African Legislation and Compliance*****11.2.1 Legislation and Environment***

Environmental legislation in South Africa, as specifically applied to mining operations, defines the relevant authorisation requirements. This comprises environmental authorisation, mining authorisation, water use licences, water pollution regulations, waste disposal permission, air pollution registration certificates, control of hazardous substances, radiation registration, disturbance of archaeological resources, protection of forests and closure of mines by the issuing of closure certificates. A critical component of authorisation is the requirement for an Environmental Management Programme ("EMP") and evidence of financial provisioning for rehabilitation and final closure. The EMP is developed through an Environmental Impact Assessment ("EIA") process and is documented in an Environmental Management Programme Report ("EMPR"), together with supporting baseline information on the mine environment and a review of identified environmental impacts. The Department of Minerals and Energy ("DME") is responsible for approval of the EMP and ensuring that other regulatory authorities with an interest in the environment accept the EMP. In summary, the EMP contains the environmental conditions of authorisation for the development and operation of a mine, which are generally defined in the form of objectives, principles and key design criteria. EMPs identify the individual impacts, mitigation measures and rehabilitation issues and must also be approved by other South African Government departments. The requirements imposed upon mining companies to ensure environmental restitution remain under review in the areas of hazardous waste management and mine closure and it is possible that this will result in additional costs and liabilities. Further, water management remains a key focus, specifically in respect to the changed requirements as provisioned for by the National Water Act 36 of 1998 and the National Environmental Management Act 107 of 1998.

Mining practices in South Africa are such that strict compliance can seldom be demonstrated; however where minor/nominal non-compliance occurs, this is generally not considered material to the continuation of future operations.

Environmental liability provisioning in the South African mining industry is a condition of the EMP process, which must be agreed with the relevant regulatory authorities and has to be approved by the South African Revenue Service ("SARS"). Based on South Africa's environmental and regulatory requirements, monies are accrued based on the estimated environmental rehabilitation costs over the operating LoM. Further, annual contributions are made by Avgold and Harmony to environmental trust funds (the "Trust Fund") created in accordance with South African statutory requirements, which provide for the estimated cost of pollution control and rehabilitation at the end of the LoM. SARS in this instance approves such annual contributions to the Trust Fund and requires that the annual contributions be estimated on the basis of remaining liability divided by the expected remaining life of the operation.

***Minerals and Petroleum Resources Development Act 28 of 2002:*** The Act is a recent addition to South African mining legislation. This Act and its draft Regulations require that an EMP be submitted and approved for prospecting and mining alike and that the EMP be monitored and assessed for its continued appropriateness, adequacy, and environmental performance. On approval of the prospecting right or mining permit/right a six monthly progress report to the Regional Manager of the DME will be required, that among other items will have to detail the execution and compliance with the approved environmental management plan. The regulations also require that appropriate financial provision be made for appropriate rehabilitation and remediation of environmental damages and a closure plan. From a social perspective the Regulations require a social and labour plan to be produced and provides for mining companies to contribute to the local economic development of areas within which they operate with visible and measurable poverty eradication. This could result in significantly increased expenditure by mines in meeting their social responsibilities in the future. On the Act coming into force existing mines will have a five-year period in which to convert their current mining rights to the new mining rights and submit with the applications the required

environmental and social documents for approval.





165

165

## Annexure 7

### 11.2.2 Compliance

#### - EMP:

**Avgold:** The EMPR for Target Mine was approved in April 1999 and ongoing environmental management is conducted in accordance with this document. Generally there is broad compliance with the EMPR given that the mine is in the final stages of development following a period of construction and new infrastructure on surface and underground,

**Harmony:** All EMPs at the various operations, apart from West Wits Operations' Cooke No.4 BU, Kalgold Operations and the Evander Operations' No.10 BU have been approved. The Cooke No.4 BU and the Kalgold Operations' EMPs have been submitted for approval. Operations at Evander No.10 BU were ceased prior to the approval of the EMP and discussions are currently being held with the DME with regard to the closure. In the interim, it has been agreed that all the outstanding environmental issues at the Evander No.10 BU will be incorporated into existing EMPs and accounted for in the Evander Operations closure liability. In several instances the EMPRs are in the process of being updated;

- **Water Use Licences:** The recent introduction of the National Water Act has resulted in the necessity to convert water permits issued under the Water Act to water registrations and water use licences.

**Avgold:** All existing water uses have been registered with DWAF with effect from June 2001 and the mine now appears to be in compliance with its water use permits (789N). The ground water and surface water monitoring program is being maintained and reported to the Regional Director, DWAF on a monthly basis as required under the permit conditions. Pertinent to the terms of the Permit is an Exemption 1955B which prohibits discharge of waste water to Swartpan, into which all non-deliberate discharge will make its way. An interception drain with sufficient pumping capacity to cope with spillages during prolonged wet spells has been constructed and is in operation. Finally effluent and groundwater monitoring results indicate contamination levels higher than water quality guidelines. Despite being non-enforceable under present permit conditions, SRK considers that continued monitoring is required and may present liability risks if the current levels do not recede,

**Harmony:** All operations, apart from West Wits Operations, have registered water uses and are awaiting instruction from the DWAF on direction regarding submission of applications for water use licences. Harmony Free State Operations submitted its water use license application in 2002, however to date no license has been received. West Wits Operations is operating, in agreement with the DWAF, under their original water permits; however applications for new order licence have been submitted and approval is awaited;

- **Financial Provision:** In accordance with the requirements of the Minerals Act and in line with the Income Tax Act, trust funds have been set up into which contributions are being made for mine closure.

**Avgold:** Avgold has established and registered a trust fund ring-fenced for its Target Operations and has been making regular contributions to the fund based on its estimated closure liability and a current operating mine life of 17 years,

**Harmony:** Kalgold Operations is in the process of registering a trust into which contributions can be made and is the only operation that is currently not contributing to a registered trust. The Free Gold Operations' St. Helena Environmental Trust has recently been registered;

- **Radiation:** Certificates of Registration are required under the National Nuclear Regulator Act of 1999. The registrations are issued by the National Nuclear Regulator ("NNR").

**Avgold:** NNR has accepted clarification on a report of the radiation audit carried out in 1999. Target Operations previously operated under an NL-72 licence in terms of the Nuclear Energy Act (1993), which included Loraine (now

President Steyn) activities. Target applied (December 2001) for a Certificate of Registration in terms of the NNR Act (47 of 1999) to replace the licence held at the time. Operation under a registration certificate would reduce the stringency of the existing licence and eliminate the need for financial guarantees in respect of radiation control. The Certificate of Registration ("CoR") (No.COR10) was issued on 5 May 2003, and includes the Loraine operations owned by President Steyn. Currently there are no indications that the mine is out of compliance with its radiation monitoring and performance. Quarterly reports are submitted as required by the conditions of the licence,

**Harmony:** Registrations have been issued to all operations apart from the Free Gold Operations' St. Helena, however to date no CoR have been received; and







166

166

**Annexure 7**

- **Waste Disposal Sites:** Waste disposal sites require permits from DWAF in terms of the Environment Conservation Act. A Memorandum of Understanding has been issued indicating that the permitting function will transfer to the Department of Environmental Affairs and Tourism in the foreseeable future.

**Avgold:** has maintained an area with a NNR approved wash bay in its salvage yard for several years for decontamination of radiation-contaminated scrap; however the area is currently empty. Target has contracted a BEE waste recycling company in Welkom (I&S Waste Recycling) to remove and process recyclable wastes from the mine site. Domestic waste is dumped at the Allanridge Municipal waste site with municipal approval. Target does not maintain its own waste site; and

**Harmony:** Permitted waste disposal sites are operated at the West Wits Operations' Elandsrand BU, Deelkraal BU, Free Gold Operations', Joel BU and St. Helena BUs. Unlicensed sites are being used at Elandsrand BU and at Evander No.8 BU. The Evander No.8 BU site will be relocated to the regional municipal site, which is in the initial planning stages. All other operations have integrated their waste management into municipal solid waste systems.

**11.3 International Legislation and Compliance****11.3.1 Harmony Australian Operations**

Approvals for the mining and processing operations conducted on the Mt. Magnet Hill 50, the Cue Big Bell and the South Kalgoorlie mining leases were obtained from the Department of Industry & Resources ("DIR") (formerly Department of Minerals and Energy) using the Notice of Intent ("NoI") process. The need for formal assessment of the mining activities by the Department of Environmental Protection ("DEP") was considered but found not to be required. Works Approvals were sought and obtained from the DEP for activities such as construction and operation of tailings storage facilities and hyper-saline bore fields.

Commitments made within the NoI and Work Approval documents are binding for any future operations on these tenements unless a request for an amendment is submitted to the relevant government authorities and is accepted. Commitments typically relate to rehabilitation practices (topsoil removal and spreading) and closure criteria (waste dump slope angles, vegetation establishment success), environmental management practices (dust control, chemical storage and handling) and environmental monitoring.

Environmental approvals are actively sought for new projects (i.e. satellite open pits) as directed by Senior Mine personnel. Discussions with site Environmental Managers indicated that approvals are generally received with minimal delay due to the good working relationships established with regulators. Bonds are not typically lodged until work is ready to commence on newly approved areas. Systems have been developed at Hill 50 to actively track the status of all environmental approval submissions. This has helped ensure mining does not commence in areas until all necessary approvals have been obtained and bonds lodged.

**11.3.2 Harmony Canadian Operations**

The Harmony Canadian Operation's Bisset mine does not own the mineral rights and operates in accordance with a mining lease and an environmental licence. It is understood that whilst the licence has no time restriction, should Harmony Canadian Operations fail to comply with its conditions it may be revoked, temporarily or permanently. As the operation is currently on care and maintenance the environmental aspects were not reviewed in detail.

**11.4 Environmental Policy and Management**

SRK has considered the Companies Environmental policy statements and commitments at an operational level and is satisfied that the Companies are generally adhering to them. Where non-compliance is occurring in terms of environmental legislation and commitments in terms of the respective EMPs, as discussed throughout Section 11 of this CPR, management is aware of the such issues and SRK consider them to be taking appropriate measures to manage the issues in line with their policies to do so.

**11.4.1 Avgold**

Avgold maintains an Environmental Management System ("EMS") database modelled after the ISO 14001 system. The company has not yet sought accreditation; however the company conducts external and internal audits annually.





167

167

### **Annexure 7**

Avgolds' Environmental Policy Statement includes a commitment to:

- 
- comply with the environmental law of all countries in which it operates and where these are deemed by the company to inadequately protect the health and safety of people or ecosystems, endeavours to exceed these standards;
- 
- aspire to minimise and control any impact on the environment and prevent pollution using suitable environmental management systems;
- 
- seek to continuously improve on performance with respect to environmental management by regular review and with the use of suitable auditing techniques;
- ensure that all new projects undergo appropriate environmental impact assessments;
- 
- ensure that all employees who have responsibility for environmental management systems receive appropriate training and are assigned responsibility for performance;
- 
- inform all employees, contractors and sub-contractors of their obligations in respect of the company policy. In addition to its general Environmental Policy, Avgold have a Radiation Protection Management Policy as summarised:

Philosophy: Avgold-Target division is committed to the practice and management of its business in a manner compatible with the broader goals of the social, economic and natural environment and to the integration of radiation protection management into all its activities; and

- Objectives:

.  
to prevent the occurrence of deterministic effects of radiation and limit stochastic effects to levels deemed to be acceptable during all phases of the operation, shutdown and decommissioning;

.  
to ensure compliance with regulatory standards, nuclear energy legislation, company policies and philosophy, by following an approved radiation protection quality management programme;

.  
to promote the education, training and motivation of employees to raise their general awareness of radiation protection.

#### **11.4.2 Harmony**

Harmony believes that all its employees as well as members of the public have the right to good quality air, water and soil as well as a safe working environment. Harmony is committed to acting responsibly as far as remediation of environmental impacts, resulting from mining activities is concerned. In order to implement policy Harmony commits to the following:

- to conduct environmental impact assessments when establishing new operations;
- to monitor and audit environmental progress;
- adopt the best affordable technology to limit impacts on the environment and minimise waste;
- to interact with all relevant authorities and all interested and affected parties;
- conform with environmental and health and safety legislation.

Harmony environmental affairs are the responsibility of the Group Environmental Coordinator who is assisted by environmental coordinators or foremen at the various business units and an environmental engineer with regard to strategy development.

### **11.5 Environmental Issues**

#### **11.5.1 Target Operations**

The key environmental issues at Target Mine are:

- ground water contamination resulting from acid generation in the tailings facility and leached from the waste rock dumps with the footprint of the re-located pyrite dam offering a further potential for contamination;
- ground water contamination resulting from potential seepage beneath the Swartpan, Voelpan and any unlined evaporation ponds;
- potential inherent liabilities following the sale of Loraine No.3 Shaft and associated assets;
- non-rehabilitated tailings facilities and rock dumps together; and
- potential radiation hazards.







168

168

**Annexure 7**

There is a risk that Target Mine will be required to supply one or more neighbouring farmers with potable quality water for domestic use in the short term, this as a result of the ground water contamination to the west of the slimes dam near Swartpan. Crops in this area do however appear to be coping adequately with the current ground water quality. The probable cost of this supply is unlikely to be high, although the supply could be required in perpetuity. A programme of surface rehabilitation was approved by the Target Division EMP Steering Committee for completion during 2002 and 2003. Included in this programme was a grassing programme for the eastern, western and southern sides of the slimes dam over a three-year period commencing in 2002.

Demolition of the old gold plant, and rehabilitation of the pyrite dam footprint have been completed.

Work is continuing on drainage modifications on the west side of the slimes dam to reduce ground water contamination. A plantation of 1,250 Eucalyptus and other trees has been planted along the west side of the slimes dam to intercept seepage and help to dewater the area. The ground water interception trench west of the tailings dam is in the process of being deepened to make it more effective.

Further expenditure is planned on water management issues associated with the tailings dam. Originally this was to include the lining of the evaporation ponds to the east of the tailings dam. A decision has now been made not to line these ponds in the foreseeable future. Work on other aspects of water management around the tailings dam was delayed, and is anticipated to commence shortly. The role of these ponds will broaden from evaporation to return water/evaporation ponds. Pumps will be installed to return water to the plant, while the balance will be evaporated. Target intends to carry out some rehabilitation work around the No.3 Shaft rock dump and drainage area during 2004. Some rock has been removed leaving the footprint to be rehabilitated. A wet area adjacent to the rock dump (known as Friccies slimes dam) has been rehabilitated.

Construction of the tailings backfilling plant is complete. Exemption from Regulation 704 of the National Water Act with respect to backfilling of underground workings has been granted by DWAF for this operation.

Generally progress on scheduled environmental rehabilitation has been made, and the environmental risk profile has been marginally reduced; however, the remedial work described for completion during 2003 was extensive, and was more optimistic than could be achieved in that period.

Despite outstanding remedial work SRK consider there to be no significant short-term risks to Target Mine from issues that have been identified. There are some longer-term risks that more extensive ground water remediation may have to be undertaken, for which the closure costing currently makes no provision. Once a comprehensive dataset on ground water quality has been obtained, the mine's management should discuss with DWAF its policy on the need to contain or remove the contaminated ground water plume.

The more important area of risk remains the cost of remediation for contamination known to exist but as yet not fully understood in terms of technical detail and the ultimate stance of the regulators at the time of closure. A detailed closure plan should therefore be developed, and updated periodically during the life of the mine taking cognisance of better technical understanding and regulatory opinion as the mine approaches its end of economic life.

**11.5.2 Free Gold Operations**

The decontamination of the Joint Metallurgical Scheme ("JMS") presents a significant risk to the Free Gold Operations associated with disturbed ground surrounding discontinued processing facilities. Investigations have been undertaken to determine the extent of contamination; however no firm estimates for decontamination are available. In the context of the existing total liability estimated for Free Gold Operations this risk associated with the JMS is not considered material.

At Joel BU the location of the tailings dam, across a watercourse, represents a potential liability however the mine has clean water diversion facilities in place upstream of the tailings dam and operates a pumping system downstream of the tailings dam by means of which seepage water is re-circulated into the water system for the processing plant. Water pollution is a significant risk in the Dankbaar/Brakpan Complex area where farmers are being exposed to groundwater pollution. Currently Free Gold Operations are trucking clean water to affected farms at a cost of ZAR80k per month. A project is underway to install a pipe network to supply the farmers with clean water with the pipeline route having been determined and agreed to by the affected





169

169

**Annexure 7**

farmers. The tender process is scheduled to commence mid-July 2003. Willow Valley Chicken, located east of Bambanani BU and west of Saaiplaas BU (Harmony Free State Operations) has complained about contamination of groundwater used by the farm. Further investigations are being undertaken to determine the extent and source of contamination and until such time as the investigation reports its findings, the issue remains a risk.

**11.5.3 Harmony Free State Operations**

Water management at Harmony Free State Operations is a complicated matter, due to the presence of several mining operations in the region. The geographical extent of water contamination is widespread and has been an area of investigation for several years and there are several risks associated with both surface and underground water management. From a groundwater perspective the Unisel and De Kroon pollution plumes have been identified and present a liability to the respective operations. Preliminary investigations have indicated that engineering options such as collection and interception barriers may prevent further movement of the contaminated water to the Sand River. Water pollution control dams for the surface discharge to the Sand River have silted up and will need to be cleaned out to increase retention capacity.

**11.5.4 Welkom Operations**

Groundwater pollution has been identified at the Welkom tailings dam. AngloGold in its Sale Agreement indemnified the acquirer of the facility from pollution that occurred prior to the purchase date. Harmony as current owners is therefore actively maintaining an enlarged cut-off trench at the facility to reduce the potential of any further contamination thus limiting its liability.

Discharge from the shafts at Welkom Operation is estimated at approximately 2.4Mlpd. The discharge water is handled as part of Free Gold Operation's overall water management system and any specific allocated liability is not therefore allocated to Welkom Operations.

**11.5.5 West Wits Operations**

Untreated mine decant water was recently discovered at West Wits Operations discharging to the Tweelopies East Spruit. West Wits Operations have commissioned an independent hydrogeological study to investigate this issue; however no conclusive findings are as yet available as to confirm the source and any associated liability. In the event that West Wits Operations are liable for clean-up and treatment of this decant, potential treatment methods include the Paques method, gypCIX or reverse osmosis, which have capital costs ranging from ZAR4.5m/MI per day to ZAR8.0m/MI per day (the mine decants 11MI per day). To date, the cost of managing the mine decant water has been in the order of ZAR10m. It is expected that a future decant may also occur some 2km east of the current decant but the quantities and any costs associated with this decant have not currently been estimated.

Sinkholes have formed in the vicinity of Randfontein No.4 BU that have not been filled and may present a liability to the mine. Sinkholes do not however represent a material liability in the context of the total liability currently estimated and provisioned for the West Wits Operations. Randfontein BU has a separate ZAR300m insurance policy underwritten by Lloyds of London in the event that a claim is made against the mine; however to date no material claims have been made.

Radiation has been detected in the Deelkraal tailings facility and the NNR requires the dam to be appropriately rehabilitated, however Harmony consider that the tailings may have economic potential and as such can be reprocessed. Irrespective of potential to reprocess, heavy rains during the past summer have prevented sufficient drainage required prior to rehabilitation. Until such time as a commitment is made to reprocess the tailings the facility will remain a liability in terms of NNR requirements.

Uranium concentrate at West Wits Operations can be processed at VRO; however is currently being stored until approval for its transport is granted by NNR.

With effect from 10 June 2003, Placer Dome Western Areas Joint Venture ("PDWAJV") took over pumping operations at Randfontein No.4 BU. PDWAJV will continue pumping at approximately 75Mlpd until its Mineral Reserves affected by water made from Randfontein BU are depleted. Pumping costs are estimated to be ZAR54m per annum. Harmony has assumed that the PDWAJV will undertake pumping beyond the life of Randfontein and as such does not include this expenditure in its operating costs.





170

170

## **Annexure 7**

### ***11.5.6 Evander Operations***

At the Evander Operations groundwater pollution has been detected in the vicinity of tailings facilities, however borehole analysis indicates that the pollution plume is not extensive.

Diversion of clean water from Leeuwpan, which is Evander Operations' evaporation facility, is required to achieve compliance with the NWA Regulation 407. A cut-off trench required to bring the management of the facility into compliance.

Return water dams at Evander Operations are located within 1:50 year floodlines however several do not comply with the requirement to accommodate a 1:50-year flood, which could result in pollution events exposing the operation to unprovisioned liabilities.

### ***11.5.7 Orkney Operations***

SRK has been informed by the Companies that Harmony is indemnified against historical pollution problems as per the Sale Agreement with VRO; any liabilities are therefore limited to the physical constraint of the shaft surface areas. In the Black Reef area Harmony may have some liability as a result of the exploration undertaken in the area and their acceptance of some responsibility by virtue of the submission and approval of the EMPR for prospecting. This could result in the need for further rehabilitation (possibly including measures for the treatment of contamination) and the need to flatten the slopes of excavations made during exploration. Much of this contamination is probably the result of the proximity of VRO Western Tailings complex near to the area, rather than the Orkney Operations.

With respect to the regional ground water problem, although contamination of ground water in the Klerksdorp, Stilfontein and Orkney area represents a significant liability, it is unlikely that this will impact significantly on Harmony. This view is taken due to the historic nature of the problem and the number of mines in the area that have contributed to the problem over a far greater time period than Orkney Operations have been operating. Any incremental impact due to the Orkney Operations over a relatively short period is unlikely to be material.

### ***11.5.8 Kalgold Operation***

Initial vegetation attempts, as specified in the EMP have proved difficult on the tailings dam. Solutions to the problem are being investigated to ensure that EMP commitments are met. If not successful there will be a risk of having to implement alternative rehabilitation methods such as cladding, which will be more expensive.

Monitoring programmes indicate that groundwater contamination is extending from the plant, heap leach pad, tailings dam, fines drains and return water dams toward the open pit which currently contains the pollution. Monitoring is required to ensure that contamination does not extend beyond the pit at closure.

The river diversion at Kalgold mine pit is not in compliance with DWAF requirements. It is estimated that ZAR4.5m would be required to bring the diversion into compliance. The compliant diversion will be implemented on determining the extent of proposed underground operations, which will influence the final positioning of the diversion.

### ***11.5.9 Harmony Australian Operations***

Potential liabilities associated with Mt. Magnet & Cue and South Kalgoorlie operations are considered as follows:

- seepage from tailings storage facilities at the Mt. Magnet Hill 50 operation the Cue Big Bell operation and South Kalgoorlie New Celebration operation. Vegetation deaths and contaminated groundwater plumes have been identified as resulting from such seepage;
- poor rehabilitation of historic waste dumps at South Kalgoorlie and to a lesser extent at the Hill 50 operation. As detailed in the relevant Closure Plans, remedial works are required to bring the rehabilitation to a standard that would be considered acceptable by regulatory authorities;
- inadequate exploration rehabilitation at the New Celebration Operation. Substantial amounts of drill-hole capping, sump rehabilitation and track rehabilitation is required to address disturbance created during historic exploration programs. Regulatory officials have indicated that bonds will be levied on all affected tenements unless progress is demonstrated; and







171

171

## **Annexure 7**

-

land contamination at the Hill 50, Big Bell and South Kalgoorlie operations. Considerable areas at all three sites may be classified as contaminated with the proposed introduction of the Contaminated Sites Bill 2002. Contaminants are likely to include hydrocarbons (TPH), arsenic, mercury, cyanide and acid (pH). Areas most likely to be classified as contaminated would include tailings areas, contractors lay down areas, processing plants and open pits containing low pH (acidic) waters. Whilst some contaminated areas can be remediated, others are likely to remain classified as contaminated and future uses restricted. Costs associated with remediation have been included in Closure Plans, but as all three operations have little experience with actual remediation costs, these amounts are not considered to have a high degree of accuracy.

Given that Harmony has identified these issues and implemented detailed improvement programmes to address these, it is considered by SRK that adequate measures have been taken at this time to minimise the environmental risks.

### ***11.5.10 Harmony Canadian Operations***

SRK has not reviewed the environmental liabilities at Harmony's Canadian Operations and has been informed that the current operation is currently under care and maintenance. An annual operating cost for continuation of the care and maintenance is in the order of ZAR2.8m and is represented as part of the overall unallocated expenditures for Harmony.

## **11.6 Liabilities and Risks**

SRK has identified risks, which cannot necessarily be accurately quantified. In such cases, SRK has either included indicative provisioning based on best technical estimates, or in areas where the risk is considered to be low, merely drawn attention to it without including specific provision.

Potential future requirements for water treatment during continued operations or following decommissioning is the single most material risk and the most technically and politically difficult to estimate. Whilst water treatment at the majority of the Mining Assets is not currently required, the potential for future requirements will be dependent upon:

-

the execution of both recently passed legislation and more stringent future legislation which imposes more costly water management requirements;

- discharge criteria demanding potable water standards as opposed to more lenient general standards;

-

tacit acceptance by various organisations of the concept of desalination and its increasing cost effectiveness as technology improves.

Actual requirements for post-closure radiation protection in South Africa are difficult to determine owing to the state of flux pending finalisation of legislative requirements. SRK's interpretation is that, in practice, a compromise will be found between strict idealistic standards and applied pragmatism.

Australian Environmental Bonds were last reviewed by Harmony as part of the Annual Environmental Report submissions made during 2002. It is anticipated that the bond amounts will increase during 2004 due to across the board unit rate bond increases by DIR. Bond reductions should be experienced at Big Bell during 2004 due to the large amount of rehabilitation earthworks undertaken during 2003.

## **11.7 Environmental Liabilities**

Based on the items identified with this Section and discussions with Harmony and Avgold, SRK has estimated that the total Environmental Liability for the Mining Assets, as summarised in Table 11.1. The net difference will be funded from future contributions (included in the total working cost projections in the case of the South African Mining assets and in the capital expenditure projections for the Australian Assets) to fund the total liability.

The Trust Fund balance has been provided to SRK by the financial representative of the Companies at 31 December 2003.

These estimates of environmental liability exclude any potential resale or salvage values, which may be realised during the rehabilitation process.





172

172

**Annexure 7**

**Table 11.1 Tax Entities: Environmental Liabilities**

**Tax Entities**

**Total Liability**

**Trust Fund Outstanding Liability**

**Closure Date**

**(ZARm)**

**(ZARm)**

**(ZARm)**

**(Financial Year)**

Target Tax Entity

37

21

16

2020

Free Gold Tax Entity

680

573

107

2023

Joel Tax Entity

18

18

0

2014

Harmony Free State Tax Entity

370

69

302

2018

Harmony Welkom Tax Entity

33

23

10

2011

Randfontein Tax Entity

362

218

145

2023

Evander Tax Entity

120

51

69

2018

Harmony Orkney Tax Entity

25

17

8

2011	
Kalgold Tax Entity	
(1)	
13	
1	
12	
2007	
Mt. Magnet & Cue Tax Entity	
95	
0	
95	
2010	
South Kalgoorlie Tax Entity	
69	
0	
69	
2006	
Bisset	
11	
0	
11	
non-operational	
<b>Total</b>	
<b>1,834</b>	
<b>992</b>	
<b>842</b>	
<b>Avgold</b>	
<b>37</b>	
<b>21</b>	
<b>16</b>	
<b>Harmony</b>	
<b>1,797</b>	
<b>971</b>	
<b>826</b>	
(1)	

The contribution from Kalgold is subject to a current sale agreement which may see a 100% disposal of the asset in the near future.

## **12. TECHNICAL-ECONOMIC INPUT PARAMETERS**

### **12.1 Introduction**

The following section includes discussion and comment on the technical-economic aspects of the LoM plans associated with the Tax Entities. Specifically, comment is included on the basis of projections, production schedules, operating costs and capital expenditures; these have been compiled into detailed TEPs on an annual basis. Key aspects associated with the generation of the TEPs and their derivations are discussed.

### **12.2 Basis of Valuation and Technical-Economic Parameters**

The valuation of the Tax Entities as presented in Section 13 has, *inter alia*, been based on the LoM plans, the resulting production profiles and associated revenue streams from gold sales, by-product credits, operating costs and capital expenditure profiles as provided to SRK by the Companies, reviewed, adjusted where appropriate and provided to the respective Financial Advisors by SRK. The generation of a LoM plan requires substantial technical input and detailed analysis and is critically dependent upon assumptions of the long- term gold price and sustained operating expenditure and the respective impact on cut-off-grades, potential expansion or contraction of the Mineral Resources and Mineral Reserves and the return on capital expenditure programmes.

The basis of forward projections of operating costs for mature mining operations are generally based on the previous financial year's performance, with certain modifications for inflation, projected improvements in productivity and other cost-reduction initiatives. In the case of development projects, TEPs are invariably based on recently completed feasibility studies.

Where warranted, following its independent review and post-discussions with the Companies, SRK has adjusted the assumed operating costs to account for future operating conditions (i.e. tonnage contribution from various ore sources and mining methods, mineability and shaft closures) and taking cognisance of its view on productivity initiatives.

Unless otherwise stated, operating costs comprise:

-

**cash cost components:** namely direct mining costs, direct processing costs, direct general and administration costs, consulting fees, management fees, bullion transport and refining charges;













174

174

**Annexure 7**

**Table 12.1 Target Tax Entity: Total Assumed TEPs**

**Financial**

**Recovered Gold**

**Total Working Costs**

**Capex**

**Total**

**Year**

**(koz)**

**(ZARm)**

**(ZARm)**

**(ZARm)**

2004

(1)

147

213

37

251

2005

326

546

61

607

2006

338

619

54

673

2007

342

608

51

659

2008

279

600

58

658

2009

296

601

36

637

2010

248

597

36

632

2011

230  
606  
36  
642  
2012  
217  
609  
36  
645  
2013  
235  
573  
36  
609  
2014  
235  
570  
36  
605  
2015  
235  
570  
36  
605  
2016  
240  
558  
36  
594  
2017  
200  
532  
36  
567  
2018  
184  
514  
0  
514  
2019  
181  
498  
0  
498  
2020  
188  
507  
0  
507  
2021  
0

16  
 0  
 16  
**Total**  
**4,119**  
**9,336**  
**582**  
**9,918**

(1)

Six-month forecast to June 2004, actual results between June 2003 and December 2003 are reported in Section 2.

**Table 12.2 Free Gold Tax Entity: Total Assumed TEPs**

**Financial**

**Recovered Gold**

**Total Working Costs**

**Capex**

**Total**

**Year**

**(koz)**

**(ZARm)**

**(ZARm)**

**(ZARm)**

2004

(1)

590

1,207

190

1,397

2005

1,281

2,564

462

3,025

2006

1,245

2,382

200

2,582

2007

1,214

2,061

70

2,131

2008

1,193

1,801

140

1,941

2009

1,081

1,761

100



1,861  
2010  
1,087  
1,797  
60  
1,857  
2011  
934  
1,592  
100  
1,692  
2012  
736  
1,201  
100  
1,301  
2013  
728  
1,201  
80  
1,281  
2014  
685  
1,164  
60  
1,224  
2015  
657  
1,094  
20  
1,114  
2016  
637  
1,091  
20  
1,111  
2017  
612  
1,078  
20  
1,098  
2018  
568  
1,048  
10  
1,058  
2019  
449  
1,015  
10  
1,025

2020  
268  
489  
10  
499  
2021  
268  
489  
0  
489  
2022  
268  
489  
0  
489  
2023  
291  
553  
0  
553  
**Total**  
**14,791**  
**26,077**  
**1,651**  
**27,728**

(1)  
Six-month forecast to June 2004, actual results between June 2003 and December 2003 are reported in Section 2.





175

175

**Annexure 7**

**Table 12.3 Joel Tax Entity: Total Assumed TEPs**

**Financial**

**Recovered Gold**

**Total Working Costs**

**Capex**

**Total**

**Year**

**(koz)**

**(ZARm)**

**(ZARm)**

**(ZARm)**

2004

(1)

40

101

0

101

2005

80

189

30

219

2006

78

182

35

217

2007

80

178

10

188

2008

79

174

10

184

2009

77

172

10

182

2010

76

171

10

181

2011

76  
 171  
 0  
 171  
 2012  
 74  
 171  
 0  
 171  
 2013  
 69  
 175  
 0  
 175  
 2014  
 23  
 91  
 0  
 91  
**Total**  
**751**  
**1,773**  
**105**  
**1,878**

(1)

Six-month forecast to June 2004, actual results between June 2003 and December 2003 are reported in Section 2.

**Table 12.4 Harmony Free State Tax Entity: Total Assumed TEPs**

**Financial**

**Recovered Gold**

**Total Working Costs**

**Capex**

**Total**

**Year**

(koz)

(ZARm)

(ZARm)

(ZARm)

2004

(1)

346

819

31

850

2005

700

1,637

36

1,673

2006

701

1,642

44  
1,686  
2007  
619  
1,422  
44  
1,466  
2008  
617  
1,453  
41  
1,494  
2009  
518  
1,171  
36  
1,207  
2010  
517  
1,171  
32  
1,203  
2011  
507  
1,154  
32  
1,186  
2012  
504  
1,173  
22  
1,195  
2013  
353  
817  
22  
839  
2014  
279  
635  
20  
655  
2015  
173  
391  
10  
401  
2016  
164  
382  
0

382  
 2017  
 160  
 377  
 0  
 377  
 2018  
 172  
 411  
 0  
 411  
**Total**  
**6,329**  
**14,653**  
**370**  
**15,023**  
 (1)  
 Six-month forecast to June 2004, actual results between June 2003 and December 2003 are reported in Section 2.  
**Table 12.5 Welkom Tax Entity: Total Assumed TEPs**  
**Financial**  
**Recovered Gold**  
**Total Working Costs**  
**Capex**  
**Total**  
**Year**  
**(koz)**  
**(ZARm)**  
**(ZARm)**  
**(ZARm)**  
 2004  
 (1)  
 48  
 121  
 0  
 121  
 2005  
 110  
 308  
 0  
 308  
 2006  
 89  
 270  
 0  
 270  
 2007  
 24  
 66  
 0  
 66  
 2008



24  
66  
0  
66  
2009  
24  
66  
0  
66  
2010  
24  
66  
0  
66  
2011  
24  
70  
0  
70  
**Total**  
**365**  
**1,034**  
**0**  
**1,034**

(1)  
Six-month forecast to June 2004, actual results between June 2003 and December 2003 are reported in Section 2.





176

176

**Annexure 7**

**Table 12.6 Randfontein Tax Entity: Total Assumed TEPS**

**Financial**

**Recovered Gold**

**Total Working Costs**

**Capex**

**Total**

**Year**

**(koz)**

**(ZARm)**

**(ZARm)**

**(ZARm)**

2004

(1)

460

955

167

1,123

2005

885

1,856

332

2,188

2006

827

1,740

280

2,020

2007

893

1,716

353

2,070

2008

1,000

1,859

225

2,085

2009

1,097

2,061

129

2,190

2010

997

1,779

37

1,816

2011

1,006  
1,792  
30  
1,822  
2012  
989  
1,767  
30  
1,797  
2013  
974  
1,756  
30  
1,786  
2014  
959  
1,758  
25  
1,783  
2015  
870  
1,645  
20  
1,665  
2016  
756  
1,490  
20  
1,510  
2017  
675  
1,349  
15  
1,364  
2018  
521  
1,054  
15  
1,069  
2019  
495  
1,040  
15  
1,055  
2020  
262  
546  
10  
556  
2021  
271

572  
 0  
 572  
 2022  
 188  
 416  
 0  
 416  
 2023  
 33  
 67  
 0  
 67  
**Total**  
**14,158**  
**27,218**  
**1,734**  
**28,952**

(1)

Six-month forecast to June 2004, actual results between June 2003 and December 2003 are reported in Section 2.

**Table 12.7 Evander Tax Entity: Total Assumed TEPs**

**Financial**

**Recovered Gold**

**Total Working Costs**

**Capex**

**Total**

**Year**

**(koz)**

**(ZARm)**

**(ZARm)**

**(ZARm)**

2004

(1)

198

450

52

502

2005

386

848

78

926

2006

392

848

83

931

2007

338

742

83

825  
2008  
288  
633  
63  
696  
2009  
277  
627  
58  
685  
2010  
275  
625  
38  
663  
2011  
266  
619  
30  
649  
2012  
232  
546  
30  
576  
2013  
224  
545  
20  
565  
2014  
148  
340  
20  
360  
2015  
86  
202  
0  
202  
2016  
86  
202  
0  
202  
2017  
86  
202  
0  
202

2018

102

231

0

231

**Total**

**3,383**

**7,661**

**555**

**8,217**

(1)

Six-month forecast to June 2004, actual results between June 2003 and December 2003 are reported in Section 2.







177

177

**Annexure 7**

**Table 12.8 Orkney Tax Entity: Total Assumed TEPs**

**Financial**

**Recovered Gold**

**Total Working Costs**

**Capex**

**Total**

**Year**

**(koz)**

**(ZARm)**

**(ZARm)**

**(ZARm)**

2004

(1)

134

297

10

308

2005

230

584

13

596

2006

186

518

3

521

2007

113

362

3

365

2008

95

313

1

314

2009

32

119

1

120

2010

31

122

1

122

2011

31  
 145  
 1  
 146  
**Total**  
**852**  
**2,461**  
**33**  
**2,493**  
 (1)  
 Six-month forecast to June 2004, actual results between June 2003 and December 2003 are reported in Section 2.  
**Table 12.9 Kalgold Tax Entity**  
 (1)  
**: Total Assumed TEPs**  
**Financial**  
**Recovered Gold**  
**Total Working Costs**  
**Capex**  
**Total**  
**Year**  
**(koz)**  
**(ZARm)**  
**(ZARm)**  
**(ZARm)**  
 2004  
 (2)  
 46  
 112  
 1  
 113  
 2005  
 89  
 211  
 0  
 211  
 2006  
 81  
 196  
 0  
 196  
 2007  
 82  
 156  
 0  
 156  
 2008  
 31  
 51  
 0  
 51  
**Total**

<b>330</b>
<b>726</b>
<b>1</b>
<b>727</b>
(1)
The contribution from Kalgold is subject to a current sale agreement which may see a 100% disposal of the asset in the near future.
(2)
Six-month forecast to June 2004, actual results between June 2003 and December 2003 are reported in Section 2.
<b>Table 12.10 Mt. Magnet &amp; Cue Tax Entity: Total Assumed TEPs</b>
<b>Financial</b>
<b>Recovered Gold</b>
<b>Total Working Costs</b>
<b>Capex</b>
<b>Total</b>
<b>Year</b>
<b>(koz)</b>
<b>(ZARm)</b>
<b>(ZARm)</b>
<b>(ZARm)</b>
2004
(1)
116
43
23
66
2005
298
91
50
141
2006
302
87
43
130
2007
288
81
37
118
2008
271
74
26
100
2009
158
58
13
71

2010  
77  
32  
8  
39  
2011  
20  
18  
4  
22

**Total**  
**1,529**  
**484**  
**204**  
**688**

(1)

Six-month forecast to June 2004, actual results between June 2003 and December 2003 are reported in Section 2.

**Table 12.11 South Kalgoorlie Tax Entity: Total Assumed TEPs**

**Financial**

**Recovered Gold**

**Total Working Costs**

**Capex**

**Total**

**Year**

(koz)

(ZARm)

(ZARm)

(ZARm)

2004

(1)

62

25

10

35

2005

116

48

12

60

2006

121

52

5

56

**Total**

**298**

**125**

**26**

**151**

(1)

Six-month forecast to June 2004, actual results between June 2003 and December 2003 are reported in Section 2.







178

178

**Annexure 7**

**12.4 Avgold**

**Table 12.12 Avgold: Total Assumed TEPs**

**Financial**

**Recovered Gold**

**Total Working Costs**

**Capex**

**Total**

**Year**

**(koz)**

**(ZARm)**

**(ZARm)**

**(ZARm)**

2004

(1)

147

213

37

251

2005

326

546

61

607

2006

338

619

54

673

2007

342

608

51

659

2008

279

600

58

658

2009

296

601

36

637

2010

248

597

36

632

2011  
230  
606  
36  
642  
2012  
217  
609  
36  
645  
2013  
235  
573  
36  
609  
2014  
235  
570  
36  
605  
2015  
235  
570  
36  
605  
2016  
240  
558  
36  
594  
2017  
200  
532  
36  
567  
2018  
184  
514  
0  
514  
2019  
181  
498  
0  
498  
2020  
188  
507  
0  
507  
2021

0  
16  
0  
16  
**Total**  
**4,119**  
**9,336**  
**582**  
**9,918**

(1)  
Six-month forecast to June 2004, actual results between June 2003 and December 2003 are reported in Section 2.  
**Figure 12.1 Avgold: Projected LoM Recovered Gold**





179

179

**Annexure 7**

**Figure 12.2 Avgold: Projected LoM Tonnes Milled**

**12.5 Harmony**

**Table 12.13 Harmony: Total Assumed TEPs**

**Financial**

**Recovered Gold**

**Total Working Costs**

**Capex**

**Total**

**Year**

**(koz)**

**(ZARm)**

**(ZARm)**

**(ZARm)**

2004

2,039

4,132

484

4,616

2005

4,175

8,336

1,012

9,347

2006

4,022

7,917

693

8,610

2007

3,650

6,784

601

7,385

2008

3,598

6,423

507

6,930

2009

3,262

6,035

346

6,381

2010

3,084

5,763

185

5,948

2011  
2,864  
5,561  
197  
5,758  
2012  
2,535  
4,858  
182  
5,040  
2013  
2,346  
4,495  
152  
4,647  
2014  
2,094  
3,987  
125  
4,112  
2015  
1,786  
3,332  
50  
3,382  
2016  
1,643  
3,165  
40  
3,205  
2017  
1,532  
3,006  
35  
3,041  
2018  
1,364  
2,743  
25  
2,768  
2019  
943  
2,055  
25  
2,080  
2020  
530  
1,035  
20  
1,055  
2021

539  
1,061  
0  
1,061  
2022  
456  
905  
0  
905  
2023  
324  
620  
0  
620  
**Total**  
**42,787**  
**82,212**  
**4,680**  
**86,892**







180

180

**Annexure 7**

**Figure 12.3 Harmony: Projected LoM Recovered Gold**

The contribution from Kalgold is subject to a current sale agreement which may see a 100% disposal of the asset in the near future.

**Figure 12.4 Harmony: Projected LoM Tonnes Milled**

The contribution from Kalgold is subject to a current sale agreement which may see a 100% disposal of the asset in the near future.





181

181

**Annexure 7****12.6 Special Factors**

SRK has included its view on the achievement of the LoM plans and the appropriateness of the Mineral Reserve statements when presenting the data in Sections 4, 12 and 13. At the time of writing SRK considered these projections to be both technically and economically achievable.

In all likelihood many of the identified risks and/or opportunities will have impact on the cash flows as presented in Section 13, some positive and some negative. The impact of one or a combination of risks and opportunities occurring cannot be specifically quantified to present a meaningful assessment. SRK has however provided sensitivity tables for single and multi-parameters, which one or a collective number of risks and opportunities. In this way the general risks are, with the aid of the sensitivity tables, adequately covered.

SRK consider that the identified risks should not impact more than 10% (the effect can be seen in the sensitivity tables) however cannot realistically predict the impact of one or more accruing at the same time. Ultimately all the risks and/or opportunities translate to increases/decreases in Revenue and Costs. These parameters have been sensitised accordingly to assess on a percentage basis the impact of one or more occurring individually or collectively.

**12.6.1 General Risks and Opportunities**

The Mining Assets are subject to certain inherent risks, which apply to some degree to all participants of the gold mining industry. These include:

- changes in the market price for gold which may be influenced, *inter alia*, by demand for gold in industry and jewellery, actual or expected sales by central banks, sales by gold producers in forward transactions and production and cost levels for gold in major gold producing countries. In the three-year period between December 2001 and December 2003 the gold price has ranged between US\$260/oz and US\$414/oz;
- the relative strength of the US dollar, the currency in which gold prices are generally quoted. During the period between December 2001 and December 2003 the exchange rate has ranged between 11.68:1ZAR:US\$ and 6.54 ZAR:US\$. The range in gold price in ZAR terms has therefore fluctuated between 103,200ZAR/kg in December 2001 and 85,571ZAR/kg in December 2003. The base case gold price of ZAR91,645/kg falls between these two extremes. The range in ZAR based gold price in the last three years against the base case is within +12% and -6%; however the impact on the Companies valuation is significant, for example using the December 2003 gold price and exchange rate and assuming an exchange rate based on a simple PPP/CPI relationship between the US\$ and the ZAR going forward, would have a 30% impact in revenue translating to a material impact on valuation as indicated in sensitivity tables presented in Section 13;
  - foreign exchange fluctuations;
  - inflation rates;
  - specific country risk including political and economic stability in the long-term;
- changes to future legislation (tenure, mining activity, labour, health and safety and environmental) within South Africa and Australia;
- exploration risk including the elapsed time between discovery of gold mineralisation, development of economic feasibility studies to bankable standards and associated uncertainty of outcome;
- the inability of the Mining Assets to fund the balance of their environmental liabilities from estimated operating cash flows, should operations cease prior to the stated LoM. This would result in an outstanding liability since the estimated rehabilitation expenditure exceeds the amounts available in the respective rehabilitation trust funds as at 31 December 2003; and
- mining risks including Mineral Reserve estimate risks, uninsured risks, industrial accidents, labour disputes, unanticipated ground water conditions, human resource management, health and safety performance (including the

impact of HIV/AIDS) and, particularly for the South African Region, the management of seismicity and ground control at increased depth and increased production from remnant areas.

In contrast, whilst certain of the above reflect opportunities in addition to risk, SRK recognise that as of yet, an un-quantified opportunity is the beneficial application of new technology.

***12.6.2 Operational Specific Risks and Opportunities***

In addition to those stated above, the Mining Assets are subject to certain specific risks and opportunities, which independently may not be classified to have a material impact (i.e. likely to affect more than 10% of the Tax Entities' annual pre-tax profits), but in combination may do so. These are as follows:







182

182

**Annexure 7**

**Avgold: risks:**

-  
a degree of risk that insufficient mechanised stopes will be available to meet the planned production increase due to development and/or scheduling constraints. While SRK consider there to be no technical impediment to the achievement of the projections in the mine plan, the achievement of these projections is dependent on the close management of the operations;

-  
a degree of risk associated with the fact that all production is derived from a single integrated production section in terms of access, rock transport and ventilation, that is distant from the shaft, with the associated risk that a major access rock failure, infrastructure equipment failure or fire could impact on all production for the duration of the interruption;

-  
that the commissioning of all the refrigeration units does not lead to the maintenance of reasonable operating temperatures to compensate for increased operating distances of the workings of the future mining blocks;

-  
a degree of risk that the Target Plant will not achieve the projected throughput. Indications are that actual feed characteristics and the proportion of waste in the feed differ from design assumptions. This is likely to preclude design throughput being achieved at the design mill product grind size but allow design throughput to be achieved at a coarser mill product grind size;

-  
a degree of risk that the Target Plant will not achieve the projected recovery due to a coarser mill product grind size. Notwithstanding the coarser milled product grind size achieved to date, overall recovery has generally exceeded design expectations. This has partly been assisted by the higher than planned grades being realised but in the main shows recovery to be less sensitive to grind than originally anticipated and this trend is likely to continue; and

-  
a degree of risk that the Target Plant will not achieve the projected recovery due to low leach recovery. Indications are that lower leach recoveries observed to date are due to the presence of a mild reversible preg robber in the ore. Overall recovery has however, consistently exceeded the projection of approximately 97% and this is likely to continue, with a slight drop off as the head grade reduces towards the end of the mine life.

**Harmony: risks:**

-  
a degree of risk associated with non-achievement of production targets as compared to historical performance. Broadly the impact of non-achievement can be assessed by consideration of the valuation sensitivity tables as presented in Section 13. In this instance SRK consider that the -10% reduction in revenue (production) and the +5% increase in operating expenditures reflects this risk;

-  
a degree of risk associated with the timely completion of the sub-66L project, the Phakisa project and the installation of hoisting facilities at Joel North BU. Should these not materialise they will result in a reduction in life and reduced flexibility at Tshepong BU; a delay in cash flow from Phakisa BU and increased operating costs at Joel BU due to continued use of the triple decline system and Joel South BU for ore transportation;

-  
a degree of risk associated with seismic activity, specifically with respect to remnant mining operations and shaft pillar extraction programmes, specifically at West Wits Operations and Orkney Operations;

-  
a degree of risk associated with underground fires at Bambanani BU and Welkom Operations. Should this materialise it is likely to have a direct impact on production;

-

a degree of risk associated with the presence of illegal miners in the Free State Goldfield, which may increase the likelihood of underground fires; and

-

a degree of risk associated with the various agreements between Harmony and VRO. The various agreements incorporate arrangements for toll processing, shared services and rights of access.

**Avgold: opportunities:**

-

an opportunity to optimise the LoM plan by further improvements to the mine design resulting in lower costs into the cut-off grade. Increased economic Mineral Resources would then translate into increased Mineral Reserves;

-

an opportunity to increase the production contribution from open stoping methods in place of drift and fill mining, resulting realising lower unit costs;

-

an opportunity to separate the level of waste hoisted with the ore currently resulting which currently has a negative impact on the head grade;





183

183

## Annexure 7

- 
- an opportunity to improve productivities, efficiencies and unit costs associated with a change in management focus as the mine transforms from the construction stage to steady state optimised production; and
- an opportunity to rationalise overhead costs should the proposed transaction take place.

### Harmony: opportunities:

- 
- the opportunity to increase Mineral Reserves through: re-classification of portions of the Inferred Mineral Resources (which SRK currently consider to be conservatively based) as Indicated Mineral Resources and consequently Probable Mineral Reserves; future conversion of those Mineral Resources classified by the suffix in the SRK statements; future increase in extraction of certain Mineral Resources classified by the suffix , specifically where low extraction ratios are currently planned;

(2)

(1)

- 
- the opportunity to improve the returns on certain projects, namely Rolspruit through further technical assessments;
- the opportunity to establish the benefits of CONOPS across the Mining Assets;
- the opportunity to out-source certain marginal operations to low-cost contractors;

- 
- the opportunity to rationalise utilisation of process facilities at the operations in the Free State Gold Field; and

- 
- the opportunity to rationalise other services across the BUs should the proposed merger be approved.

## 13. MINING ASSETS VALUATION

### 13.1 Introduction

The following section presents discussion and comment on the valuation of the Tax Entities. Specifically, comment is included on the methodology used to generate the TEMs and to establish the Base Cases including basis of valuation, valuation techniques and valuation results.

In complying with Section 12.14 of the JSE Listings Requirements, specifically the non-technical requirements of 12.14(b), SRK has relied upon the Companies and their respective Financial Advisors for certain inputs to the TEMs. These inputs are duly acknowledged by SRK. Further in reproducing the results of the TEMs in this CPR, SRK provides assurances to the Directors of the Companies, that the technical-economic inputs: Sections 12.14(b)(i, ii, iii, v, vi and vii) including operating costs, capital expenditure and saleable product profiles of the Tax Entities, as provided to and reviewed by SRK, are accurately incorporated into the TEMs. SRK also duly acknowledge the Companies and their Financial Advisors' opinion that the remaining inputs to the TEMs required in compliance with Section 12.14(b)(iv, viii, ix, x, xi, xii, xiii, xiv, xvi, xv, xvi, xvii and xviii) are accurately reflected in the TEMs.

### 13.2 Basis of Valuation of the Mining Assets

In generating the TEM's and deriving the Base Case valuations, SRK has:

- incorporated certain macro-economic parameters (Table 1.1) as provided by the Financial Advisors;
- incorporated the gold price forecasts (Table 1.1) as provided by the Financial Advisors;

-

determined a Base Case nominal WACC based discount factor of 12.0%, as provided by the Financial Advisors, which has been uniformly applied;

-

relied upon the Companies and their Financial Advisors for all accounting inputs as required for the generation of the TEMs;

-

relied upon the Companies and their respective Financial Advisors, that the calculation of nominal cash flows is in accordance with the fiscal regime within which the Tax Entity operates and are accurately reflected in the TEMs;

-  
excluded any potential new order mineral royalties which may be applied to the Mining Assets located in South Africa. At the time when this CPR was generated, no formal agreement and/or notification has been put in place with regard to when or if mining companies will be subjected to this revenue based royalty and if so what percentage is may be;







184

184

**Annexure 7**

-

reported a discounted cash flow ("DCF") valuation, dated 1 January 2004 for the Base Case LoM plans, which include Mineral Resources and other material not derived from Mineral Reserves. For comparative and compliance purposes only, SRK also report NPV's which on a simplistic basis, represent cash flows based on Mineral Reserves alone; and

-

performed sensitivity analyses to ascertain the impact of discount factors, commodity prices, total working costs and capital expenditures.

**13.3 Limitations and Reliance on Information**

The cash flows reported for the Tax Entities are contingent upon the current and anticipated performance of mine management, as well as the expected achievement of the operating parameters as provided to and reviewed by SRK and set out in this CPR.

SRK has relied upon the Companies that such projections and forecasts as indicated, will be realised in the amounts and time periods contemplated.

The cash flow projections and valuation is based upon the anticipated operating performance as well as information provided to SRK by the Companies and their respective Financial Advisors at the date hereof. It should be understood that unforeseen developments might affect our opinion, or the reasonableness of any assumptions or basis used.

The LoM plans and the TEMs include forward-looking statements that are not historical facts. These forward-looking statements are necessarily estimates and involve a number of risks and uncertainties that could cause actual results to differ materially.

Notwithstanding the aforementioned comments, SRK consider that at the time of compilation, the Mineral Reserves and associated depletion resulting in cash flow projections are appropriate and technically and economically achievable, however it must be noted that SRK do consider that a certain amount of upside potential is already built into the projections that fundamentally rely on the existing management performance to implement and sustain recent initiatives to ensure that the projected cash flows are realised within the anticipated timeframe.

**13.4 Valuation Methodology**

In generating the TEMs SRK has been provided with financial input parameters from the Companies as presented in Table 13.1 and Table 13.2. SRK has placed reliance on the Companies financial representatives as identified in Section 1.6.1.

**Table 13.1 Assessed Losses and Unredeemed Capital as at 31 December 2003****Tax Entity**

AL

UC

**"a" Factor****"b" Factor****Tax****Non-****(ZARm)****(ZARm)****Threshold****Mining Tax**

Target

0

3,652

37

185

5

38%

Free Gold

0  
334  
46  
230  
5  
38%  
Joel  
128  
756  
46  
230  
5  
38%  
Harmony Free State  
2  
0  
37  
185  
5  
30%  
Welkom  
2  
2  
46  
230  
5  
38%  
Randfontein  
4  
15  
46  
230  
5  
38%  
Evander  
0  
15  
0  
0  
0  
38%  
Orkney  
0  
0  
46  
230  
5  
38%  
Kalgold  
10  
250

46

230

5

38%

Mt. Magnet & Cue

12

12

na

na

na

na

South Kalgoorlie

23

53

na

na

na

na





185

185

**Annexure 7**

**Table 13.2 Working Capital Opening Balances as at 31 December 2003**

**Tax Entity**

**Debtors**

**Creditors**

**Stores**

**(ZARm)**

**(ZARm)**

**(ZARm)**

Target

34

-65

26

Free Gold

101

234

0

Joel

6

18

0

Harmony Free State

169

-540

157

Welkom

42

-39

0

Randfontein

70

-150

1

Evander

28

-64

2

Orkney

154

-113

5

Kalgold

7

-3

0

Mt. Magnet & Cue

12

-64

18

South Kalgoorlie

6

-35

12

In generating the TEMs SRK note the following:

- the TEMs are used solely for the valuation of the Tax Entities;
- TEMs include:

.  
the saleable product projections of the Tax Entities; and

.  
the total working costs stated in 1 January 2004 money terms, as defined in Section 12 and including direct mining costs, direct processing costs, direct general and administration costs, consulting fees, management fees, distribution and transportation costs, non-production related sundry income; royalties, terminal separation benefits, reclamation and mine closure costs (the net difference of the total environmental liability and the current trust fund provision);

- the total capital costs stated in 1 January 2004 money terms;
- no salvage value has been included for plant and equipment on cessation of operations;
- the macro-economic parameters as stated in Table 1.1 and their use for generation of post-tax pre-finance cash flows;

- the calculation of taxation liabilities is based on the fiscal structure under which the Mining Assets operate.

In this respect the Mining Assets are classified as Tax Entities (Target Tax Entity, Free Gold Tax Entity, Joel Tax Entity, Harmony Free State Tax Entity, Welkom Tax Entity, Randfontein Tax Entity, Evander Tax Entity, Orkney Tax Entity, Kalgold Tax Entity, Mt. Magnet & Cue Tax Entity and South Kalgoorlie Tax Entity). In South Africa mining companies are taxed in accordance with the definitions of mining and non-mining income. Consequently, the non-mining income of the Mining Assets is taxed at a rate of 38%. The South African mining tax rate formula is expressed as:  $y=a-(b/x)$ , where "y" represents the rate of mining tax and "x" is expressed as a percentage of the ratio between taxable income and taxable revenue from gold mining. The a and b factors for each Tax Entity are presented in Table 13.1;

- the valuation of the Tax Entities has been undertaken on an un-g geared basis and excludes deferred tax payments;

-  
the valuations of the Tax Entities exclude South African mineral royalties; which have not yet been formalised in terms of when and if operations located in South Africa will be liable and what percentage of the net revenue will be payable should the royalties become policy. The materiality of implementing revenue based royalties can be assessed by viewing the sensitivity tables provided in this Section where a percentage decrease between 0% and -5% on the revenue line indicates the impact on NPV. Note this risk is only applicable to the Mining Assets located in South Africa;

- the valuation of the Tax Entities is on a stand alone basis and no STC has been incorporated into the projections;

-  
the valuation of the Tax Entities does not equate to the valuation of Avgold and Harmony, the Companies.

Notwithstanding this aspect, the Companies have provided SRK with certain data, which in addition to the valuation of the Tax Entities, represent equity-based valuations of the Companies. These items include:

.  
the net cash position of the individual companies at 31 December 2003;

.  
the attributable valuation by assessment of market capitalisation of the various interests in listed companies; and







186

186

**Annexure 7**

.  
the unallocated head office annual operating expenditures as incurred by the Companies are ZAR0m per annum for Avgold and ZAR103m per annum for Harmony. These amounts are projected in constant amounts for ten years and presented at a nominal discount factor of 12.0%;

- the monthly operating care and maintenance cost for Bisset Mine amounts to ZAR230k per month. This has been included on the same basis as the unallocated head office expenditures;

-  
the selection of a nominal Weighted Average Cost of Capital ("WACC") based discount factor of 12.0%. A range of discount factors is, however provided in each of the valuation tables. The base case WACC has been provided to SRK by the Companies Financial Advisors as identified in Section 1. The WACC has been calculated taking into account the Companies average tax rate; RSA inflation rate and debt/capital ratio. The after tax cost of debt and the cost of equity multiplied by the debt/capital ratio results in an appropriate WACC for the Companies;

-  
results of a sensitivity analysis on the main operating parameters including revenue, operating costs and capital expenditure;

- no hedging or forward sale components has been included in the valuation; and

-  
the statement that, at 31 December 2003, there were 680.1 million shares in issue for Avgold and 258.3 million shares in issue for Harmony. This information was provided by the Companies and relates to the shares in issues reported in the Companies quarterly results to 31 December 2003.

**13.5 Post-Tax Pre-Finance Cash flows**

Table 13.3 through Table 13.15 inclusive; present the un-gearred nominal cash flows for Target Tax Entity, Free Gold Tax Entity, Joel Tax Entity, Harmony Free State Tax Entity, Welkom Tax Entity, Randfontein Tax Entity, Evander Tax Entity, Orkney Tax Entity, Kalgold Tax Entity, Mt. Magnet & Cue Tax Entity and South Kalgoorlie Tax Entity in financial years. Note that these tables are not representative of financial statements as may be customary for determining the consolidated cash flow positions for Avgold and Harmony. Further, no account is taken of movements in working capital at the company level, or deferrals of tax liabilities between accounting periods, as may be the case in the generation of such financial statements.

The first period 2004 reports the forecast six-month projections to between January and June 2004, thereafter the projections are annual YE June. Actual results for the first six-month period of 2004 are reported in Section 2. The Tax Entity valuations are derived from the reported cash flows commencing 1 January 2004.





187

**Table 13.3 Target Tax Entity: TEM in ZAR (nominal terms)**

**Annexure 7**

**Financial Year**

**Units**

**Totals**

**2004**

**(1)**

**2005**

**2006**

**2007**

**2008**

**2009**

**2010**

**2011**

**2012**

**2013**

**2014**

**2015**

**2016**

**2017**

**2018**

**2019**

**2020**

**2021**

**2022**

**2023**

**Project Year**

**/Averages**

**1**

**2**

**3**

**4**

**5**

**6**

**7**

**8**

**9**

**10**

**11**

**12**

**13**

**14**

**15**

**16**

**17**

**18**

**19**

**20**

**Production**

**Mining**

**RoM Tonnage**

(kt)

19,944

528

1,257

1,298

1,404

1,404

1,404

1,404

1,404

1,404

1,122

1,122

1,122

1,083

1,045

1,006

968

968

**Head Grade**

(g/t)

6.6

8.9

8.3

8.4

8.5

7.0

7.4

6.2

5.7

5.4

5.7

5.7

5.7

5.9

5.9

5.9

6.0

6.0

**Contained Gold**

(koz)

4,242

151

336

351

384

314

333

280

259

245  
207  
207  
207  
204  
199  
190  
187  
187  
**Processing**  
**Feed Tonnage**  
**(kt)**  
19,944  
528  
1,257  
1,285  
1,285  
1,285  
1,285  
1,285  
1,285  
1,285  
1,285  
1,285  
1,285  
1,285  
1,285  
1,285  
1,080  
1,006  
968  
968  
**Feed Grade**  
**(g/t)**  
6.6  
8.9  
8.3  
8.4  
8.5  
7.0  
7.4  
6.2  
5.7  
5.4  
5.9  
5.9  
5.9  
6.0  
6.0  
5.9  
6.0  
6.0  
**Feed Metal**



**(koz)**

**4,242**

151

336

348

351

287

304

257

237

225

243

243

243

248

207

190

187

187

**Metallurgical Recovery**

**(%)**

**97%**

97%

97%

97%

97%

97%

97%

97%

97%

97%

97%

97%

97%

97%

97%

97%

97%

97%

**Recovered Gold**

**(koz)**

**4,112**

147

326

338

342

279

296

248

230

217

235  
235  
235  
240  
200  
184  
181  
181  
**Clean-up Gold**  
**(koz)**  
7  
7  
**Saleable Metal**  
**(koz)**  
**4,119**  
147  
326  
338  
342  
279  
296  
248  
230  
217  
235  
235  
235  
240  
200  
184  
181  
188  
**Sales**  
**Gold**  
**(koz)**  
**4,119**  
**147**  
**326**  
**338**  
**342**  
**279**  
**296**  
**248**  
**230**  
**217**  
**235**  
**235**  
**235**  
**240**  
**200**  
**184**

181

188

**Commodity Prices**

**Gold Price**

**(US\$/oz)**

366

386

390

394

398

402

406

410

414

418

422

426

431

435

439

444

448

453

**(ZAR/kg)**

91,659

111,797

125,823

134,929

143,309

145,259

151,796

158,626

165,765

173,224

181,019

189,165

197,677

206,573

215,869

225,583

235,734

246,342

**Macro-economics**

**Exchange Rates**

**(US\$:ZAR)**

7.8

9.0

10.0

10.7

11.2

11.3

11.6  
12.0  
12.5  
12.9  
13.3  
13.8  
14.3  
14.8  
15.3  
15.8  
16.4  
16.9  
**(US\$:AUS\$)**  
1.3  
1.3  
1.3  
1.3  
1.3  
1.3  
1.4  
1.4  
1.4  
1.4  
1.4  
1.4  
1.5  
1.5  
1.5  
1.5  
1.5  
1.6  
1.6  
**(ZAR:AUS\$)**  
5.9  
6.8  
7.5  
7.9  
8.4  
8.4  
8.6  
8.7  
8.9  
9.1  
9.3  
9.5  
9.7  
9.9  
10.1  
10.3  
10.5  
10.7  
**RSA CPI**

(%)

2.55%

4.10%

4.77%

4.50%

4.50%

4.50%

4.50%

4.50%

4.50%

4.50%

4.50%

4.50%

4.50%

4.50%

4.50%

4.50%

4.50%

4.50%

**USA CPI**

(%)

1.38%

1.03%

1.00%

1.00%

1.00%

1.00%

1.00%

1.00%

1.00%

1.00%

1.00%

1.00%

1.00%

1.00%

1.00%

1.00%

1.00%

1.00%

**AUS CPI**

(%)

2.40%

2.40%

2.40%

2.40%

2.40%

2.40%

2.40%

2.40%

2.40%

2.40%

2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%

**Financial - Nominal**

**Sales Revenue**

(ZAR'm)

**20,919**

**420**

**1,135**

**1,323**

**1,435**

**1,243**

**1,335**

**1,173**

**1,132**

**1,118**

**1,264**

**1,321**

**1,381**

**1,475**

**1,286**

**1,232**

**1,267**

**1,377**

**Total Working Costs**

(ZAR'm)

**-13,576**

**-267**

**-586**

**-687**

**-699**

**-702**

**-754**

**-765**

**-820**

**-863**

**-859**

**-886**

**-926**

**-950**

**-928**

**-947**

**-963**

**-1,029**

**55**

**Mining**

**(ZAR'm)**

-9,320

-147

-385

-481

-485

-504

-523

-546

-581

-611

-579

-605

-633

-640

-643

-644

-643

-671

**Processing**

**(ZAR'm)**

-1,744

-28

-77

-83

-87

-91

-95

-99

-104

-108

-114

-119

-125

-130

-119

-119

-121

-126

**Overheads**

**(ZAR'm)**

-2,468

-42

-106

-112

-117

-122

-127

-133

-139

-145

-152  
-159  
-166  
-173  
-181  
-189  
-198  
-207

**Environmental**

**(ZAR'm)**

-19  
-2  
-2  
-2  
-2  
-2  
-3  
-3  
-3

**Terminal Separation Benefits**

**(ZAR'm)**

-20  
-20

**Net Change in Working Capital**

**(ZAR'm)**

-5  
-50  
-16  
-9  
-8  
18  
-6  
15  
6  
4  
-13  
-3  
-3  
-6  
15  
5  
-2  
-5  
55

**Operating Profit**

**(ZAR'm)**

**7,343**  
**153**  
**549**  
**636**  
**735**



541  
582  
408  
312  
255  
406  
435  
455  
525  
358  
286  
304  
349  
55

**Tax Deductible Allowances**

(ZAR'm)

-4,418  
-153  
-549  
-636  
-735  
-541  
-582  
-408  
-312  
-212  
-53  
-55  
-58  
-60  
-63

**Tax Liability**

(ZAR'm)

-850  
-107  
-116  
-121  
-145  
-85  
-83  
-89  
-103

**Capital Expenditure**

(ZAR'm)

-766  
-37  
-64  
-59  
-58  
-69  
-44

-46  
-48  
-51  
-53  
-55  
-58  
-60  
-63  
**Final Net Free Cash**  
**(ZAR'm)**  
5,727  
116  
485  
577  
677  
472  
537  
362  
264  
205  
246  
264  
276  
320  
210  
203  
215  
245  
55  
**Statistics - Nominal**  
**Cash Operating Costs**  
**(ZAR/kg)**  
105,624  
47,468  
55,907  
64,204  
64,767  
82,692  
81,049  
100,629  
115,329  
128,064  
115,816  
121,027  
126,474  
126,505  
151,558  
166,701  
171,027  
171,876  
**Total Cash Costs**

(ZAR/kg)

105,624

47,468

55,907

64,204

64,767

82,692

81,049

100,629

115,329

128,064

115,816

121,027

126,474

126,505

151,558

166,701

171,027

171,876

**Total Working Costs**

(ZAR/kg)

105,970

58,279

57,733

65,311

65,771

80,939

81,992

98,998

114,878

127,954

117,645

121,374

126,835

127,357

149,092

165,839

171,443

176,079

**Total Costs**

(ZAR/kg)

111,949

66,449

64,016

70,905

71,252

88,876

86,814

104,992

121,660

135,452

**124,888**  
**128,943**  
**134,745**  
**135,444**  
**159,218**  
**165,839**  
**171,443**  
**176,079**

(1)

Six-month forecast to June 2004, actual results between July 2003 and December 2003 are reported in Section 2.





188

**Table**

**13.4**

**Free Gold Tax Entity: TEM in ZAR (nominal terms)**

**Annexure 7**

**Financial Year**

**Units**

**Totals**

**2004**

**(1)**

**2005**

**2006**

**2007**

**2008**

**2009**

**2010**

**2011**

**2012**

**2013**

**2014**

**2015**

**2016**

**2017**

**2018**

**2019**

**2020**

**2021**

**2022**

**2023**

**Project Year**

**/Averages**

**1**

**2**

**3**

**4**

**5**

**6**

**7**

**8**

**9**

**10**

**11**

**12**

**13**

**14**

**15**

**16**

**17**

**18**

**19**

**20**

**Production**

**Mining**

**RoM Tonnage**

(kt)

74,240

4,344

8,747

7,968

8,180

4,698

4,735

4,758

4,051

3,445

3,418

3,051

2,539

2,539

2,537

2,503

2,088

1,160

1,160

1,160

1,160

**Head Grade**

(g/t)

6.4

4.5

4.8

5.1

4.8

7.6

7.3

7.3

7.4

6.9

6.8

7.2

8.3

8.0

7.7

7.3

6.9

7.4

7.4

7.4

7.4

**Contained Gold**

(koz)

15,228



628  
1,351  
1,298  
1,259  
1,154  
1,115  
1,121  
963  
761  
752  
707  
676  
656  
631  
587  
464  
276  
276  
276  
276  
**Processing  
Feed Tonnage  
(kt)**  
74,240  
4,344  
8,747  
7,968  
8,180  
4,698  
4,735  
4,758  
4,051  
3,445  
3,418  
3,051  
2,539  
2,539  
2,537  
2,503  
2,088  
1,160  
1,160  
1,160  
1,160  
**Feed Grade  
(g/t)**  
6.4  
4.5  
4.8  
5.1  
4.8

7.6  
7.3  
7.3  
7.4  
6.9  
6.8  
7.2  
8.3  
8.0  
7.7  
7.3  
6.9  
7.4  
7.4  
7.4  
7.4

**Feed Metal**

**(koz)**

**15,228**

628  
1,351  
1,298  
1,259  
1,154  
1,115  
1,121  
963  
761  
752  
707  
676  
656  
631  
587  
464  
276  
276  
276  
276

**Metallurgical Recovery**

**(%)**

**96%**  
94%  
95%  
96%  
96%  
97%  
97%  
97%  
97%

97%  
97%  
97%  
97%  
97%  
97%  
97%  
97%  
97%  
97%  
97%  
97%

**Recovered Gold**

**(koz)**

**14,690**

590

1,281

1,245

1,210

1,120

1,081

1,087

934

736

728

685

657

637

612

568

449

268

268

268

268

**Clean-up Gold**

**(koz)**

**101**

4

73

23

**Saleable Metal**

**(koz)**

**14,791**

590

1,281

1,245

1,214

1,193

1,081

1,087

934

736  
728  
685  
657  
637  
612  
568  
449  
268  
268  
268  
291  
**Sales**  
**Gold**  
**(koz)**  
**14,791**  
**590**  
**1,281**  
**1,245**  
**1,214**  
**1,193**  
**1,081**  
**1,087**  
**934**  
**736**  
**728**  
**685**  
**657**  
**637**  
**612**  
**568**  
**449**  
**268**  
**268**  
**268**  
**291**  
**Commodity Prices**  
**Gold Price**  
**(US\$/oz)**  
366  
386  
390  
394  
398  
402  
406  
410  
414  
418  
422  
426

431  
435  
439  
444  
448  
453  
457  
462  
**(ZAR/kg)**

91,659  
111,797  
125,823  
134,929  
143,309  
145,259  
151,796  
158,626  
165,765  
173,224  
181,019  
189,165  
197,677  
206,573  
215,869  
225,583  
235,734  
246,342  
257,427  
269,011

**Macro-economics**

**Exchange Rates**

**(US\$:ZAR)**

7.8  
9.0  
10.0  
10.7  
11.2  
11.3  
11.6  
12.0  
12.5  
12.9  
13.3  
13.8  
14.3  
14.8  
15.3  
15.8  
16.4  
16.9  
17.5

18.1  
**(US\$:AUS\$)**

1.3  
1.3  
1.3  
1.3  
1.3  
1.3  
1.4  
1.4  
1.4  
1.4  
1.4  
1.5  
1.5  
1.5  
1.5  
1.6  
1.6  
1.6  
1.6

**(ZAR:AUS\$)**

5.9  
6.8  
7.5  
7.9  
8.4  
8.4  
8.6  
8.7  
8.9  
9.1  
9.3  
9.5  
9.7  
9.9  
10.1  
10.3  
10.5  
10.7  
10.9  
11.1

**RSA CPI**

(%)  
2.55%  
4.10%  
4.77%  
4.50%  
4.50%  
4.50%

4.50%  
4.50%  
4.50%  
4.50%  
4.50%  
4.50%  
4.50%  
4.50%  
4.50%  
4.50%  
4.50%  
4.50%  
4.50%

**USA CPI**

(%)  
1.38%  
1.03%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%

**AUS CPI**

(%)  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%

2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%

**Financial - Nominal**

**Sales Revenue**

(ZAR'm)

74,891  
1,682  
4,453  
4,871  
5,096  
5,320  
4,883  
5,132  
4,608  
3,796  
3,922  
3,857  
3,863  
3,915  
3,933  
3,817  
3,150  
1,964  
2,052  
2,144  
2,434

**Total Working Costs**

(ZAR'm)

-36,537  
-993  
-2,742  
-2,636  
-2,382  
-2,177  
-2,153  
-2,348  
-2,132  
-1,669  
-1,789  
-1,798  
-1,776  
-1,846  
-1,906  
-1,926  
-1,905  
-953



**-1,036**

**-1,083**

**-1,284**

**Mining**

**(ZAR'm)**

**-29,914**

-945

-2,121

-2,025

-1,872

-1,819

-1,869

-1,963

-1,789

-1,427

-1,479

-1,490

-1,476

-1,531

-1,571

-1,583

-1,580

-780

-816

-852

-924

**Processing**

**(ZAR'm)**

**-2,700**

-115

-240

-234

-224

-124

-130

-136

-128

-116

-121

-118

-111

-116

-121

-126

-120

-98

-102

-107

-112

**Overheads**

**(ZAR'm)**

**-3,589**

-144

-302

-313

-184

-195

-186

-195

-202

-155

-161

-168

-175

-183

-191

-200

-208

-98

-103

-108

-117

**Environmental**

**(ZAR'm)**

**-164**

-3

-6

-6

-6

-6

-7

-7

-7

-8

-8

-8

-9

-9

-9

-10

-10

-11

-11

-12

-12

**Terminal Separation Benefits**

**(ZAR'm)**

**-388**

-20

-62

-1

-37

-38  
-14  
-20  
-3  
-7  
-15  
-19  
-43  
-110

**Net Change in Working Capital  
(ZAR'm)**

**219**  
214  
-73  
-39  
-34  
-32  
38  
-10  
32  
37  
-6  
7  
-3  
1  
2  
12  
57  
34  
-4  
-5  
-9

**Operating Profit  
(ZAR'm)**

**38,354**  
**689**  
1,711  
2,235  
2,713  
3,143  
2,729  
2,784  
2,476  
2,128  
2,133  
2,059  
2,087  
2,069  
2,026  
1,891  
1,244

1,010

1,016

1,061

1,151

**Tax Deductible Allowances**

(ZAR'm)

-1,987

-190

-480

-218

-80

-167

-124

-78

-136

-142

-119

-93

-32

-34

-35

-18

-19

-20

**Tax Liability**

(ZAR'm)

-14,853

-37

-463

-816

-1,094

-1,247

-1,086

-1,127

-970

-826

-836

-816

-856

-846

-825

-773

-491

-410

-420

-439

-473

**Capital Expenditure**

(ZAR'm)

-1,987

-190

-480  
-218  
-80  
-167  
-124  
-78  
-136  
-142  
-119  
-93  
-32  
-34  
-35  
-18  
-19  
-20  
**Final Net Free Cash**  
**(ZAR'm)**  
21,515  
462  
767  
1,201  
1,539  
1,730  
1,519  
1,579  
1,369  
1,160  
1,178  
1,151  
1,198  
1,189  
1,166  
1,099  
734  
580  
596  
623  
678  
**Statistics - Nominal**  
**Cash Operating Costs**  
**(ZAR/kg)**  
78,694  
65,648  
66,868  
66,437  
60,391  
57,582  
65,000  
67,858  
72,958

74,152

77,806

83,358

86,286

92,436

98,968

107,980

136,706

117,252

122,528

128,042

127,259

**Total Cash Costs**

**(ZAR/kg)**

78,694

65,648

66,868

66,437

60,391

57,582

65,000

67,858

72,958

74,152

77,806

83,358

86,286

92,436

98,968

107,980

136,706

117,252

122,528

128,042

127,259

**Total Working Costs**

**(ZAR/kg)**

79,419

54,135

68,850

68,099

63,084

58,639

64,065

69,455

73,403

72,863

79,020

84,371

86,976

93,195

100,132  
108,937  
136,473  
114,466  
124,419  
129,995  
141,831  
Total Costs  
(ZAR/kg)  
83,738  
64,485  
80,912  
73,734  
65,197  
63,131  
67,768  
71,763  
78,082  
79,065  
84,265  
88,738  
88,564  
94,906  
101,991  
109,984  
137,858  
116,891  
124,419  
129,995  
141,831

(1)

Six-month forecast to June 2004, actual results between July 2003 and December 2003 are reported in Section 2.







189

**Table 13.5 Joel Tax Entity: TEM in ZAR (nominal terms)**

**Annexure 7**

**Financial Year**

**Units**

**Totals/**

**2004**

**(1)**

**2005**

**2006**

**2007**

**2008**

**2009**

**2010**

**2011**

**2012**

**2013**

**2014**

**2015**

**2016**

**2017**

**2018**

**2019**

**2020**

**2021**

**2022**

**2023**

**Project Year**

**Averages**

**1**

**2**

**3**

**4**

**5**

**6**

**7**

**8**

**9**

**10**

**11**

**12**

**13**

**14**

**15**

**16**

**17**

**18**

**19**

**20**

**Production**

**Mining**

**RoM Tonnage**

(kt)

5,257

429

858

663

477

470

459

457

457

445

411

131

**Head Grade**

(g/t)

4.7

3.1

3.1

3.9

5.4

5.5

5.5

5.5

5.5

5.5

5.4

5.2

**Contained Gold**

(koz)

788

42

85

82

84

82

81

80

80

78

72

22

**Processing**

**Feed Tonnage**

(kt)

5,257

429

858

663

477

470

459  
457  
457  
445  
411  
131

**Feed Grade**

**(g/t)**

**4.7**  
3.1  
3.1  
3.9  
5.4  
5.5  
5.5  
5.5  
5.5  
5.4  
5.2

**Feed Metal**

**(koz)**

**788**  
42  
85  
82  
84  
82  
81  
80  
80  
78  
72  
22

**Metallurgical Recovery**

**(%)**

**95%**  
94%  
94%  
95%  
95%  
95%  
95%  
95%  
95%  
95%  
95%  
95%  
95%

**Recovered Gold**

**(koz)**

**748**

40  
80  
78  
80  
79  
77  
76  
76  
74  
69  
21

**Clean-up Gold**

**(koz)**

**2**

2

**Saleable Metal**

**(koz)**

**751**

40

80

78

80

79

77

76

76

74

69

23

**Sales**

**Gold**

**(koz)**

**751**

**40**

**80**

**78**

**80**

**79**

**77**

**76**

**76**

**74**

**69**

**23**

**Commodity Prices**

**Gold Price**

**(US\$/oz)**

366

386

390

394

398  
402  
406  
410  
414  
418  
422  
426

**(ZAR/kg)**

91,659  
111,797  
125,823  
134,929  
143,309  
145,259  
151,796  
158,626  
165,765  
173,224  
181,019  
189,165

**Macro-economics**

**Exchange Rates**

**(US\$:ZAR)**

7.8  
9.0  
10.0  
10.7  
11.2  
11.3  
11.6  
12.0  
12.5  
12.9  
13.3  
13.8

**(US\$:AUS\$)**

1.3  
1.3  
1.3  
1.3  
1.3  
1.3  
1.4  
1.4  
1.4  
1.4  
1.4  
1.5

**(ZAR:AUS\$)**

5.9

6.8  
7.5  
7.9  
8.4  
8.4  
8.6  
8.7  
8.9  
9.1  
9.3  
9.5

**RSA CPI**

(%)

2.55%  
4.10%  
4.77%  
4.50%  
4.50%  
4.50%  
4.50%  
4.50%  
4.50%  
4.50%  
4.50%  
4.50%  
4.50%

**USA CPI**

(%)

1.38%  
1.03%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%

**AUS CPI**

(%)

2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%

2.40%

2.40%

**Financial - Nominal**

**Sales Revenue**

(ZAR'm)

3,346

113

278

304

334

350

347

361

377

384

369

130

**Total Working Costs**

(ZAR'm)

-2,193

-83

-201

-200

-205

-208

-214

-223

-233

-242

-258

-129

1

**Mining**

(ZAR'm)

-1,482

-66

-124

-126

-143

-145

-148

-155

-162

-168

-172

-74

**Processing**

(ZAR'm)

-473

-21

-44



-42  
-40  
-42  
-44  
-46  
-48  
-50  
-51  
-46

**Overheads**

**(ZAR'm)**

**-236**

-15  
-29  
-30  
-19  
-20  
-20  
-21  
-22  
-23  
-24  
-13

**Environmental**

**(ZAR'm)**

**Terminal Separation Benefits**

**(ZAR'm)**

**-26**

-2  
0  
-1  
-2  
-13  
-9

**Net Change in Working Capital**

**(ZAR'm)**

**24**

18  
-5  
-2  
-2  
-1  
1  
-1  
-1  
0  
2  
12  
1

**Operating Profit**

**(ZAR'm)**

1,153  
30  
77  
104  
129  
142  
133  
138  
144  
142  
112  
1  
1  
**Tax Deductible Allowances**  
(ZAR'm)  
-118  
-31  
-38  
-11  
-12  
-12  
-13  
**Tax Liability**  
(ZAR'm)  
-305  
-52  
-47  
-49  
-57  
-56  
-43  
**Capital Expenditure**  
(ZAR'm)  
-118  
-31  
-38  
-11  
-12  
-12  
-13  
**Final Net Free Cash**  
(ZAR'm)  
730  
30  
45  
66  
118  
78  
73  
76  
86

85

69

1

1

**Statistics - Nominal**

**Cash Operating Costs**

**(ZAR/kg)**

93,813

82,254

79,055

81,940

81,743

84,652

89,063

93,389

97,593

103,979

115,817

183,926

**Total Cash Costs**

**(ZAR/kg)**

93,813

82,254

79,055

81,940

81,743

84,652

89,063

93,389

97,593

103,979

115,817

183,926

**Total Working Costs**

**(ZAR/kg)**

93,897

67,279

80,935

82,792

82,631

85,060

89,599

93,692

98,088

104,586

120,815

179,408

**Total Costs**

**(ZAR/kg)**

98,956

67,279

**93,503**

**98,581**

**87,235**

**89,938**

**94,816**

**99,168**

**98,088**

**104,586**

**120,815**

**179,408**

(1)

Six-month forecast to June 2004, actual results between July 2003 and December 2003 are reported in Section 2.





190

**Table 13.6 Harmony Free State Tax Entity: TEM in ZAR (nominal terms)**

**Annexure 7**

**Financial Year**

**Units**

**Totals/**

**2004**

**(1)**

**2005**

**2006**

**2007**

**2008**

**2009**

**2010**

**2011**

**2012**

**2013**

**2014**

**2015**

**2016**

**2017**

**2018**

**2019**

**2020**

**2021**

**2022**

**2023**

**Project Year**

**Averages**

**1**

**2**

**3**

**4**

**5**

**6**

**7**

**8**

**9**

**10**

**11**

**12**

**13**

**14**

**15**

**16**

**17**

**18**

**19**

**20**

**Production**

**Mining**

**RoM Tonnage**

(kt)

63,018

3,743

6,926

6,659

6,367

6,366

6,406

6,409

5,701

4,662

2,474

2,474

1,680

1,206

973

973

**Head Grade**

(g/t)

3.3

3.1

3.3

3.5

3.2

3.2

2.7

2.7

2.9

3.5

4.7

3.6

3.4

4.4

5.3

5.3

**Contained Gold**

(koz)

6,684

368

746

742

657

655

552

551

539

527

370

289

182



172

167

167

**Processing**

**Feed Tonnage**

**(kt)**

**63,018**

3,743

6,926

6,659

6,367

6,366

6,406

6,409

5,701

4,662

2,474

2,474

1,680

1,206

973

973

**Feed Grade**

**(g/t)**

**3.3**

3.1

3.3

3.5

3.2

3.2

2.7

2.7

2.9

3.5

4.7

3.6

3.4

4.4

5.3

5.3

**Feed Metal**

**(koz)**

**6,684**

368

746

742

657

655

552

551

539

527  
370  
289  
182  
172  
167  
167

**Metallurgical Recovery**

(%)

**94%**

94%

94%

94%

94%

94%

94%

94%

94%

95%

95%

95%

95%

95%

96%

96%

**Recovered Gold**

(koz)

**6,308**

346

700

701

619

617

518

517

507

499

353

275

173

164

160

160

**Clean-up Gold**

(koz)

**22**

4

4

13

**Saleable Metal**

(koz)

**6,329**

346

700

701

619

617

518

517

507

504

353

279

173

164

160

172

**Sales**

**Gold**

**(koz)**

**6,329**

**346**

**700**

**701**

**619**

**617**

**518**

**517**

**507**

**504**

**353**

**279**

**173**

**164**

**160**

**172**

**Commodity Prices**

**Gold Price**

**(US\$/oz)**

366

386

390

394

398

402

406

410

414

418

422

426

431

435  
439  
444  
**(ZAR/kg)**  
91,659  
111,797  
125,823  
134,929  
143,309  
145,259  
151,796  
158,626  
165,765  
173,224  
181,019  
189,165  
197,677  
206,573  
215,869  
225,583

**Macro-economics**

**Exchange Rates**

**(US\$:ZAR)**

7.8  
9.0  
10.0  
10.7  
11.2  
11.3  
11.6  
12.0  
12.5  
12.9  
13.3  
13.8  
14.3  
14.8  
15.3  
15.8

**(US\$:AUS\$)**

1.3  
1.3  
1.3  
1.3  
1.3  
1.3  
1.4  
1.4  
1.4  
1.4  
1.4

1.5  
1.5  
1.5  
1.5  
1.5

**(ZAR:AUS\$)**

5.9  
6.8  
7.5  
7.9  
8.4  
8.4  
8.6  
8.7  
8.9  
9.1  
9.3  
9.5  
9.7  
9.9  
10.1  
10.3

**RSA CPI**

(%)

2.55%  
4.10%  
4.77%  
4.50%  
4.50%  
4.50%  
4.50%  
4.50%  
4.50%  
4.50%  
4.50%  
4.50%  
4.50%  
4.50%  
4.50%  
4.50%  
4.50%  
4.50%  
4.50%

**USA CPI**

(%)

1.38%  
1.03%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%

1.00%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%

**AUS CPI**

(%)  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%

**Financial - Nominal**

**Sales Revenue**

(ZAR'm)

**29,072**

**986**

**2,434**

**2,742**

**2,598**

**2,751**

**2,338**

**2,443**

**2,501**

**2,597**

**1,900**

**1,573**

**1,018**

**1,008**

**1,025**

**1,156**

**Total Working Costs**

(ZAR'm)

**-18,997**

**-1,061**

**-1,766**

**-1,810**

**-1,621**

**-1,735**  
**-1,441**  
**-1,527**  
**-1,570**  
**-1,666**  
**-1,185**  
**-973**  
**-611**  
**-645**  
**-667**  
**-764**  
**44**

**Mining**  
**(ZAR'm)**

**-13,607**  
-613  
-1,283  
-1,306  
-1,201  
-1,254  
-1,052  
-1,100  
-1,139  
-1,186  
-881  
-683  
-454  
-466  
-483  
-505

**Processing**  
**(ZAR'm)**

**-1,575**  
-68  
-133  
-136  
-137  
-143  
-151  
-157  
-152  
-141  
-84  
-88  
-51  
-46  
-43  
-45

**Overheads**  
**(ZAR'm)**

**-2,932**

-128  
-268  
-275  
-260  
-272  
-229  
-239  
-250  
-261  
-193  
-150  
-95  
-100  
-104  
-109

**Environmental  
(ZAR'm)**

**-407**  
-10  
-21  
-22  
-23  
-24  
-25  
-26  
-27  
-29  
-30  
-31  
-33  
-34  
-36  
-37

**Terminal Separation Benefits  
(ZAR'm)**

**-263**  
-53  
0  
-37  
0  
-49  
-25  
-34  
-1  
-64

**Net Change in Working Capital  
(ZAR'm)**

**-214**  
-242  
-62  
-19



0

-5

15

-4

-2

-1

28

13

22

2

0

-4

44

**Operating Profit**

**(ZAR'm)**

**10,075**

**-75**

**668**

**933**

**978**

**1,017**

**897**

**916**

**931**

**931**

**715**

**600**

**407**

**363**

**358**

**392**

**44**

**Tax Deductible Allowances**

**(ZAR'm)**

**-456**

**-31**

**-37**

**-48**

**-50**

**-49**

**-45**

**-42**

**-43**

**-31**

**-33**

**-31**

**-16**

**Tax Liability**

**(ZAR'm)**

**-3,023**

**-149**

-277  
-295  
-307  
-272  
-278  
-282  
-285  
-217  
-181  
-126  
-116  
-114  
-124

**Capital Expenditure  
(ZAR'm)**

-456  
-31  
-37  
-48  
-50  
-49  
-45  
-42  
-43  
-31  
-33  
-31  
-16

**Final Net Free Cash  
(ZAR'm)**

6,596  
-106  
482  
608  
632  
661  
580  
596  
606  
615  
465  
387  
265  
247  
245  
269  
44

**Statistics - Nominal  
Cash Operating Costs  
(ZAR/kg)**  
92,005

75,162

77,326

78,735

82,961

86,957

88,943

92,992

97,704

101,344

105,546

105,912

111,600

119,933

127,171

123,115

**Total Cash Costs**

**(ZAR/kg)**

92,005

75,162

77,326

78,735

82,961

86,957

88,943

92,992

97,704

101,344

105,546

105,912

111,600

119,933

127,171

123,115

**Total Working Costs**

**(ZAR/kg)**

96,497

98,613

81,132

83,027

84,164

90,354

89,538

94,889

99,557

106,350

108,046

111,964

113,492

126,479

134,390

142,606

**Total Costs**

**(ZAR/kg)**

**98,816**

**101,538**

**82,832**

**85,229**

**86,768**

**92,897**

**92,321**

**97,475**

**102,315**

**108,344**

**111,023**

**115,535**

**116,504**

**126,479**

**134,390**

**142,606**

(1)

Six-month forecast to June 2004, actual results between July 2003 and December 2003 are reported in Section 2.





191

**Table 13.7 Welkom Tax Entity: TEM in ZAR (nominal terms)**

**Annexure 7**

**Financial Year**

**Units**

**Totals/**

**2004**

**(1)**

**2005**

**2006**

**2007**

**2008**

**2009**

**2010**

**2011**

**2012**

**2013**

**2014**

**2015**

**2016**

**2017**

**2018**

**2019**

**2020**

**2021**

**2022**

**2023**

**Project Year**

**Averages**

**1**

**2**

**3**

**4**

**5**

**6**

**7**

**8**

**9**

**10**

**11**

**12**

**13**

**14**

**15**

**16**

**17**

**18**

**19**

**20**

**Production**

**Mining**

**RoM Tonnage**

(kt)

3,168

430

802

695

248

248

248

248

248

**Head Grade**

(g/t)

3.8

3.7

4.6

4.3

3.2

3.2

3.2

3.2

3.2

**Contained Gold**

(koz)

391

51

118

95

25

25

25

25

25

25

**Processing**

**Feed Tonnage**

(kt)

3,168

430

802

695

248

248

248

248

248

**Feed Grade**

(g/t)

3.8

3.7

4.6

4.3



3.2  
3.2  
3.2  
3.2  
3.2

**Feed Metal**

**(koz)**

**391**

51  
118  
95  
25  
25  
25  
25  
25

**Metallurgical Recovery**

**(%)**

**93%**

94%  
93%  
93%  
93%  
93%  
93%  
93%  
93%  
93%

**Recovered Gold**

**(koz)**

**365**

48  
110  
89  
24  
24  
24  
24  
24

**Clean-up Gold**

**(koz)**

**Saleable Metal**

**(koz)**

**365**  
48  
110  
89  
24  
24  
24  
24  
24

**Sales**

**Gold**

**(koz)**

365

48

110

89

24

24

24

24

24

**Commodity Prices**

**Gold Price**

**(US\$/oz)**

366

386

390

394

398

402

406

410

414

**(ZAR/kg)**

91,659

111,797

125,823

134,929

143,309

145,259

151,796

158,626

165,765

**Macro-economics**

**Exchange Rates**

**(US\$:ZAR)**

7.8

9.0

10.0

10.7

11.2

11.3

11.6

12.0

12.5

**(US\$:AUS\$)**

1.3

1.3

1.3

1.3

1.3  
1.3  
1.4  
1.4  
1.4

**(ZAR:AUS\$)**

5.9  
6.8  
7.5  
7.9  
8.4  
8.4  
8.6  
8.7  
8.9

**RSA CPI**

(%)

2.55%  
4.10%  
4.77%  
4.50%  
4.50%  
4.50%  
4.50%  
4.50%  
4.50%

**USA CPI**

(%)

1.38%  
1.03%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%

**AUS CPI**

(%)

2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%

**Financial - Nominal  
Sales Revenue  
(ZAR'm)**

1,406

137

383

349

99

105

106

111

116

**Total Working Costs**

(ZAR'm)

-1,152

-123

-324

-294

-71

-79

-82

-86

-95

2

**Mining**

(ZAR'm)

-1,071

-114

-298

-254

-74

-77

-81

-84

-88

**Processing**

(ZAR'm)

-37

-7

-15

-15

**Overheads**

(ZAR'm)

**Environmental**

(ZAR'm)

-11

-1

-1

-1

-1

-2

-2

-2

-2

**Terminal Separation Benefits**

(ZAR'm)

-35

0

-6

-24

-5

**Net Change in Working Capital**

(ZAR'm)

3

-1

-3

1

4

0

0

0

0

2

**Operating Profit**

(ZAR'm)

254

14

59

55

27

26

24

25

21

2

**Tax Deductible Allowances**

(ZAR'm)

**Tax Liability**

(ZAR'm)

-84

-3

-19

-17

-10

-9

-9

-9

-7

**Capital Expenditure**

(ZAR'm)

**Final Net Free Cash**

(ZAR'm)

171

11

41

38  
17  
16  
15  
16  
14  
2

**Statistics - Nominal**

**Cash Operating Costs**

(ZAR/kg)

97,634

80,927

91,422

97,168

101,096

105,645

110,399

115,367

120,559

**Total Cash Costs**

(ZAR/kg)

97,634

80,927

91,422

97,168

101,096

105,645

110,399

115,367

120,559

**Total Working Costs**

(ZAR/kg)

101,457

82,309

94,467

105,886

97,709

108,046

112,369

117,785

129,528

**Total Costs**

(ZAR/kg)

101,457

82,309

94,467

105,886

97,709

108,046

112,369

117,785

**129,528**

(1)

Six-month forecast to June 2004, actual results between July 2003 and December 2003 are reported in Section 2.







192

**Table 13.8 Randfontein Tax Entity: TEM in ZAR (nominal terms)**

**Annexure 7**

**Financial Year**

**Units**

**Totals/**

**2004**

**(1)**

**2005**

**2006**

**2007**

**2008**

**2009**

**2010**

**2011**

**2012**

**2013**

**2014**

**2015**

**2016**

**2017**

**2018**

**2019**

**2020**

**2021**

**2022**

**2023**

**Project Year**

**Averages**

**1**

**2**

**3**

**4**

**5**

**6**

**7**

**8**

**9**

**10**

**11**

**12**

**13**

**14**

**15**

**16**

**17**

**18**

**19**

**20**

**Production**

**Mining**

**RoM Tonnage**

(kt)

72,468

3,722

6,484

5,057

4,959

5,166

5,440

4,575

4,588

4,481

4,461

4,436

4,111

3,692

3,300

2,620

2,479

1,101

1,131

624

41

**Head Grade**

(g/t)

6.3

4.0

4.4

5.3

5.8

6.3

6.5

7.0

7.1

7.1

7.0

7.0

6.8

6.6

6.6

6.4

6.4

7.7

7.7

7.8

8.9

**Contained Gold**

(koz)

14,625

483

920

865  
932  
1,042  
1,131  
1,032  
1,041  
1,024  
1,008  
993  
901  
783  
699  
540  
512  
271  
281  
157  
12

**Processing  
Feed Tonnage  
(kt)**

72,468  
3,722  
6,484  
5,057  
4,959  
5,166  
5,440  
4,575  
4,588  
4,481  
4,461  
4,436  
4,111  
3,692  
3,300  
2,620  
2,479  
1,101  
1,131  
624  
41

**Feed Grade  
(g/t)**

6.3  
4.0  
4.4  
5.3  
5.8  
6.3  
6.5

7.0  
7.1  
7.1  
7.0  
7.0  
6.8  
6.6  
6.6  
6.4  
6.4  
7.7  
7.7  
7.8  
8.9

**Feed Metal**

**(koz)**

**14,625**

483  
920  
865  
932  
1,042  
1,131  
1,032  
1,041  
1,024  
1,008  
993  
901  
783  
699  
540  
512  
271  
281  
157  
12

**Metallurgical Recovery**

**(%)**

**96%**

95%  
95%  
96%  
96%  
96%  
96%  
97%  
97%  
97%  
97%

97%  
97%  
97%  
97%  
97%  
97%  
97%  
97%  
97%

**Recovered Gold**

**(koz)**

**14,083**

460  
878  
827  
893  
1,000  
1,087  
997  
1,006  
989  
974  
959  
870  
756  
675  
521  
495  
262  
271  
152  
11

**Clean-up Gold**

**(koz)**

**76**

7  
11  
36  
21

**Saleable Metal**

**(koz)**

**14,158**

460  
885  
827  
893  
1,000  
1,097  
997  
1,006  
989

974  
959  
870  
756  
675  
521  
495  
262  
271  
188  
33

**Sales**

**Gold**

(koz)

**14,158**

**460**

**885**

**827**

**893**

**1,000**

**1,097**

**997**

**1,006**

**989**

**974**

**959**

**870**

**756**

**675**

**521**

**495**

**262**

**271**

**188**

**33**

**Commodity Prices**

**Gold Price**

(US\$/oz)

366

386

390

394

398

402

406

410

414

418

422

426

431

435  
439  
444  
448  
453  
457  
462

**(ZAR/kg)**

91,659  
111,797  
125,823  
134,929  
143,309  
145,259  
151,796  
158,626  
165,765  
173,224  
181,019  
189,165  
197,677  
206,573  
215,869  
225,583  
235,734  
246,342  
257,427  
269,011

**Macro-economics**

**Exchange Rates**

**(US\$:ZAR)**

7.8  
9.0  
10.0  
10.7  
11.2  
11.3  
11.6  
12.0  
12.5  
12.9  
13.3  
13.8  
14.3  
14.8  
15.3  
15.8  
16.4  
16.9  
17.5  
18.1



**(US\$:AUS\$)**

1.3  
1.3  
1.3  
1.3  
1.3  
1.3  
1.4  
1.4  
1.4  
1.4  
1.4  
1.5  
1.5  
1.5  
1.5  
1.5  
1.6  
1.6  
1.6  
1.6

**(ZAR:AUS\$)**

5.9  
6.8  
7.5  
7.9  
8.4  
8.4  
8.6  
8.7  
8.9  
9.1  
9.3  
9.5  
9.7  
9.9  
10.1  
10.3  
10.5  
10.7  
10.9  
11.1

**RSA CPI**

(%)

2.55%  
4.10%  
4.77%  
4.50%  
4.50%  
4.50%  
4.50%

4.50%  
4.50%  
4.50%  
4.50%  
4.50%  
4.50%  
4.50%  
4.50%  
4.50%  
4.50%  
4.50%  
4.50%  
4.50%

**USA CPI**  
(%)

1.38%  
1.03%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%

**AUS CPI**  
(%)

2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%

2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%

**Financial - Nominal**

**Sales Revenue**

(ZAR'm)

**73,059**

**1,312**

**3,078**

**3,236**

**3,747**

**4,459**

**4,957**

**4,707**

**4,963**

**5,099**

**5,247**

**5,400**

**5,120**

**4,651**

**4,334**

**3,501**

**3,470**

**1,924**

**2,079**

**1,503**

**273**

**Total Working Costs**

(ZAR'm)

**-39,110**

**-1,132**

**-1,967**

**-1,913**

**-1,995**

**-2,256**

**-2,584**

**-2,310**

**-2,449**

**-2,516**

**-2,613**

**-2,731**

**-2,646**

**-2,493**

**-2,371**

**-1,909**

**-2,002**

**-1,034**

**-1,213**

**-888**

**-101**

**Mining**

**(ZAR'm)**

**-27,315**

-681

-1,385

-1,404

-1,451

-1,601

-1,813

-1,674

-1,755

-1,808

-1,880

-1,954

-1,878

-1,741

-1,620

-1,329

-1,317

-715

-768

-499

-44

**Processing**

**(ZAR'm)**

**-2,992**

-115

-215

-154

-159

-170

-196

-146

-152

-157

-163

-170

-167

-161

-157

-143

-145

-107

-113

-150

-51

**Overheads**

**(ZAR'm)**

**-8,025**

-155  
-319  
-328  
-337  
-434  
-503  
-485  
-513  
-534  
-549  
-563  
-571  
-572  
-530  
-450  
-441  
-266  
-280  
-180  
-13

**Environmental  
(ZAR'm)**

**-218**  
-4  
-8  
-8  
-9  
-9  
-9  
-10  
-10  
-11  
-11  
-12  
-12  
-13  
-13  
-14  
-15  
-15  
-16  
-17  
-1

**Terminal Separation Benefits  
(ZAR'm)**

**-482**  
-1  
-5  
-3  
-44  
-4

-1
-2
-27
-37
-37
-68
-13
-92
-30
-72
-45
<b>Net Change in Working Capital</b>
<b>(ZAR'm)</b>
<b>-79</b>
-176
-36
-15
-38
-42
-19
4
-13
-6
-7
-5
19
30
18
40
8
69
-6
30
53
<b>Operating Profit</b>
<b>(ZAR'm)</b>
<b>33,949</b>
<b>180</b>
<b>1,110</b>
<b>1,323</b>
<b>1,752</b>
<b>2,203</b>
<b>2,373</b>
<b>2,397</b>
<b>2,514</b>
<b>2,583</b>
<b>2,633</b>
<b>2,669</b>
<b>2,474</b>
<b>2,158</b>
<b>1,963</b>

1,592

1,468

890

866

615

171

**Tax Deductible Allowances**

(ZAR'm)

-2,035

-167

-346

-305

-403

-269

-160

-48

-41

-43

-45

-39

-32

-34

-27

-28

-29

-20

**Tax Liability**

(ZAR'm)

-12,869

-2

-115

-394

-535

-787

-904

-972

-1,024

-1,051

-1,070

-1,086

-1,005

-870

-791

-639

-582

-356

-350

-249

-81

**Capital Expenditure**

(ZAR'm)

-2,035  
-167  
-346  
-305  
-403  
-269  
-160  
-48  
-41  
-43  
-45  
-39  
-32  
-34  
-27  
-28  
-29  
-20

**Final Net Free Cash**

(ZAR'm)

19,044  
11  
649  
624  
815  
1,147  
1,309  
1,377  
1,450  
1,489  
1,519  
1,544  
1,436  
1,254  
1,146  
925  
857  
514  
515  
367  
90

**Statistics - Nominal**

**Cash Operating Costs**

(ZAR/kg)

87,042  
66,409  
69,695  
73,354  
70,130  
70,870  
73,616



74,310

77,371

81,219

85,609

90,081

96,659

105,128

109,950

118,504

123,738

133,250

137,610

141,910

106,718

**Total Cash Costs**

**(ZAR/kg)**

87,042

66,409

69,695

73,354

70,130

70,870

73,616

74,310

77,371

81,219

85,609

90,081

96,659

105,128

109,950

118,504

123,738

133,250

137,610

141,910

106,718

**Total Working Costs**

**(ZAR/kg)**

88,811

79,059

71,463

74,378

71,827

72,503

75,721

74,495

78,269

81,790

86,276

91,544

97,767  
105,955  
112,992  
117,713  
130,159  
126,693  
143,736  
152,037  
100,118  
Total Costs  
(ZAR/kg)  
93,432  
90,752  
84,033  
86,241  
86,330  
81,134  
80,422  
76,047  
79,572  
83,175  
87,746  
92,844  
98,965  
107,394  
114,258  
119,423  
132,044  
129,167  
143,736  
152,037  
100,118  
(1)

Six-month forecast to June 2004, actual results between July 2003 and December 2003 are reported in Section 2.





193

**Table 13.9 Evander Tax Entity: TEM in ZAR (nominal terms)**

**Annexure 7**

**Financial Year**

**Units**

**Totals/**

**2004**

**(1)**

**2005**

**2006**

**2007**

**2008**

**2009**

**2010**

**2011**

**2012**

**2013**

**2014**

**2015**

**2016**

**2017**

**2018**

**2019**

**2020**

**2021**

**2022**

**2023**

**Project Year**

**Averages**

**1**

**2**

**3**

**4**

**5**

**6**

**7**

**8**

**9**

**10**

**11**

**12**

**13**

**14**

**15**

**16**

**17**

**18**

**19**

**20**

**Production**

**Mining**

**RoM Tonnage**

(kt)

19,526

1,214

2,330

2,332

2,023

1,673

1,647

1,634

1,592

1,392

1,154

751

446

446

446

446

**Head Grade**

(g/t)

5.6

5.3

5.3

5.4

5.4

5.6

5.4

5.4

5.4

5.4

6.2

6.3

6.2

6.2

6.2

6.2

**Contained Gold**

(koz)

3,486

205

401

406

350

299

287

285

276

240

228

153

89

89

89

89

**Processing**

**Feed Tonnage**

**(kt)**

**19,526**

1,214

2,330

2,332

2,023

1,673

1,647

1,634

1,592

1,392

1,154

751

446

446

446

446

**Feed Grade**

**(g/t)**

**5.6**

5.3

5.3

5.4

5.4

5.6

5.4

5.4

5.4

5.4

5.4

6.2

6.3

6.2

6.2

6.2

6.2

**Feed Metal**

**(koz)**

**3,486**

205

401

406

350

299

287

285

276

240  
228  
153  
89  
89  
89  
89

**Metallurgical Recovery**

(%)

**97%**

96%

96%

96%

96%

97%

96%

96%

96%

96%

97%

97%

97%

97%

97%

97%

**Recovered Gold**

(koz)

**3,364**

198

386

392

338

288

277

275

266

232

221

148

86

86

86

86

**Clean-up Gold**

(koz)

**19**

3

16

**Saleable Metal**

(koz)

**3,383**



198  
386  
392  
338  
288  
277  
275  
266  
232  
224  
148  
86  
86  
86  
102

**Sales**

**Gold  
(koz)**

**3,383**

**198  
386  
392  
338  
288  
277  
275  
266  
232  
224  
148  
86  
86  
86  
102**

**Commodity Prices**

**Gold Price**

**(US\$/oz)**

366  
386  
390  
394  
398  
402  
406  
410  
414  
418  
422  
426  
431  
435

439

444

**(ZAR/kg)**

91,659

111,797

125,823

134,929

143,309

145,259

151,796

158,626

165,765

173,224

181,019

189,165

197,677

206,573

215,869

225,583

**Macro-economics**

**Exchange Rates**

**(US\$:ZAR)**

7.8

9.0

10.0

10.7

11.2

11.3

11.6

12.0

12.5

12.9

13.3

13.8

14.3

14.8

15.3

15.8

**(US\$:AUS\$)**

1.3

1.3

1.3

1.3

1.3

1.3

1.4

1.4

1.4

1.4

1.4

1.5

1.5  
1.5  
1.5  
1.5

**(ZAR:AUS\$)**

5.9  
6.8  
7.5  
7.9  
8.4  
8.4  
8.6  
8.7  
8.9  
9.1  
9.3  
9.5  
9.7  
9.9  
10.1  
10.3

**RSA CPI**

(%)

2.55%  
4.10%  
4.77%  
4.50%  
4.50%  
4.50%  
4.50%  
4.50%  
4.50%  
4.50%  
4.50%  
4.50%  
4.50%  
4.50%  
4.50%  
4.50%  
4.50%  
4.50%

**USA CPI**

(%)

1.38%  
1.03%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%

1.00%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%

**AUS CPI**

(%)

2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%

**Financial - Nominal**

**Sales Revenue**

(ZAR'm)

**15,510**

**564**

**1,344**

**1,534**

**1,417**

**1,284**

**1,251**

**1,297**

**1,314**

**1,194**

**1,205**

**832**

**506**

**529**

**553**

**687**

**Total Working Costs**

(ZAR'm)

**-9,894**

**-519**

**-902**

**-938**

**-841**

**-749**

-776

-815

-841

-770

-807

-515

-314

-344

-359

-433

28

**Mining**

(ZAR'm)

-6,952

-336

-657

-680

-610

-543

-561

-583

-593

-542

-545

-352

-222

-232

-242

-253

**Processing**

(ZAR'm)

-877

-35

-65

-68

-64

-62

-65

-67

-69

-67

-68

-47

-43

-45

-47

-63

**Overheads**

(ZAR'm)

-1,791

-75

-153  
-160  
-155  
-142  
-148  
-154  
-159  
-156  
-160  
-94  
-55  
-58  
-60  
-63

**Environmental  
(ZAR'm)**

**-93**  
-2  
-5  
-5  
-5  
-5  
-6  
-6  
-6  
-6  
-6  
-7  
-7  
-7  
-8  
-8  
-8

**Terminal Separation Benefits  
(ZAR'm)**

**-148**  
-2  
-4  
-12  
-11  
-1  
-1  
-3  
-15  
-4  
-30  
-27  
-39

**Net Change in Working Capital  
(ZAR'm)**

**-34**  
-69

-19  
-13  
4  
5  
4  
-2  
1  
6  
2  
13  
13  
-1  
-1  
-6  
28

**Operating Profit  
(ZAR'm)**

**5,616**  
46  
442  
596  
576  
535  
475  
482  
473  
423  
397  
317  
192  
186  
194  
255  
28

**Tax Deductible Allowances  
(ZAR'm)**

-659  
-52  
-81  
-91  
-95  
-75  
-72  
-49  
-41  
-43  
-30  
-31

**Tax Liability  
(ZAR'm)**

**-1,916**

-125  
-197  
-189  
-182  
-156  
-169  
-169  
-148  
-141  
-112  
-77  
-73  
-76  
-101  
**Capital Expenditure**  
**(ZAR'm)**  
-659  
-52  
-81  
-91  
-95  
-75  
-72  
-49  
-41  
-43  
-30  
-31  
**Final Net Free Cash**  
**(ZAR'm)**  
3,040  
-7  
236  
308  
292  
278  
246  
263  
264  
233  
226  
173  
115  
112  
117  
153  
28  
**Statistics - Nominal**  
**Cash Operating Costs**  
**(ZAR/kg)**  
91,411



72,384  
72,737  
74,511  
78,960  
83,435  
89,848  
94,116  
99,075  
106,247  
111,036  
107,390  
119,720  
125,108  
130,738  
119,271  
Total Cash Costs  
(ZAR/kg)  
91,411  
72,384  
72,737  
74,511  
78,960  
83,435  
89,848  
94,116  
99,075  
106,247  
111,036  
107,390  
119,720  
125,108  
130,738  
119,271  
Total Working Costs  
(ZAR/kg)  
94,024  
84,259  
75,009  
76,940  
80,116  
83,608  
90,099  
95,365  
101,540  
106,956  
116,074  
112,054  
117,468  
128,320  
134,139  
135,924

**Total Costs**

**(ZAR/kg)**

**100,290**

**92,765**

**81,764**

**84,367**

**89,123**

**91,981**

**98,484**

**101,151**

**106,462**

**112,874**

**120,343**

**118,806**

**117,468**

**128,320**

**134,139**

**135,924**

(1)

Six-month forecast to June 2004, actual results between July 2003 and December 2003 are reported in Section 2.





194

**Table 13.10 Orkney Tax Entity: TEM in ZAR (nominal terms)**

**Annexure 7**

**Financial Year**

**Units**

**Totals/**

**2004**

**(1)**

**2005**

**2006**

**2007**

**2008**

**2009**

**2010**

**2011**

**2012**

**2013**

**2014**

**2015**

**2016**

**2017**

**2018**

**2019**

**2020**

**2021**

**2022**

**2023**

**Project Year**

**Averages**

**1**

**2**

**3**

**4**

**5**

**6**

**7**

**8**

**9**

**10**

**11**

**12**

**13**

**14**

**15**

**16**

**17**

**18**

**19**

**20**

**Production**

**Mining**

**RoM Tonnage**

(kt)

5,756

708

1,333

1,174

923

698

312

304

305

**Head Grade**

(g/t)

4.9

6.2

5.7

5.2

4.0

4.4

3.4

3.4

3.4

**Contained Gold**

(koz)

898

141

242

196

119

100

34

33

33

**Processing**

**Feed Tonnage**

(kt)

5,756

708

1,333

1,174

923

698

312

304

305

**Feed Grade**

(g/t)

4.9

6.2

5.7

5.2

4.0  
4.4  
3.4  
3.4  
3.4

**Feed Metal**

**(koz)**

**898**

141

242

196

119

100

34

33

33

**Metallurgical Recovery**

**(%)**

**95%**

95%

95%

95%

95%

95%

95%

95%

95%

**Recovered Gold**

**(koz)**

**852**

134

230

186

113

95

32

31

31

**Clean-up Gold**

**(koz)**

**Saleable Metal**

**(koz)**

**852**

134

230

186

113

95

32

31

31

**Sales**

**Gold**

(koz)

852

134

230

186

113

95

32

31

31

**Commodity Prices**

**Gold Price**

(US\$/oz)

366

386

390

394

398

402

406

410

414

(ZAR/kg)

91,659

111,797

125,823

134,929

143,309

145,259

151,796

158,626

165,765

**Macro-economics**

**Exchange Rates**

(US\$:ZAR)

7.8

9.0

10.0

10.7

11.2

11.3

11.6

12.0

12.5

(US\$:AUS\$)

1.3

1.3

1.3

1.3



1.3  
1.3  
1.4  
1.4  
1.4

**(ZAR:AUS\$)**

5.9  
6.8  
7.5  
7.9  
8.4  
8.4  
8.6  
8.7  
8.9

**RSA CPI**

**(%)**

2.55%  
4.10%  
4.77%  
4.50%  
4.50%  
4.50%  
4.50%  
4.50%  
4.50%

**USA CPI**

**(%)**

1.38%  
1.03%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%

**AUS CPI**

**(%)**

2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%

**Financial - Nominal  
Sales Revenue  
(ZAR'm)**

3,252

381

799

729

474

422

146

148

154

**Total Working Costs**

(ZAR'm)

-2,415

-278

-587

-516

-351

-311

-108

-122

-144

3

**Mining**

(ZAR'm)

-1,923

-246

-477

-402

-284

-233

-91

-93

-97

**Processing**

(ZAR'm)

-311

-35

-68

-62

-51

-40

-18

-18

-19

**Overheads**

(ZAR'm)

-150

-16

-32

-30

-24

-19

-9

-9

-10

**Environmental**

**(ZAR'm)**

**-9**

0

-1

-1

-1

-1

-1

-1

-1

**Terminal Separation Benefits**

**(ZAR'm)**

**-68**

-6

-23

-1

-20

0

-18

**Net Change in Working Capital**

**(ZAR'm)**

**46**

19

-4

2

11

2

10

0

1

3

**Operating Profit**

**(ZAR'm)**

**838**

**103**

**212**

**213**

**123**

**111**

**38**

**26**

**10**

**3**

**Tax Deductible Allowances**

**(ZAR'm)**

**-33**

**-10**

-13  
 -3  
 -3  
 -1  
 -1  
 -1  
 -1  
**Tax Liability**  
**(ZAR'm)**  
 -294  
 -34  
 -73  
 -80  
 -44  
 -41  
 -14  
 -8  
 -1  
**Capital Expenditure**  
**(ZAR'm)**  
 -33  
 -10  
 -13  
 -3  
 -3  
 -1  
 -1  
 -1  
 -1  
**Final Net Free Cash**  
**(ZAR'm)**  
 511  
 59  
 126  
 130  
 75  
 69  
 23  
 17  
 9  
 3  
**Statistics - Nominal**  
**Cash Operating Costs**  
**(ZAR/kg)**  
 89,939  
 71,455  
 80,666  
 85,293  
 102,454  
 99,249  
 117,149

123,798

129,427

**Total Cash Costs**

(ZAR/kg)

89,939

71,455

80,666

85,293

102,454

99,249

117,149

123,798

129,427

**Total Working Costs**

(ZAR/kg)

91,108

66,913

82,186

89,096

99,947

105,701

107,930

125,092

148,106

**Total Costs**

(ZAR/kg)

92,348

69,409

83,937

89,641

100,878

106,201

108,593

125,803

148,850

(1)

Six-month forecast to June 2004, actual results between July 2003 and December 2003 are reported in Section 2.





195

**Table 13.11 Kalgold Tax Entity**

(1)

**: TEM in ZAR (nominal terms)**

**Annexure 7**

**Financial Year**

**Units**

**Totals/**

**2004**

(1)

**2005**

**2006**

**2007**

**2008**

**2009**

**2010**

**2011**

**2012**

**2013**

**2014**

**2015**

**2016**

**2017**

**2018**

**2019**

**2020**

**2021**

**2022**

**2023**

**Project Year**

**Averages**

**1**

**2**

**3**

**4**

**5**

**6**

**7**

**8**

**9**

**10**

**11**

**12**

**13**

**14**

**15**

**16**

**17**

**18**

**19**

**20**



**Production**

**Mining**

**RoM Tonnage**

(kt)

5,080

681

1,324

1,344

1,320

410

**Head Grade**

(g/t)

2.3

2.3

2.3

2.1

2.2

2.6

**Contained Gold**

(koz)

370

51

100

91

93

34

**Processing**

**Feed Tonnage**

(kt)

5,980

792

1,584

1,581

1,584

439

**Feed Grade**

(g/t)

2.1

2.2

2.1

2.0

2.0

2.5

**Feed Metal**

(koz)

403

56

109

100

101

35

**Metallurgical Recovery**

(%)

**82%**

82%

82%

81%

81%

83%

**Recovered Gold**

(koz)

**329**

46

89

81

82

29

**Clean-up Gold**

(koz)

**1**

1

**Saleable Metal**

(koz)

**330**

46

89

81

82

31

**Sales**

**Gold**

(koz)

**330**

46

89

81

82

31

**Commodity Prices**

**Gold Price**

(US\$/oz)

366

386

390

394

398

402

(ZAR/kg)

91,659

111,797

125,823

134,929

143,309

145,259

**Macro-economics**

**Exchange Rates**

**(US\$:ZAR)**

7.8

9.0

10.0

10.7

11.2

11.3

**(US\$:AUS\$)**

1.3

1.3

1.3

1.3

1.3

1.3

**(ZAR:AUS\$)**

5.9

6.8

7.5

7.9

8.4

8.4

**RSA CPI**

(%)

2.55%

4.10%

4.77%

4.50%

4.50%

4.50%

**USA CPI**

(%)

1.38%

1.03%

1.00%

1.00%

1.00%

1.00%

**AUS CPI**

(%)

2.40%

2.40%

2.40%

2.40%

2.40%

2.40%

**Financial - Nominal**

**Sales Revenue**

(ZAR'm)

1,243

132

311

318

345

138

**Total Working Costs**

(ZAR'm)

-780

-116

-224

-215

-183

-51

7

**Mining**

(ZAR'm)

-432

-70

-133

-123

-83

-23

**Processing**

(ZAR'm)

-320

-39

-81

-85

-89

-27

**Overheads**

(ZAR'm)

-11

-1

-3

-3

-3

-1

**Environmental**

(ZAR'm)

-12

-1

-3

-3

-3

-1

**Terminal Separation Benefits**

(ZAR'm)

-9

-1  
 -8  
**Net Change in Working Capital**

(ZAR'm)

4

-4

-4

-1

-4

10

7

**Operating Profit**

(ZAR'm)

463

16

87

103

162

87

7

**Tax Deductible Allowances**

(ZAR'm)

0

0

**Tax Liability**

(ZAR'm)

-88

-51

-37

**Capital Expenditure**

(ZAR'm)

0

0

**Final Net Free Cash**

(ZAR'm)

375

16

87

103

111

50

7

**Statistics - Nominal**

**Cash Operating Costs**

(ZAR/kg)

74,393

76,423

77,870

83,338

68,468

53,476

**Total Cash Costs**

**(ZAR/kg)**

**74,393**

**76,423**

**77,870**

**83,338**

**68,468**

**53,476**

**Total Working Costs**

**(ZAR/kg)**

**75,997**

**80,507**

**80,412**

**84,923**

**71,433**

**52,733**

**Total Costs**

**(ZAR/kg)**

**76,042**

**80,831**

**80,412**

**84,923**

**71,433**

**52,733**

(1)

The contribution from Kalgold is subject to a current sale agreement which may see a 100% disposal of the asset in the near future.

(2)

Six-month forecast to June 2004, actual results between July 2003 and December 2003 are reported in Section 2.







196

**Table 13.12 Mt. Magnet & Cue Tax Entity: TEM in ZAR (nominal terms)**

**Annexure 7**

**Financial Year**

**Units**

**Totals/**

**2004**

**(1)**

**2005**

**2006**

**2007**

**2008**

**2009**

**2010**

**2011**

**2012**

**2013**

**2014**

**2015**

**2016**

**2017**

**2018**

**2019**

**2020**

**2021**

**2022**

**2023**

**Project Year**

**Averages**

**1**

**2**

**3**

**4**

**5**

**6**

**7**

**8**

**9**

**10**

**11**

**12**

**13**

**14**

**15**

**16**

**17**

**18**

**19**

**20**

**Production**

**Mining**

**RoM Tonnage**

(kt)

13,604

1,248

2,497

2,497

2,497

2,503

1,887

378

98

**Head Grade**

(g/t)

3.9

3.2

4.1

4.1

3.9

3.7

2.9

6.8

6.8

**Contained Gold**

(koz)

1,685

129

327

332

317

300

176

83

21

**Processing**

**Feed Tonnage**

(kt)

13,604

1,248

2,497

2,497

2,497

2,503

1,887

378

98

**Feed Grade**

(g/t)

3.9

3.2

4.1

4.1

3.9

3.7

2.9

6.8

6.8

**Feed Metal**

**(koz)**

**1,685**

129

327

332

317

300

176

83

21

**Metallurgical Recovery**

**(%)**

**92%**

91%

92%

92%

92%

91%

90%

94%

94%

**Recovered Gold**

**(koz)**

**1,544**

117

301

305

290

274

159

77

20

**Clean-up Gold**

**(koz)**

**Saleable Metal**

**(koz)**

**1,544**

117

301

305

290

274

159

77

20

**Sales**

**Gold**

**(koz)**

**1,529**

**116**

**298**

**302**

**288**

**271**

**158**

**77**

**20**

**Commodity Prices**

**Gold Price**

**(US\$/oz)**

366

386

390

394

398

402

406

410

414

**(ZAR/kg)**

91,659

111,797

125,823

134,929

143,309

145,259

151,796

158,626

165,765

**Macro-economics**

**Exchange Rates**

**(US\$:ZAR)**

7.8

9.0

10.0

10.7

11.2

11.3

11.6

12.0

12.5

**(US\$:AUS\$)**

1.3

1.3

1.3

1.3

1.3  
1.3  
1.4  
1.4  
1.4

**(ZAR:AUS\$)**

5.9  
6.8  
7.5  
7.9  
8.4  
8.4  
8.6  
8.7  
8.9

**RSA CPI**

**(%)**

2.55%  
4.10%  
4.77%  
4.50%  
4.50%  
4.50%  
4.50%  
4.50%  
4.50%

**USA CPI**

**(%)**

1.38%  
1.03%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%

**AUS CPI**

**(%)**

2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%

**Financial - Nominal  
Sales Revenue  
(ZAR'm)**

6,136

331

1,035

1,183

1,207

1,210

712

361

98

**Total Working Costs**

(ZAR'm)

-4,026

-309

-656

-694

-692

-682

-519

-300

-172

-3

**Mining**

(ZAR'm)

-2,150

-152

-389

-412

-398

-368

-226

-148

-57

**Processing**

(ZAR'm)

-1,609

-87

-210

-234

-252

-271

-296

-145

-113

**Overheads**

(ZAR'm)

-78

-4

-8

-9

-10

-11

-11

-12

-12

**Environmental**

**(ZAR'm)**

**-153**

-8

-26

-30

-30

-30

-18

-9

-2

**Terminal Separation Benefits**

**(ZAR'm)**

**Net Change in Working Capital**

**(ZAR'm)**

**-35**

-58

-22

-9

-2

-1

33

14

14

-3

**Operating Profit**

**(ZAR'm)**

**2,110**

22

379

489

515

528

193

62

-74

-3

**Tax Deductible Allowances**

**(ZAR'm)**

**-1,617**

-132

-350

-338

-319

-239

-120

-75

-43

**Tax Liability**

(ZAR'm)

-230

-24

-53

-69

-80

-5

**Capital Expenditure**

(ZAR'm)

-1,617

-132

-350

-338

-319

-239

-120

-75

-43

**Final Net Free Cash**

(ZAR'm)

263

-111

5

98

127

209

68

-13

-117

-3

**Statistics - Nominal**

**Cash Operating Costs**

(ZAR/kg)

80,701

67,238

65,657

69,685

73,811

77,065

108,891

127,968

297,239

**Total Cash Costs**

(ZAR/kg)

80,701

67,238

65,657

69,685

73,811

77,065



**108,891**

**127,968**

**297,239**

**Total Working Costs**

**(ZAR/kg)**

**84,666**

**85,672**

**70,860**

**73,785**

**77,361**

**80,729**

**105,878**

**125,896**

**279,037**

**Total Costs**

**(ZAR/kg)**

**118,674**

**122,339**

**108,683**

**109,765**

**113,051**

**109,048**

**130,402**

**157,382**

**348,928**

(1)

Six-month forecast to June 2004, actual results between July 2003 and December 2003 are reported in Section 2.





197

**Table 13.13 South Kalgoorlie: TEM in ZAR (nominal terms)**

**Annexure 7**

**Financial Year**

**Units**

**Totals/**

**2004**

**(1)**

**2005**

**2006**

**2007**

**2008**

**2009**

**2010**

**2011**

**2012**

**2013**

**2014**

**2015**

**2016**

**2017**

**2018**

**2019**

**2020**

**2021**

**2022**

**2023**

**Project Year**

**Averages**

**1**

**2**

**3**

**4**

**5**

**6**

**7**

**8**

**9**

**10**

**11**

**12**

**13**

**14**

**15**

**16**

**17**

**18**

**19**

**20**

**Production**

**Mining**

**RoM Tonnage**

(kt)

**3,184**

650

1,246

1,287

**Head Grade**

(g/t)

3.2

3.2

3.2

3.2

**Contained Gold**

(koz)

326

67

127

132

**Processing**

**Feed Tonnage**

(kt)

**3,184**

650

1,246

1,287

**Feed Grade**

(g/t)

3.2

3.2

3.2

3.2

**Feed Metal**

(koz)

326

67

127

132

**Metallurgical Recovery**

(%)

92%

92%

92%

93%

**Recovered Gold**

(koz)

301

62

117

122

**Clean-up Gold**

(koz)

**Saleable Metal**

**(koz)**

**301**

62

117

122

**Sales**

**Gold**

**(koz)**

**298**

**62**

**116**

**121**

**Commodity Prices**

**Gold Price**

**(US\$/oz)**

366

386

390

394

**(ZAR/kg)**

91,659

111,797

125,823

134,929

**Macro-economics**

**Exchange Rates**

**(US\$:ZAR)**

7.8

9.0

10.0

10.7

**(US\$:AUS\$)**

1.3

1.3

1.3

1.3

**(ZAR:AUS\$)**

5.9

6.8

7.5

7.9

**RSA CPI**

**(%)**

2.55%

4.10%

4.77%

4.50%

**USA CPI**

**(%)**

1.38%

1.03%

1.00%

1.00%

**AUS CPI**

(%)

2.40%

2.40%

2.40%

2.40%

**Financial - Nominal**

**Sales Revenue**

(ZAR'm)

**1,052**

**176**

**403**

**473**

**Total Working Costs**

(ZAR'm)

**-903**

**-174**

**-337**

**-406**

**14**

**Mining**

(ZAR'm)

**-560**

**-92**

**-213**

**-255**

**Processing**

(ZAR'm)

**-272**

**-46**

**-105**

**-122**

**Overheads**

(ZAR'm)

**-28**

**-4**

**-8**

**-16**

**Environmental**

(ZAR'm)

**-26**

**-4**

**-10**

**-12**

**Terminal Separation Benefits**

(ZAR'm)

**Net Change in Working Capital**

(ZAR'm)

-18
-28
-2
-1
14
<b>Operating Profit</b>
<b>(ZAR'm)</b>
149
2
66
67
14
<b>Tax Deductible Allowances</b>
<b>(ZAR'm)</b>
-177
-57
-81
-38
<b>Tax Liability</b>
<b>(ZAR'm)</b>
-5
-5
<b>Capital Expenditure</b>
<b>(ZAR'm)</b>
-177
-57
-81
-38
<b>Final Net Free Cash</b>
<b>(ZAR'm)</b>
-32
-55
-15
24
14
<b>Statistics - Nominal</b>
<b>Cash Operating Costs</b>
<b>(ZAR/kg)</b>
92,538
73,729
90,215
104,348
<b>Total Cash Costs</b>
<b>(ZAR/kg)</b>
92,538
73,729
90,215
104,348
<b>Total Working Costs</b>
<b>(ZAR/kg)</b>
97,261



**90,800**

**93,426**

**107,884**

**Total Costs**

**(ZAR/kg)**

**116,287**

**120,487**

**116,009**

**118,064**

(1)

Six-month forecast to June 2004, actual results between July 2003 and December 2003 are reported in Section 2.





198

**Table 13.14 Avgold: TEM in ZAR (nominal terms)**

**Annexure 7**

**Financial Year**

**Units**

**Totals/**

**2004**

**(1)**

**2005**

**2006**

**2007**

**2008**

**2009**

**2010**

**2011**

**2012**

**2013**

**2014**

**2015**

**2016**

**2017**

**2018**

**2019**

**2020**

**2021**

**2022**

**2023**

**Project Year**

**Averages**

**1**

**2**

**3**

**4**

**5**

**6**

**7**

**8**

**9**

**10**

**11**

**12**

**13**

**14**

**15**

**16**

**17**

**18**

**19**

**20**

**Production**

**Mining**

**RoM Tonnage**

(kt)

19,944

528

1,257

1,298

1,404

1,404

1,404

1,404

1,404

1,404

1,122

1,122

1,122

1,083

1,045

1,006

968

968

**Head Grade**

(g/t)

6.6

8.9

8.3

8.4

8.5

7.0

7.4

6.2

5.7

5.4

5.7

5.7

5.7

5.9

5.9

5.9

6.0

6.0

**Contained Gold**

(koz)

4,242

151

336

351

384

314

333

280

259

245  
207  
207  
207  
204  
199  
190  
187  
187  
**Processing**  
**Feed Tonnage**  
**(kt)**  
19,944  
528  
1,257  
1,285  
1,285  
1,285  
1,285  
1,285  
1,285  
1,285  
1,285  
1,285  
1,285  
1,285  
1,285  
1,285  
1,080  
1,006  
968  
968  
**Feed Grade**  
**(g/t)**  
6.6  
8.9  
8.3  
8.4  
8.5  
7.0  
7.4  
6.2  
5.7  
5.4  
5.9  
5.9  
5.9  
6.0  
6.0  
5.9  
6.0  
6.0  
**Feed Metal**

**(koz)**

**4,242**

151

336

348

351

287

304

257

237

225

243

243

243

248

207

190

187

187

**Metallurgical Recovery**

**(%)**

**97%**

97%

97%

97%

97%

97%

97%

97%

97%

97%

97%

97%

97%

97%

97%

97%

97%

97%

**Recovered Gold**

**(koz)**

**4,112**

147

326

338

342

279

296

248

230

217

235  
235  
235  
240  
200  
184  
181  
181  
**Clean-up Gold**  
**(koz)**  
7  
7  
**Saleable Metal**  
**(koz)**  
**4,119**  
147  
326  
338  
342  
279  
296  
248  
230  
217  
235  
235  
235  
240  
200  
184  
181  
188  
**Sales**  
**Gold**  
**(koz)**  
**4,119**  
**147**  
**326**  
**338**  
**342**  
**279**  
**296**  
**248**  
**230**  
**217**  
**235**  
**235**  
**235**  
**240**  
**200**  
**184**



181

188

**Commodity Prices**

**Gold Price**

(US\$/oz)

366

386

390

394

398

402

406

410

414

418

422

426

431

435

439

444

448

453

(ZAR/kg)

91,659

111,797

125,823

134,929

143,309

145,259

151,796

158,626

165,765

173,224

181,019

189,165

197,677

206,573

215,869

225,583

235,734

246,342

**Macro-economics**

**Exchange Rates**

(US\$:ZAR)

7.8

9.0

10.0

10.7

11.2

11.3

11.6  
12.0  
12.5  
12.9  
13.3  
13.8  
14.3  
14.8  
15.3  
15.8  
16.4  
16.9  
**(US\$:AUS\$)**  
1.3  
1.3  
1.3  
1.3  
1.3  
1.3  
1.4  
1.4  
1.4  
1.4  
1.4  
1.4  
1.5  
1.5  
1.5  
1.5  
1.5  
1.6  
1.6  
**(ZAR:AUS\$)**  
5.9  
6.8  
7.5  
7.9  
8.4  
8.4  
8.6  
8.7  
8.9  
9.1  
9.3  
9.5  
9.7  
9.9  
10.1  
10.3  
10.5  
10.7  
**RSA CPI**

(%)

2.55%

4.10%

4.77%

4.50%

4.50%

4.50%

4.50%

4.50%

4.50%

4.50%

4.50%

4.50%

4.50%

4.50%

4.50%

4.50%

4.50%

4.50%

**USA CPI**

(%)

1.38%

1.03%

1.00%

1.00%

1.00%

1.00%

1.00%

1.00%

1.00%

1.00%

1.00%

1.00%

1.00%

1.00%

1.00%

1.00%

1.00%

1.00%

**AUS CPI**

(%)

2.40%

2.40%

2.40%

2.40%

2.40%

2.40%

2.40%

2.40%

2.40%

2.40%

2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%

**Financial - Nominal**

**Sales Revenue**

(ZAR'm)

**20,919**

**420**

**1,135**

**1,323**

**1,435**

**1,243**

**1,335**

**1,173**

**1,132**

**1,118**

**1,264**

**1,321**

**1,381**

**1,475**

**1,286**

**1,232**

**1,267**

**1,377**

**Total Working Costs**

(ZAR'm)

**-13,576**

**-267**

**-586**

**-687**

**-699**

**-702**

**-754**

**-765**

**-820**

**-863**

**-859**

**-886**

**-926**

**-950**

**-928**

**-947**

**-963**

**-1,029**

**55**

**Mining**

**(ZAR'm)**

-9,320

-147

-385

-481

-485

-504

-523

-546

-581

-611

-579

-605

-633

-640

-643

-644

-643

-671

**Processing**

**(ZAR'm)**

-1,744

-28

-77

-83

-87

-91

-95

-99

-104

-108

-114

-119

-125

-130

-119

-119

-121

-126

**Overheads**

**(ZAR'm)**

-2,468

-42

-106

-112

-117

-122

-127

-133

-139

-145

-152  
-159  
-166  
-173  
-181  
-189  
-198  
-207

**Environmental**

**(ZAR'm)**

-19  
-2  
-2  
-2  
-2  
-2  
-3  
-3  
-3

**Terminal Separation Benefits**

**(ZAR'm)**

-20  
-20

**Net Change in Working Capital**

**(ZAR'm)**

-5  
-50  
-16  
-9  
-8  
18  
-6  
15  
6  
4  
-13  
-3  
-3  
-6  
15  
5  
-2  
-5  
55

**Operating Profit**

**(ZAR'm)**

**7,343**  
**153**  
**549**  
**636**  
**735**

541  
582  
408  
312  
255  
406  
435  
455  
525  
358  
286  
304  
349  
55

**Tax Deductible Allowances**

(ZAR'm)

-4,418  
-153  
-549  
-636  
-735  
-541  
-582  
-408  
-312  
-212  
-53  
-55  
-58  
-60  
-63

**Tax Liability**

(ZAR'm)

-850  
-107  
-116  
-121  
-145  
-85  
-83  
-89  
-103

**Capital Expenditure**

(ZAR'm)

-766  
-37  
-64  
-59  
-58  
-69  
-44

-46  
-48  
-51  
-53  
-55  
-58  
-60  
-63  
**Final Net Free Cash**  
**(ZAR'm)**  
5,727  
116  
485  
577  
677  
472  
537  
362  
264  
205  
246  
264  
276  
320  
210  
203  
215  
245  
55  
**Statistics - Nominal**  
**Cash Operating Costs**  
**(ZAR/kg)**  
105,624  
47,468  
55,907  
64,204  
64,767  
82,692  
81,049  
100,629  
115,329  
128,064  
115,816  
121,027  
126,474  
126,505  
151,558  
166,701  
171,027  
171,876  
**Total Cash Costs**



(ZAR/kg)

105,624

47,468

55,907

64,204

64,767

82,692

81,049

100,629

115,329

128,064

115,816

121,027

126,474

126,505

151,558

166,701

171,027

171,876

**Total Working Costs**

(ZAR/kg)

105,970

58,279

57,733

65,311

65,771

80,939

81,992

98,998

114,878

127,954

117,645

121,374

126,835

127,357

149,092

165,839

171,443

176,079

**Total Costs**

(ZAR/kg)

111,949

66,449

64,016

70,905

71,252

88,876

86,814

104,992

121,660

135,452

**124,888**

**128,943**

**134,745**

**135,444**

**159,218**

**165,839**

**171,443**

**176,079**

(1)

Six-month forecast to June 2004, actual results between July 2003 and December 2003 are reported in Section 2.





199

**Table 13.15 Harmony: TEM in ZAR (nominal terms)**

**Annexure 7**

**Financial Year**

**Units**

**Totals/**

**2004**

**(1)**

**2005**

**2006**

**2007**

**2008**

**2009**

**2010**

**2011**

**2012**

**2013**

**2014**

**2015**

**2016**

**2017**

**2018**

**2019**

**2020**

**2021**

**2022**

**2023**

**Project Year**

**Averages**

**1**

**2**

**3**

**4**

**5**

**6**

**7**

**8**

**9**

**10**

**11**

**12**

**13**

**14**

**15**

**16**

**17**

**18**

**19**

**20**

**Production**

**Mining**

**RoM Tonnage**

(kt)

265,300

17,170

32,547

29,675

26,994

22,231

21,134

18,762

17,039

14,425

11,918

10,842

8,776

7,883

7,256

6,542

4,567

2,261

2,291

1,784

1,201

**Head Grade**

(g/t)

5.2

3.9

4.2

4.4

4.4

5.2

5.0

5.3

5.4

5.7

6.3

6.2

6.6

6.7

6.8

6.6

6.6

7.5

7.6

7.6

7.5

**Contained Gold**

(koz)

44,481

2,165

4,416

4,240  
3,836  
3,691  
3,400  
3,210  
2,979  
2,630  
2,430  
2,164  
1,848  
1,700  
1,585  
1,383  
976  
548  
557  
433  
288

**Processing**

**Feed Tonnage**

(kt)

**266,200**

17,281  
32,807  
29,911  
27,258  
22,260  
21,134  
18,762  
17,039  
14,425  
11,918  
10,842  
8,776  
7,883  
7,256  
6,542  
4,567  
2,261  
2,291  
1,784  
1,201

**Feed Grade**

(g/t)

**5.2**  
3.9  
4.2  
4.4  
4.4  
5.2  
5.0

5.3  
5.4  
5.7  
6.3  
6.2  
6.6  
6.7  
6.8  
6.6  
6.6  
7.5  
7.6  
7.6  
7.5

**Feed Metal**

**(koz)**

**44,514**

2,170  
4,426  
4,250  
3,844  
3,692  
3,400  
3,210  
2,979  
2,630  
2,430  
2,164  
1,848  
1,700  
1,585  
1,383  
976  
548  
557  
433  
288

**Metallurgical Recovery**

**(%)**

**96%**  
94%  
94%  
95%  
95%  
95%  
96%  
96%  
96%  
96%  
96%



97%  
97%  
97%  
97%  
97%  
97%  
97%  
97%  
97%

**Recovered Gold**

**(koz)**

**42,585**

2,041

4,172

4,026

3,649

3,526

3,253

3,085

2,864

2,530

2,344

2,087

1,786

1,643

1,532

1,335

943

530

539

419

279

**Clean-up Gold**

**(koz)**

**221**

7

4

75

11

4

3

7

29

36

45

**Saleable Metal**

**(koz)**

**42,806**

2,041

4,179

4,026

3,652  
3,601  
3,264  
3,085  
2,864  
2,535  
2,346  
2,094

1,786  
1,643  
1,532  
1,364  
943  
530  
539  
456  
324

**Sales**

**Gold**

**(koz)**

**42,787**

**2,039**

**4,175**

**4,022**

**3,650**

**3,598**

**3,262**

**3,084**

**2,864**

**2,535**

**2,346**

**2,094**

**1,786**

**1,643**

**1,532**

**1,364**

**943**

**530**

**539**

**456**

**324**

**Commodity Prices**

**Gold Price**

**(US\$/oz)**

366

386

390

394

398

402

406

410  
414  
418  
422  
426  
431  
435  
439  
444  
448  
453  
457  
462

**(ZAR/kg)**

91,659  
111,797  
125,823  
134,929  
143,309  
145,259  
151,796  
158,626  
165,765  
173,224  
181,019  
189,165  
197,677  
206,573  
215,869  
225,583  
235,734  
246,342  
257,427  
269,011

**Macro-economics**

**Exchange Rates**

**(US\$:ZAR)**

7.8  
9.0  
10.0  
10.7  
11.2  
11.3  
11.6  
12.0  
12.5  
12.9  
13.3  
13.8  
14.3  
14.8

15.3  
15.8  
16.4  
16.9  
17.5  
18.1

**(US\$:AUS\$)**

1.3  
1.3  
1.3  
1.3  
1.3  
1.3  
1.4  
1.4  
1.4  
1.4  
1.4  
1.5  
1.5  
1.5  
1.5  
1.5  
1.6  
1.6  
1.6  
1.6

**(ZAR:AUS\$)**

5.9  
6.8  
7.5  
7.9  
8.4  
8.4  
8.6  
8.7  
8.9  
9.1  
9.3  
9.5  
9.7  
9.9  
10.1  
10.3  
10.5  
10.7  
10.9  
11.1

**RSA CPI**

(%)  
2.55%

4.10%  
4.77%  
4.50%  
4.50%  
4.50%  
4.50%  
4.50%  
4.50%  
4.50%  
4.50%  
4.50%  
4.50%  
4.50%  
4.50%  
4.50%  
4.50%  
4.50%  
4.50%  
4.50%

**USA CPI**

(%)  
1.38%  
1.03%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%  
1.00%

**AUS CPI**

(%)  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%

2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%  
2.40%

**Financial - Nominal**

**Sales Revenue**

(ZAR'm)

208,968

5,813

14,517

15,740

15,316

16,039

14,740

14,560

14,130

13,070

12,642

11,791

10,508

10,104

9,845

9,161

6,619

3,888

4,131

3,647

2,707

**Total Working Costs**

(ZAR'm)

-116,006

-4,787

-9,706

-9,621

-8,327

-8,247

-7,871

-7,730

-7,635

-6,861

-6,652

-6,145

-5,346

-5,327

-5,303

-5,032

-3,835

-1,988

-2,249

-1,971

-1,385

**Mining**

**(ZAR'm)**

**-85,406**

-3,315

-7,078

-6,988

-6,116

-6,065

-5,841

-5,800

-5,680

-5,131

-4,957

-4,553

-4,030

-3,970

-3,917

-3,670

-2,897

-1,495

-1,584

-1,351

-967

**Processing**

**(ZAR'm)**

**-11,164**

-567

-1,175

-1,152

-1,017

-879

-900

-716

-682

-531

-487

-469

-373

-368

-369

-378

-265

-205

-215

-256

-163

**Overheads**

**(ZAR'm)**

**-16,839**

-541

-1,123

-1,163

-993

-1,094

-1,107

-1,115

-1,168

-1,128

-1,088

-988

-897

-913

-886

-822

-650

-365

-383

-288

-130

**Environmental**

**(ZAR'm)**

**-1,093**

-34

-80

-88

-79

-79

-67

-61

-57

-53

-56

-58

-61

-64

-67

-70

-25

-26

-27

-28

-13

**Terminal Separation Benefits**

**(ZAR'm)**



**-1,420**

-4

-21

-135

-74

-66

-46

-40

-81

-56

-84

-117

-40

-46

-83

-134

-135

-30

-72

-156

**Net Change in Working Capital**

**(ZAR'm)**

**-83**

-327

-229

-95

-48

-64

90

1

32

39

19

40

54

33

18

42

138

103

-10

26

44

**Operating Profit**

**(ZAR'm)**

**92,962**

**1,026**

**4,811**

**6,119**

**6,989**

**7,792**

6,869  
6,830  
6,495  
6,209  
5,990  
5,646  
5,162  
4,776  
4,542  
4,129  
2,785  
1,900  
1,881  
1,677  
1,322

**Tax Deductible Allowances**

(ZAR'm)

-7,083  
-641  
-1,420  
-1,080  
-961  
-812  
-535  
-306  
-305  
-258  
-226  
-194  
-81  
-68  
-62  
-46  
-48  
-40

**Tax Liability**

(ZAR'm)

-33,667  
-76  
-968  
-1,838  
-2,287  
-2,742  
-2,493  
-2,613  
-2,510  
-2,366  
-2,308  
-2,195  
-2,064  
-1,905

-1,807

-1,637

-1,073

-766

-770

-687

-555

**Capital Expenditure**

(ZAR'm)

-7,083

-641

-1,420

-1,080

-961

-812

-535

-306

-305

-258

-226

-194

-81

-68

-62

-46

-48

-40

**Final Net Free Cash**

(ZAR'm)

52,212

309

2,423

3,201

3,741

4,238

3,841

3,911

3,681

3,584

3,457

3,257

3,016

2,803

2,673

2,446

1,663

1,094

1,111

989

767

**Statistics - Nominal**

**Cash Operating Costs**

(ZAR/kg)

85,217

69,729

72,203

74,368

71,589

71,821

77,334

79,553

84,529

86,119

89,490

92,250

95,404

102,734

108,523

114,759

129,908

125,171

130,118

133,757

125,190

**Total Cash Costs**

(ZAR/kg)

85,217

69,729

72,203

74,368

71,589

71,821

77,334

79,553

84,529

86,119

89,490

92,250

95,404

102,734

108,523

114,759

129,908

125,171

130,118

133,757

125,190

**Total Working Costs**

(ZAR/kg)

87,168

75,484

74,749  
76,910  
73,356  
73,687  
77,565  
80,593  
85,712  
87,016  
91,145  
94,337  
96,246  
104,230  
111,270  
118,565  
130,687  
120,518  
134,141  
139,079  
137,629  
Total Costs  
(ZAR/kg)  
92,491  
85,594  
85,684  
85,541  
81,824  
80,939  
82,839  
83,782  
89,132  
90,295  
94,236  
97,314  
97,705  
105,555  
112,570  
119,654  
132,334  
122,967  
134,141  
139,079  
137,629

(1)

Six-month forecast to June 2004, actual results between July 2003 and December 2003 are reported in Section 2.





200

200

**Annexure 7**

**13.6 Net Present Values and Sensitivities**

The following Tables present the Net Present Values ("NPV") of the 1 January 2004 money terms cash flow as derived from the TEM for each Tax Entity. In summary they include the following:

the variation in NPV with discount factors;

variation in NPV based on single parameter sensitivities; and

variation in NPV based on twin (revenue and operating expenditure) sensitivities.

**13.6.1 Target Tax Entity**

**Table 13.16 Target Tax Entity: NPV at a Range of Discount Factors**

**Discount Factor**

**NPV**

**(%)**

**(ZARm)**

**0.0%**

**5,727**

**4.0%**

**4,449**

**8.0%**

**3,591**

**12.0%**

**2,990**

**16.0%**

**2,554**

**20.0%**

**2,225**

**24.0%**

**1,970**

**Table 13.17 Target Tax Entity: NPV Sensitivity - Varying Single Parameter**

**Sensitivity Ranges**

**Revenue**

**-30%**

**-20%**

**-10%**

**10%**

**20%**

**30%**

**Working Cost**

**-15%**

**-10%**

**-5%**

**5%**

**10%**

**15%**

**Capital**

**-15%**

**-10%**



-5%

5%

10%

15%

Currency

(ZARm)

(ZARm)

(ZARm)

(ZARm)

(ZARm)

(ZARm)

(ZARm)

Valuation at 0.0% Discount Factor

Revenue

301

2,393

4,303

**5,727**

7,122

8,500

9,880

Total Working Cost

7,054

6,613

6,179

**5,727**

5,278

4,810

4,358

Capital

5,804

5,780

5,756

**5,727**

5,694

5,663

5,638

Valuation at 12.0% Discount Factor

Revenue

453

1,371

2,254

**2,990**

3,667

4,313

4,954

Total Working Cost

3,604

3,404

3,202

**2,990**

2,774

2,548

2,321

**Capital**

3,037

3,022

3,007

**2,990**

2,971

2,954

2,938

**Table 13.18 Target Tax Entity: NPV Sensitivity - Varying Twin Parameter at 12.0% Discount**

**NPV (ZARm)**

**-30%**

**-20%**

**-10%**

**10%**

**20%**

**30%**

**Revenue Sensitivity Range**

**-15%**

2,107

2,849

3,540

4,192

4,836

5,455

6,094

**-10%**

1,580

2,412

3,128

3,798

4,443

5,082

5,700

**TWC Sensitivity**

**-5%**

1,017

1,934

2,702

3,404

4,064

4,707

5,327

453

1,371

2,254

**2,990**

3,667

4,313

4,954

**5%**

-110

807

1,724

2,548

3,265

3,933

4,565

**10%**

-673

243

1,160

2,071

2,841

3,533

4,181

**15%**

-1,236

-321

595

1,510

2,386

3,128

3,800





201

201

**Annexure 7**

**13.6.2 Free Gold Tax Entity**

**Table 13.19 Free Gold Tax Entity: NPV at a Range of Discount Factors**

**Discount Factor**

**NPV**

(%)

(ZARm)

**0.0%**

**21,515**

4.0%

15,649

8.0%

11,929

**12.0%**

**9,449**

16.0%

7,737

20.0%

6,499

24.0%

5,578

**Table 13.20 Free Gold Tax Entity: NPV Sensitivity - Varying Single Parameter**

**Sensitivity Ranges**

**Revenue**

**-30%**

**-20%**

**-10%**

**10%**

**20%**

**30%**

**Working Cost**

**-15%**

**-10%**

**-5%**

**5%**

**10%**

**15%**

**Capital**

**-15%**

**-10%**

**-5%**

**5%**

**10%**

**15%**

**Currency**

(ZARm)

(ZARm)

(ZARm)

(ZARm)

(ZARm)

(ZARm)

(ZARm)

**Valuation at 0.0% Discount Factor**

**Revenue**

8,799

13,072

17,285

**21,515**

25,720

29,926

34,131

**Total Working Cost**

27,455

25,475

23,495

**21,515**

19,523

17,515

15,535

**Capital**

21,836

21,729

21,622

**21,515**

21,407

21,300

21,193

**Valuation at 12.0% Discount Factor**

**Revenue**

3,691

5,653

7,546

**9,449**

11,329

13,209

15,089

**Total Working Cost**

12,145

11,247

10,348

**9,449**

8,539

7,611

6,707

**Capital**

9,659

9,589

9,519

**9,449**

9,379

9,310

9,240

**Table 13.21 Free Gold Tax Entity: NPV Sensitivity - Varying Twin Parameter at 12.0% Discount**

**NPV (ZARm)**

**-30%**

**-20%**

**-10%**

**10%**

**20%**

**30%**

**Revenue Sensitivity Range**

**-15%**

5,125

7,025

8,917

10,797

12,677

14,557

16,437

**-10%**

4,624

6,557

8,468

10,348

12,228

14,108

15,988

**TWC Sensitivity**

**-5%**

4,151

6,105

8,019

9,899

11,779

13,659

15,538

3,691

5,653

7,546

**9,449**

11,329

13,209

15,089

**5%**

3,165

5,151

7,084

9,000

10,880

12,760

14,640



**10%**

2,689  
4,670  
6,632  
8,539  
10,431  
12,311  
14,190

**15%**

2,165  
4,210  
6,180  
8,066  
9,981  
11,861  
13,741





202

202

**Annexure 7**

**13.6.3 Joel Tax Entity**

**Table 13.22 Joel Tax Entity: NPV at a Range of Discount Factors**

**Discount Factor**

**NPV**

(%)

(ZARm)

**0.0%**

**730**

4.0%

604

8.0%

509

**12.0%**

**436**

16.0%

378

20.0%

332

24.0%

295

**Table 13.23 Joel Tax Entity: NPV Sensitivity - Varying Single Parameter**

**Sensitivity Ranges**

**Revenue**

**-30%**

**-20%**

**-10%**

**10%**

**20%**

**30%**

**Working Cost**

**-15%**

**-10%**

**-5%**

**5%**

**10%**

**15%**

**Capital**

**-15%**

**-10%**

**-5%**

**5%**

**10%**

**15%**

**Currency**

(ZARm)

(ZARm)

(ZARm)

(ZARm)

(ZARm)

(ZARm)

(ZARm)

**Valuation at 0.0% Discount Factor**

**Revenue**

31

319

527

**730**

922

1,117

1,305

**Total Working Cost**

1,102

975

855

**730**

597

462

319

**Capital**

751

745

738

**730**

720

712

705

**Valuation at 12.0% Discount Factor**

**Revenue**

7

181

313

**436**

550

667

777

**Total Working Cost**

660

583

511

**436**

355

272

181

**Capital**

453

448

442

**436**

428

421

416

**Table 13.24 Joel Tax Entity: NPV Sensitivity - Varying Twin Parameter at 12.0% Discount**

**NPV (ZARm)**

**-30%**

**-20%**

**-10%**

**10%**

**20%**

**30%**

**Revenue Sensitivity Range**

**-15%**

181

312

435

547

664

773

883

**-10%**

133

270

393

511

625

738

848

**TWC Sensitivity**

**-5%**

71

226

354

474

586

703

812

7

181

313

**436**

550

667

777

**5%**

-56

133

271

394

514

626

742

**10%**

-120

72

226

355

476

589

706

**15%**

-184

8

181

314

436

553

671







203

203

**Annexure 7**

**13.6.4 Harmony Free State Tax Entity**

**Table 13.25 Harmony Free State Tax Entity: NPV at a Range of Discount Factors**

**Discount Factor**

**NPV**

(%)

(ZARm)

**0.0%**

**6,596**

4.0%

5,144

8.0%

4,122

**12.0%**

**3,380**

16.0%

2,829

20.0%

2,408

24.0%

2,079

**Table 13.26 Harmony Free State Tax Entity: NPV Sensitivity - Varying Single Parameter**

**Sensitivity Ranges**

**Revenue**

**-30%**

**-20%**

**-10%**

**10%**

**20%**

**30%**

**Working Cost**

**-15%**

**-10%**

**-5%**

**5%**

**10%**

**15%**

**Capital**

**-15%**

**-10%**

**-5%**

**5%**

**10%**

**15%**

**Currency**

(ZARm)

(ZARm)

(ZARm)

(ZARm)

(ZARm)

(ZARm)

(ZARm)

**Valuation at 0.0% Discount Factor**

**Revenue**

790

2,786

4,709

**6,596**

8,483

10,392

12,281

**Total Working Cost**

10,170

8,984

7,781

**6,596**

5,411

4,196

2,995

**Capital**

6,682

6,653

6,625

**6,596**

6,567

6,538

6,509

**Valuation at 12.0% Discount Factor**

**Revenue**

164

1,295

2,356

**3,380**

4,404

5,447

6,469

**Total Working Cost**

5,356

4,704

4,034

**3,380**

2,726

2,045

1,370

**Capital**

3,432

3,415

3,397

**3,380**

3,362

3,345

3,328

**Table 13.27 Harmony Free State Tax Entity: NPV Sensitivity - Varying Twin Parameter at 12.0%**

**Discount**

**NPV (ZARm)**

**-30%**

**-20%**

**-10%**

**10%**

**20%**

**30%**

**Revenue Sensitivity Range**

**-15%**

1,258

2,313

3,337

4,364

5,401

6,424

7,446

**-10%**

913

1,986

3,010

4,034

5,076

6,098

7,120

**TWC Sensitivity**

**-5%**

555

1,627

2,683

3,707

4,738

5,772

6,795

164

1,295

2,356

**3,380**

4,404

5,447

6,469

**5%**

-312

935

2,020

3,053

4,077

5,113

6,143

**10%**

-829

578

1,664

2,726

3,750

4,774

5,818

**15%**

-1,345

189

1,333

2,398

3,422

4,446

5,487





204

204

**Annexure 7**

**13.6.5 Welkom Tax Entity**

**Table 13.28 Welkom Tax Entity: NPV at a Range of Discount Factors**

**Discount Factor**

**NPV**

(%)

(ZARm)

**0.0%**

**171**

4.0%

152

8.0%

137

**12.0%**

**124**

16.0%

114

20.0%

105

24.0%

97

**Table 13.29 Welkom Tax Entity: NPV Sensitivity - Varying Single Parameter**

**Sensitivity Ranges**

**Revenue**

**-30%**

**-20%**

**-10%**

**10%**

**20%**

**30%**

**Working Cost**

**-15%**

**-10%**

**-5%**

**5%**

**10%**

**15%**

**Capital**

**-15%**

**-10%**

**-5%**

**5%**

**10%**

**15%**

**Currency**

(ZARm)

(ZARm)

(ZARm)

(ZARm)



(ZARm)

(ZARm)

(ZARm)

**Valuation at 0.0% Discount Factor**

**Revenue**

-167

-27

89

**171**

250

330

409

**Total Working Cost**

359

296

233

**171**

107

17

-92

**Capital**

171

171

171

**171**

171

171

171

**Valuation at 12.0% Discount Factor**

**Revenue**

-132

-27

63

**124**

183

243

302

**Total Working Cost**

266

218

171

**124**

75

6

-78

**Capital**

124

124

124

**124**

124

124

124

**Table 13.30 Welkom Tax Entity: NPV Sensitivity - Varying Twin Parameter at 12.0% Discount**

**NPV (ZARm)**

**-30%**

**-20%**

**-10%**

**10%**

**20%**

**30%**

**Revenue Sensitivity Range**

**-15%**

-3

76

135

195

254

314

373

**-10%**

-45

50

112

171

231

290

349

**TWC Sensitivity**

**-5%**

-88

13

88

148

207

266

326

-132

-27

63

**124**

183

243

302

**5%**

-176

-70

29

100

160

219

279

**10%**

-219

-114

-10

75

136

196

255

**15%**

-263

-157

-52

44

113

172

231





205

205

**Annexure 7**

**13.6.6 Randfontein Tax Entity**

**Table 13.31 Randfontein Tax Entity: NPV at a Range of Discount Factors**

**Discount Factor**

**NPV**

(%)

(ZARm)

**0.0%**

**19,044**

4.0%

13,558

8.0%

10,040

**12.0%**

**7,691**

16.0%

6,077

20.0%

4,924

24.0%

4,079

**Table 13.32 Randfontein Tax Entity: NPV Sensitivity - Varying Single Parameter**

**Sensitivity Ranges**

**Revenue**

**-30%**

**-20%**

**-10%**

**10%**

**20%**

**30%**

**Working Cost**

**-15%**

**-10%**

**-5%**

**5%**

**10%**

**15%**

**Capital**

**-15%**

**-10%**

**-5%**

**5%**

**10%**

**15%**

**Currency**

(ZARm)

(ZARm)

(ZARm)

(ZARm)

(ZARm)

(ZARm)

(ZARm)

**Valuation at 0.0% Discount Factor**

**Revenue**

6,964

11,078

14,971

**19,044**

22,990

26,923

30,852

**Total Working Cost**

24,812

22,896

20,976

**19,044**

17,075

15,009

12,811

**Capital**

19,374

19,264

19,154

**19,044**

18,929

18,811

18,694

**Valuation at 12.0% Discount Factor**

**Revenue**

2,373

4,230

5,893

**7,691**

9,374

11,046

12,718

**Total Working Cost**

10,180

9,355

8,528

**7,691**

6,816

5,858

4,808

**Capital**

7,916

7,841

7,766

**7,691**

7,610

7,527

7,444

**Table 13.33 Randfontein Tax Entity: NPV Sensitivity - Varying Twin Parameter at 12.0% Discount NPV (ZARm)**

**-30%**

**-20%**

**-10%**

**10%**

**20%**

**30%**

**Revenue Sensitivity Range**

**-15%**

3,695

5,411

7,150

8,941

10,619

12,293

13,965

**-10%**

3,300

4,991

6,731

8,528

10,205

11,881

13,556

**TWC Sensitivity**

**-5%**

2,875

4,572

6,312

8,110

9,791

11,469

13,144

2,373

4,230

5,893

**7,691**

9,374

11,046

12,718

**5%**

1,846

3,765

5,462

7,254

8,941

10,613

12,285



**10%**

1,272  
3,246  
4,998  
6,816  
8,507  
10,181  
11,852

**15%**

717  
2,727  
4,471  
6,361  
8,073  
9,747  
11,419





206

206

**Annexure 7**

**13.6.7 Orkney Tax Entity**

**Table 13.34 Orkney Tax Entity: NPV at a Range of Discount Factors**

**Discount Factor**

**NPV**

(%)

(ZARm)

**0.0%**

**511**

4.0%

467

8.0%

430

**12.0%**

**399**

16.0%

372

20.0%

349

24.0%

328

**Table 13.35 Orkney Tax Entity: NPV Sensitivity - Varying Single Parameter**

**Sensitivity Ranges**

**Revenue**

**-30%**

**-20%**

**-10%**

**10%**

**20%**

**30%**

**Working Cost**

**-15%**

**-10%**

**-5%**

**5%**

**10%**

**15%**

**Capital**

**-15%**

**-10%**

**-5%**

**5%**

**10%**

**15%**

**Currency**

(ZARm)

(ZARm)

(ZARm)

(ZARm)

(ZARm)

(ZARm)

(ZARm)

**Valuation at 0.0% Discount Factor**

**Revenue**

-171

125

322

**511**

695

878

1,062

**Total Working Cost**

911

778

644

**511**

372

229

59

**Capital**

515

514

512

**511**

510

509

507

**Valuation at 12.0% Discount Factor**

**Revenue**

-113

110

256

**399**

539

679

819

**Total Working Cost**

702

601

500

**399**

295

190

64

**Capital**

402

401

400

**399**

398

397

396

**Table 13.36 Orkney Tax Entity: NPV Sensitivity - Varying Twin Parameter at 12.0% Discount**

**NPV (ZARm)**

**-30%**

**-20%**

**-10%**

**10%**

**20%**

**30%**

**Revenue Sensitivity Range**

**-15%**

125

269

411

551

691

831

971

**-10%**

63

217

360

500

640

780

920

**TWC Sensitivity**

**-5%**

-20

164

308

450

590

730

870

-113

110

256

**399**

539

679

819

**5%**

-207

38

204

347

489

629

769

**10%**

-300

-52

150

295

438

578

718

**15%**

-394

-146

91

243

386

527

667







207

207

**Annexure 7**

**13.6.8 Evander Tax Entity**

**Table 13.37 Evander Tax Entity: NPV at a Range of Discount Factors**

**Discount Factor**

**NPV**

(%)

(ZARm)

**0.0%**

**3,040**

4.0%

2,379

8.0%

1,917

**12.0%**

**1,582**

16.0%

1,335

20.0%

1,146

24.0%

998

**Table 13.38 Evander Tax Entity: NPV Sensitivity - Varying Single Parameter**

**Sensitivity Ranges**

**Revenue**

**-30%**

**-20%**

**-10%**

**10%**

**20%**

**30%**

**Working Cost**

**-15%**

**-10%**

**-5%**

**5%**

**10%**

**15%**

**Capital**

**-15%**

**-10%**

**-5%**

**5%**

**10%**

**15%**

**Currency**

(ZARm)

(ZARm)

(ZARm)

(ZARm)

(ZARm)

(ZARm)

(ZARm)

**Valuation at 0.0% Discount Factor**

**Revenue**

276

1,267

2,166

**3,040**

3,927

4,805

5,681

**Total Working Cost**

4,655

4,121

3,582

**3,040**

2,507

1,973

1,408

**Capital**

3,147

3,112

3,076

**3,040**

3,005

2,969

2,934

**Valuation at 12.0% Discount Factor**

**Revenue**

45

608

1,106

**1,582**

2,068

2,545

3,020

**Total Working Cost**

2,467

2,177

1,882

**1,582**

1,290

997

676

**Capital**

1,653

1,629

1,606

**1,582**

1,558

1,535

1,511

**Table 13.39 Evander Tax Entity: NPV Sensitivity - Varying Twin Parameter at 12.0% Discount**

**NPV (ZARm)**

**-30%**

**-20%**

**-10%**

**10%**

**20%**

**30%**

**Revenue Sensitivity Range**

**-15%**

574

1,069

1,545

2,032

2,506

2,981

3,456

**-10%**

425

923

1,399

1,882

2,361

2,836

3,310

**TWC Sensitivity**

**-5%**

255

773

1,253

1,728

2,216

2,691

3,165

45

608

1,106

**1,582**

2,068

2,545

3,020

**5%**

-217

459

960

1,436

1,914

2,400

2,875

**10%**

-486

286

802

1,290

1,765

2,255

2,730

**15%**

-755

81

642

1,144

1,619

2,100

2,584





208

208

**Annexure 7**

**13.6.9 Kalgold Tax Entity**

**Table 13.40 Kalgold Tax Entity**

(1)

**: NPV at a Range of Discount Factors**

**Discount Factor**

**NPV**

**(%)**

**(ZARm)**

**0.0%**

**375**

4.0%

343

8.0%

315

**12.0%**

**291**

16.0%

270

20.0%

251

24.0%

235

(1)

The contribution from Kalgold is subject to a current sale agreement which may see a 100% disposal of the asset in the near future.

**Table 13.41 Kalgold Tax Entity**

(1)

**: NPV Sensitivity - Varying Single Parameter**

**Sensitivity Ranges**

**Revenue**

**-30%**

**-20%**

**-10%**

**10%**

**20%**

**30%**

**Working Cost**

**-15%**

**-10%**

**-5%**

**5%**

**10%**

**15%**

**Capital**

**-15%**

**-10%**

**-5%**

**5%**



10%

15%

Currency

(ZARm)

(ZARm)

(ZARm)

(ZARm)

(ZARm)

(ZARm)

(ZARm)

Valuation at 0.0% Discount Factor

Revenue

90

214

306

**375**

452

521

591

Total Working Cost

510

467

425

**375**

332

282

228

Capital

375

375

375

**375**

375

375

375

Valuation at 12.0% Discount Factor

Revenue

55

154

231

**291**

355

413

470

Total Working Cost

407

371

335

**291**

252

208

159

**Capital**

291

291

291

**291**

291

291

291

(1)

The contribution from Kalgold is subject to a current sale agreement which may see a 100% disposal of the asset in the near future.

**Table 13.42 Kalgold Tax Entity**

(1)

**: NPV Sensitivity - Varying Twin Parameter at 12.0% Discount**

**NPV (ZARm)**

**-30%**

**-20%**

**-10%**

**10%**

**20%**

**30%**

**Revenue Sensitivity Range**

**-15%**

151

230

289

353

410

467

531

**-10%**

119

205

270

335

392

449

514

**TWC Sensitivity**

**-5%**

87

185

251

310

374

431

489

55

154

231

**291**

355

413

470

**5%**

23

122

206

272

335

394

452

**10%**

-9

90

186

252

312

376

433

**15%**

-41

58

156

233

293

358

415

(1)

The contribution from Kalgold is subject to a current sale agreement which may see a 100% disposal of the asset in the near future.





209

209

**Annexure 7**

**13.6.10 Mt. Magnet & Cue Tax Entity**

**Table 13.43 Mt. Magnet & Cue Tax Entity: NPV at a Range of Discount Factors**

**Discount Factor**

**NPV**

**(%)**

**(ZARm)**

**0.0%**

**263**

**4.0%**

**230**

**8.0%**

**200**

**12.0%**

**173**

**16.0%**

**148**

**20.0%**

**125**

**24.0%**

**105**

**Table 13.44 Mt. Magnet & Cue Tax Entity: NPV Sensitivity - Varying Single Parameter**

**Sensitivity Ranges**

**Revenue**

**-30%**

**-20%**

**-10%**

**10%**

**20%**

**30%**

**Working Cost**

**-15%**

**-10%**

**-5%**

**5%**

**10%**

**15%**

**Capital**

**-15%**

**-10%**

**-5%**

**5%**

**10%**

**15%**

**Currency**

**(ZARm)**

**(ZARm)**

**(ZARm)**

**(ZARm)**

(ZARm)

(ZARm)

(ZARm)

**Valuation at 0.0% Discount Factor**

**Revenue**

-1,302

-713

-202

**263**

705

1,147

1,588

**Total Working Cost**

1,134

844

553

**263**

-39

-358

-689

**Capital**

700

555

409

**263**

117

-29

-175

**Valuation at 12.0% Discount Factor**

**Revenue**

-952

-528

-159

**173**

489

805

1,121

**Total Working Cost**

783

580

376

**173**

-37

-261

-495

**Capital**

510

397

285

**173**

60

-52

-164

**Table 13.45 Mt. Magnet & Cue Tax Entity: NPV Sensitivity - Varying Twin Parameter at 12.0% Discount**

**NPV (ZARm)**

**-30%**

**-20%**

**-10%**

**10%**

**20%**

**30%**

**Revenue Sensitivity Range**

**-15%**

-548

-170

162

478

794

1,110

1,421

**-10%**

-681

-285

60

376

692

1,009

1,322

**TWC Sensitivity**

**-5%**

-817

-404

-46

274

591

907

1,222

-952

-528

-159

**173**

489

805

1,121

**5%**

-1,088

-657

-273

69

387

703



1,020  
**10%**  
-1,223  
-793  
-388  
-37  
285  
602  
918  
**15%**  
-1,358  
-928  
-511  
-147  
184  
500  
816





210

210

**Annexure 7**

**13.6.11 South Kalgoorlie Tax Entity**

**Table 13.46 South Kalgoorlie Tax Entity: NPV at a Range of Discount Factors**

**Discount Factor**

**NPV**

**(%)**

**(ZARm)**

**0.0%**

**-32**

**4.0%**

**-35**

**8.0%**

**-38**

**12.0%**

**-40**

**16.0%**

**-41**

**20.0%**

**-43**

**24.0%**

**-44**

**Table 13.47 South Kalgoorlie Tax Entity: NPV Sensitivity - Varying Single Parameter**

**Sensitivity Ranges**

**Revenue**

**-30%**

**-20%**

**-10%**

**10%**

**20%**

**30%**

**Working Cost**

**-15%**

**-10%**

**-5%**

**5%**

**10%**

**15%**

**Capital**

**-15%**

**-10%**

**-5%**

**5%**

**10%**

**15%**

**Currency**

**(ZARm)**

**(ZARm)**

**(ZARm)**

**(ZARm)**

(ZARm)

(ZARm)

(ZARm)

**Valuation at 0.0% Discount Factor**

**Revenue**

-335

-233

-130

**-32**

52

129

206

**Total Working Cost**

168

104

39

**-32**

-113

-199

-285

**Capital**

-2

-12

-22

**-32**

-43

-53

-63

**Valuation at 12.0% Discount Factor**

**Revenue**

-300

-212

-124

**-40**

33

100

166

**Total Working Cost**

134

78

23

**-40**

-110

-183

-257

**Capital**

-11

-21

-30

**-40**

-49

-59

-68

**Table 13.48 South Kalgoorlie Tax Entity: NPV Sensitivity - Varying Twin Parameter at 12.0%**

**Discount**

**NPV (ZARm)**

**-30%**

**-20%**

**-10%**

**10%**

**20%**

**30%**

**Revenue Sensitivity Range**

**-15%**

-189

-101

-20

51

117

184

250

**-10%**

-226

-138

-52

23

89

156

222

**TWC Sensitivity**

**-5%**

-263

-175

-87

-7

61

128

194

-300

-212

-124

**-40**

33

100

166

**5%**

-337

-249

-161

-73

5

72

139

**10%**

-374

-286

-198

-110

-27

44

111

**15%**

-411

-323

-235

-147

-59

16

83







211

211

**Annexure 7**

**13.7 Avgold's Tax Entities**

**Table 13.49 Summations of Avgold Tax Entities: NPV at a Range of Discount Factors**

**Discount Factor**

**NPV**

**NPV per Share**

(%)

(ZARm)

(ZAR)

**0.0%**

**5,727**

8.42

4.0%

4,449

6.54

8.0%

3,591

5.28

**12.0%**

**2,990**

4.40

16.0%

2,554

3.76

20.0%

2,225

3.27

24.0%

1,970

2.90

**Table 13.50 Summations of Avgold Tax Entities: NPV Sensitivity - Varying Single Parameter**

**Sensitivity Ranges**

**Revenue**

**-30%**

**-20%**

**-10%**

**10%**

**20%**

**30%**

**Working Cost**

**-15%**

**-10%**

**-5%**

**5%**

**10%**

**15%**

**Capital**

**-15%**

**-10%**

-5%

5%

10%

15%

Currency

(ZARm)

(ZARm)

(ZARm)

(ZARm)

(ZARm)

(ZARm)

(ZARm)

Valuation at 0.0% Discount Factor

Revenue

301

2,393

4,303

**5,727**

7,122

8,500

9,880

Total Working Cost

7,054

6,613

6,179

**5,727**

5,278

4,810

4,358

Capital

5,804

5,780

5,756

**5,727**

5,694

5,663

5,638

Valuation at 12.0% Discount Factor

Revenue

453

1,371

2,254

**2,990**

3,667

4,313

4,954

Total Working Cost

3,604

3,404

3,202

**2,990**

2,774  
 2,548  
 2,321  
**Capital**  
 3,037  
 3,022  
 3,007  
**2,990**  
 2,971  
 2,954  
 2,938  
**Table 13.51 Summations of Avgold Tax Entities: NPV Sensitivity - Varying Twin Parameter at 12.0%**  
**Discount**  
**NPV (ZARm)**  
**-30%**  
**-20%**  
**-10%**  
**10%**  
**20%**  
**30%**  
**Revenue Sensitivity Range**  
**-15%**  
 2,107  
 2,849  
 3,540  
 4,192  
 4,836  
 5,455  
 6,094  
**-10%**  
 1,580  
 2,412  
 3,128  
 3,798  
 4,443  
 5,082  
 5,700  
**TWC Sensitivity**  
**-5%**  
 1,017  
 1,934  
 2,702  
 3,404  
 4,064  
 4,707  
 5,327  
 453  
 1,371  
 2,254  
**2,990**  
 3,667

4,313

4,954

**5%**

-110

807

1,724

2,548

3,265

3,933

4,565

**10%**

-673

243

1,160

2,071

2,841

3,533

4,181

**15%**

-1,236

-321

595

1,510

2,386

3,128

3,800





212

212

**Annexure 7**

**13.8 Harmony's Tax Entities**

**Table 13.52 Summations of Harmony Tax Entities: NPV at a Range of Discount Factors**

**Discount Factor**

**NPV**

**NPV per Share**

(%)

(ZARm)

(ZAR)

**0.0%**

**52,212**

**202.10**

4.0%

38,491

148.99

8.0%

29,562

114.43

**12.0%**

**23,484**

**90.90**

16.0%

19,218

74.39

20.0%

16,095

62.30

24.0%

13,750

53.22

**Table 13.53 Summations of Harmony Tax Entities: NPV Sensitivity - Varying Single Parameter**

**Sensitivity Ranges**

**Revenue**

**-30%**

**-20%**

**-10%**

**10%**

**20%**

**30%**

**Working Cost**

**-15%**

**-10%**

**-5%**

**5%**

**10%**

**15%**

**Capital**

**-15%**

**-10%**



-5%

5%

10%

15%

Currency

(ZARm)

(ZARm)

(ZARm)

(ZARm)

(ZARm)

(ZARm)

(ZARm)

Valuation at 0.0% Discount Factor

Revenue

14,975

27,889

40,043

**52,212**

64,195

76,168

88,107

Total Working Cost

71,276

64,939

58,583

**52,212**

45,771

39,126

32,289

Capital

53,550

53,105

52,659

**52,212**

51,757

51,302

50,849

Valuation at 12.0% Discount Factor

Revenue

4,838

11,464

17,481

**23,484**

29,326

35,154

40,951

Total Working Cost

33,101

29,914

26,707

**23,484**

20,202  
 16,742  
 13,135

**Capital**

24,429  
 24,115  
 23,800  
**23,484**  
 23,162  
 22,838  
 22,516

**Table 13.54 Summations of Harmony Tax Entities: NPV Sensitivity - Varying Twin Parameter at 12.0% Discount**

**NPV (ZARm)**

**-30%**  
**-20%**  
**-10%**  
**10%**  
**20%**  
**30%**

**Revenue Sensitivity Range**

**-15%**  
 10,369  
 16,434  
 22,361  
 28,308  
 34,133  
 39,934  
 45,733  
**-10%**  
 8,624  
 14,778  
 20,750  
 26,707  
 32,539  
 38,344  
 44,148

**TWC Sensitivity**

**-5%**  
 6,806  
 13,085  
 19,134  
 25,092  
 30,933  
 36,754  
 42,556  
 4,838  
 11,464  
 17,481  
**23,484**  
 29,326

35,154  
40,951  
**5%**  
2,641  
9,627  
15,801  
21,852  
27,701  
33,530  
39,341  
**10%**  
401  
7,697  
14,063  
20,202  
26,073  
31,904  
37,731  
**15%**  
-1,868  
5,719  
12,256  
18,510  
24,448  
30,282  
36,116





213

213

**Annexure 7****14. SUMMARY EQUITY VALUATION AND CONCLUDING REMARKS****14.1 Summary Equity Valuation**

Tables 14.1 and 14.2 present the summary equity valuation for the Companies for LoM Valuations and Proven and Probable Reserve Valuations ("P&P Valuations"). In addition to the valuations of the Tax Entities, the "Sum-of-the-Parts" valuation includes market-based valuation of various interests attributable to Avgold and Harmony as at 1 January 2004, which has been provided to SRK by the Financial Advisors.

The value per share stated also includes the Net cash position as at 31 December 2004, these being the latest available figures. Unallocated Corporate expenses are as stated in Section 12 of this report and are based on a DCF approach assuming a 12.0% discount factor over a ten-year period.

**Table 14.1 Avgold: Summary Equity Valuation****Company/Tax Entity****LoM Valuation****P&P Valuation**

NPV

NPV

@12.0% DCF

@12.0% DCF

(ZARm)

(ZARm)

Avgold

Wholly Owned

Target

(1)

2,990

2,899

**Total Asset Valuation****2,990****2,899**

Unallocated Corporate Expenses

0

0

Net (debt)/cash at 31 December 2003

-3

-3

Mark-to-market Gold Hedge Book at 31 December 2003

-394

-394

**EQUITY VALUE****2,593****2,502**Shares in Issue (**millions**) 31 December 2003**680.1****680.1****DCF per SHARE****3.81****3.68**

(1)

Target Mine only, no value attributed to the Mineral Resources in Table 4.9.







214

214

**Annexure 7**

**Table 14.2 Harmony: Summary Equity Valuation**

**Company/Tax Entity**

**LoM Valuation**

**P&P Valuation**

**NPV**

**NPV**

**@12.0% DCF**

**@12.0% DCF**

**(ZARm)**

**(ZARm)**

**Harmony**

**Wholly Owned**

Free Gold Joint Venture Company (Proprietary) Limited

9,449

9,252

Joel Joint Venture Company (Proprietary) Limited

436

280

Harmony Free State

3,380

2,225

Harmony Welkom

124

124

Randfontein Estates Limited

7,691

4,636

Evander Gold Mining Company Limited

1,582

1,582

Harmony Orkney

399

399

Kalahari Goldridge Mining Company Limited

**(1)**

291

291

Mt. Magnet

173

173

Sth Kalgoolie

-40

-40

**Subtotal**

**23,484**

**18,922**

**Interests In Listed Entities**

Anglovaal Mining Limited (34% Stake)

1,633
1,633
Abelle Limited (83% Stake)
1,547
1,547
Bendigo (31.6% Stake)
297
297
Avgold Limited (11.4% Stake)
837
837
<b>Subtotal</b>
<b>4,314</b>
<b>4,314</b>
<b>Total Asset Valuation</b>
<b>27,798</b>
<b>23,236</b>
Unallocated Corporate Expenses
(2)
-969
-969
Net (debt)/cash at 31 December 2003
25
25
Mark-to-market of Hedge Book at 31 December 2003
-380
-380
Equity Value
<b>26,474</b>
<b>21,912</b>
Shares in Issue
<b>258.4</b>
<b>258.4</b>
<b>DCF per Share</b>
<b>102.47</b>
<b>84.82</b>

(1)  
The contribution from Kalgold is subject to a current sale agreement which may see a 100% disposal of the asset in the near future.

(2)  
Harmony carries unallocated corporate cost at Company Level amounting to approximately ZAR103m per annum. For the purposes of summary equity valuation this cost has been projected out for a period of 10 years and discounted on the same bases as the Tax Entities.

In terms of the pending sale of Kalgold, Harmony has announced that on successful completion of the sale, Harmony will receive ZAR250m. This amount is for a cash consideration of ZAR137.5m and 25,700,935 Alease shares. The net consideration will therefore replace the ZAR291m contribution from Kalgold as currently detailed in Table 14.1.

## **14.2 Hedge Books**

### **14.2.1 Avgold**

Avgold reports in its unaudited financial results for the quarter and half year ending 31 December 2003 that as at 31 December 2003, Avgold's hedge book represented 72% of forecast gold production to June 2006. The commitment had a mark-to-market value of negative ZAR394m calculated at a gold price of US\$414.82/oz and an exchange rate of

ZAR6.65:US\$1.00. This mark-to-market valuation is inclusive of a negative ZAR286m pertaining to the rand/US\$ forward exchange contracts ("FECs") utilised to convert the rand gold hedge into dollar gold hedge.

Subsequent changes to the exchange rates will result in adjustments to the Company's income and thereby creating variability in valuation at Company level.

The net hedge book at 31 December 2003 is presented in Table 14.3.





215

215

**Annexure 7****Table 14.3 Avgold: Net Hedge Book****Period Ending****June 2004****June 2005****June 2006****Dollar forward Sales contracts**

Quantity Sold

(kgs)

4,571

9,137

4,403

(oz)

146,962

293,762

141,545

(US\$/oz)

**314****316****323****14.2.2 Harmony**

Harmony reports in its unaudited financial results for the quarter and half year ending 31 December 2003 that at 31 December 2003, Harmony's hedge book relates only to the production from Harmony Australian Operations. The commitment had a mark-to-market value of negative ZAR380m calculated at a gold price of AUS\$552/ozt.

Subsequent changes to the exchange rates will result in adjustments to the Company's income and thereby creating variability in valuation at Company level.

The net hedge book at 31 December 2003 is presented in Table 14.4.

**Table 14.4 Harmony: Net Hedge Book****Period Ending****June 2005****June 2006****June 2007****June 2008****June 2008****Dollar forward Sales contracts**

Quantity Sold

(kgs)

5,443

3,359

4,572

3,110

3,110

(oz)

175,000

108,000

147,000

100,000

100,000

(Aus\$/oz)

513

510

515

518

518

Call Contracts

(kgs)

3,953

1,244

(oz)

127,100

40,000

(US\$/oz)

**513**

**522**







216

**Annexure 7**

**14.3 Precedent Transactions**

**Table 14.5 Recent Gold Transactions in Africa**

**Project**

(1)

**Period**

(1)

**Gold Price**

(2)

**Location**

(1)

**Status**

(1)

**Seller**

(1)

**Buyer**

(1)

**Price Paid**

(1)

**Au Equivalent**

(1)

**Tonnage**

**Grade**

(1)

**Certainty**

(1)

**\$Paid/ozt**

(1)

(US\$/ozt)

(US\$m)

(ozt)

(Mmt)

(g/mt)

**Disposals/ Acquisitions**

Hartebeestfontein

3Q 1999

295

RSA

PRD

(3)

Avgold

DRD

\$7.4

1,702,000

7.2

7.3

P&PB

(6)

\$4.35

Golden Pride

3Q 1999

295

Tanzania

PRD

Ashanti

Resolute

\$20.0

541,000

5.4

3.1

P&PB

\$36.97

Goldfields

Navachab

3Q 1999

295

Namibia

PRD

Inmet

AngloGold

\$3.6

59,800

1.0

1.9

P&PB

\$60.20

Randfontein

1Q 2000

290

RSA

PRD

Randfontein

Harmony

\$143.0

6,402,000

32.1

6.2

P&PB

\$22.34

Estates

Morila

2Q 2000

280

Mali

PRE

Randgold

AngloGold

\$132.0

2,086,800

17.1

3.8

P&PB  
\$63.25  
Teberebie  
2Q 2000  
280  
Ghana  
PRD  
Pioneer  
Ashanti  
\$18.8  
4,122,000  
113.5  
1.1  
P&PB  
\$4.56  
Group  
Goldfields  
Elandsrand  
4Q 2000  
270  
RSA  
PRD  
Anglogold  
Harmony  
\$130.0  
10,150,000  
41.0  
7.7  
P&PB  
\$12.81  
Damang  
4Q 2001  
278  
Ghana  
PRD  
Ranger  
Gold Fields/  
\$41.2  
1,447,200  
25.0  
1.8  
P&PB  
\$28.47  
Repadre  
Ity  
4Q 2001  
278  
Ivory Coast  
PRD  
Normandy  
Cogema

\$10.8  
338,100  
2.1  
5.0  
P&PB  
\$32.09  
Mining  
Wassa  
4Q 2001  
278  
Ghana  
FEA  
(4)  
Satellite  
Golden Star  
\$9.0  
695,700  
13.0  
1.7  
P&PB  
\$12.94  
Goldfields  
Free State and Joel  
4Q 2001  
278  
RSA  
PRD  
Anglogold  
ARMgold/  
\$222.0  
12,204,000  
52.0  
7.3  
P&PB  
\$18.19  
Harmony  
President Steyn  
4Q 2001  
278  
RSA  
PRD  
Mineserv  
Thistle Mining  
\$32.1  
1,248,000  
6.9  
5.6  
P&PB  
\$25.72  
Crown Gold  
1Q 2002

290  
RSA  
PRD  
DRD  
Khumo  
\$9.2  
944,400  
43.2  
0.7  
P&PB  
\$9.74  
Bathong  
Recoveries  
Holdings  
St. Helena  
2Q 2002  
313  
RSA  
PRD  
Gold Fields  
ARMgold/  
\$11.9  
322,000  
2.0  
5.0  
P&PB  
\$36.96  
Harmony  
Golden Reefs  
4Q 2002  
323  
RSA  
PRD  
EAGC  
Bema Gold  
\$63.6  
1,620,000  
15.5  
3.3  
P&PB  
\$39.26  
Ventures  
Nlotoroso  
1Q 2003  
352  
Ghana  
FEA  
Mogdow  
Newmont  
\$20.0  
531,000

7.0  
2.4  
P&PB  
\$37.66  
Mines  
Mining  
Doornkop  
1Q 2003  
352  
RSA  
PRE  
(5)  
Harmony  
Africa  
\$27.8  
1,051,500  
3.2  
10.2  
P&PB  
\$26.44  
Gold  
Vanguard  
ETC (Avgold)  
1Q 2003  
352  
RSA  
PRD  
Avgold  
Metorex/Crew  
\$36.2  
578,000  
2.1  
8.5  
P&PB  
\$62.63  
Syama  
2Q 2003  
375  
Mali  
PRD  
Randgold  
Resolute  
\$16.6  
4,247,200  
41.3  
3.2  
P&PB  
\$3.90  
Mining







217

**Annexure 7**

**Mining Assets**

**Period**

**Gold Price**

**Location**

**Status**

**Owner**

**Valuation**

**Au Equivalent**

**Tonnage**

**Grade**

**Certainty**

**\$Valued/ozt**

**(US\$/ozt)**

**(US\$m)**

**(ozt)**

**(Mmt)**

**(g/mt)**

**Mergers/Listings**

ARMgold

2Q 2002

285

RSA

PRD

ARMgold

\$352.0

7,795,000

45.7

5.3

P&PB

\$45.16

ARMgold

3Q 2003

350

RSA

PRD

ARMgold

\$480.1

8,940,000

47.9

5.8

P&PB

\$53.71

Harmony

3Q 2003

350

RSA/AUSS

PRD

Harmony

\$1,070.1

28,939,000

173.1

5.2

P&PB

\$36.98

**Avgold**

**1Q 2004**

**366**

**RSA**

**PRD**

**Avgold**

**\$318.2**

**3,600,991**

**16.8**

**6.6**

**P&PB**

**\$88.37**

**Harmony**

**1Q 2004**

**366**

**RSA/AUSS**

**PRD**

**Harmony**

**\$2,809.2**

**35,816,089**

**203.9**

**5.5**

**P&PB**

**\$78.44**

(1)

Source: Metals Economics Group "Historical Gold Transactions Bi-Annual Report, June 2003".

(2)

Source: LSE PM Fix (straight average over period).

(3)

PRD = Asset in production.

(4)

FEA = Project at Feasibility Stage.

(5)

PRE = Project at Pre-Production Stage.

(6)

P&PB = Proved and Probable Reserve Ounces. The reserve ounces as reported for the Disposals and Acquisitions have not been verified in terms of SAMREC compliance.





218

218

**Annexure 7**

**14.4 Concluding Remarks**

The views expressed by SRK in this CPR have been based on the fundamental assumption that the required management resources and pro-active management skills and access to adequate capital necessary to achieve the LoM plan projections for the Mining Assets are sustained.

SRK has conducted a comprehensive review and assessment of all material issues likely to influence the future operations of the Mining Assets. The LoM plans for the Mining Assets, as provided to and taken in good faith by SRK, have been reviewed in detail for appropriateness, reasonableness and viability, including the existence of and justification for departures from historical performance. Where material differences were found, these were discussed with the Companies and adjusted where considered appropriate. SRK consider that the resulting TEPs are based upon sound reasoning, engineering judgement and technically achievable mine plans, within the context of the risks associated with the gold mining industry.

Mr H G Waldeck,  
Dr Michael Harley,  
Director,  
Director,  
SRK Consulting.  
SRK Consulting.  
Dr Michael Armitage,  
Dr Iestyn Humphreys,  
Director,  
Director,  
SRK Consulting.  
SRK Consulting.  
Mr Mike Warren,  
Mr Jonathan Suthers,  
Principal,  
Principal,  
SRK Consulting.  
SRK Consulting.







219

219

## **Annexure 7**

### **GLOSSARY, ABBREVIATIONS AND UNITS**

#### **GLOSSARY**

**AARL elution**

a two step gold strip from loaded carbon comprising batch elution followed by batch electrowinning

**Abelle**

Abelle Limited; a company listed on the ASX, which operates a gold mining operation in Australia and has various interests in exploration properties in Australia and Papua New Guinea

**Aliquot**

a known formation of a whole used in analysis as a sample

**alluvial**

water transported, sedimentary deposit

**alluvial fan**

an outspread, gently sloping mass of alluvium deposited by a stream. Viewed from above, it has the shape of an open fan, the apex being at the valley mouth

**andesite**

a dark-coloured, fine-grained extrusive rock

**AngloGold**

AngloGold Limited

**Anisotropy**

this term is applied both to a random function and to its variogram (or covariance) when the values of the variogram depend on both the distance and the direction

**Archaean**

that period of geological time prior to  $2.5 \times 10^9$

years

before present, i.e. the earliest

part of the Pre-Cambrian

**arenaceous**

term describing sedimentary rocks with a modal grain size in the sand fraction

**argillaceous**

applied to rocks or substances composed of clay minerals, or having a notable portion of clay in their composition

**assay**

the chemical analysis of mineral samples to determine the metal content

**asymmetric**

without symmetry, having no center, plane, axis of symmetry

**atomic absorption**

an instrumental analytical technique based on the principle that atoms of elements in the ground state are able to absorb radiation of the same characteristic wavelength, as they would normally emit if excited

**auriferous**

containing gold

**Avmin**

Anglovaal Mining Limited

**Aztec**

automated non-destructive analysis technique using non-destructive energy dispersive X-Ray analysis

**backfill**

material generally sourced from mine residues and utilised for the filling of mined voids, to ensure long-term stability of excavations and minimise the effects of seismic activity

**Bambanani BU**

Bambanani Gold Mine

**Banded Ironstone**

a rock that consists of alternating bands of iron-rich minerals, generally hematite, and chert or fine grained quartz  
basalt

a dark-coloured igneous rock, commonly extrusive, composed primarily of calcic plagioclase and pyroxene; the fine-grained equivalent of gabbro

**Bayesian**

a statistical method that regards parameters of a population as random variables having known probability distribution  
bedrock

the solid rock that underlies gravel, soil, or other superficial material

**Bendigo**

Bendigo Mining NL; a company listed on the ASX which owns a single gold development project in Australia

**biotite**

a common rockforming mineral of the mica group, has perfect basal cleavage





220

220

**Annexure 7**

box hole

a short raise or opening drive above a drift for the purpose of drawing ore from a stope, or to permit access

blasthole

a drill hole in a mine that is filled with explosives in order to blast loose a quantity of rock

braided

divergence of stream channels into complex system of smaller channels

breast mining

a mining method whereby the direction of mining is in the direction of strike

breccia

a coarse-grained clastic rock, composed of angular broken rock fragments held together by a mineral cement or a fine-grained matrix

bulk mining

any large-scale, mechanised method of mining involving many thousands of tonnes of ore being brought to surface each day

Carbon-in-Leach

the recovery process in which gold is leached from gold ore pulp by cyanide and simultaneously adsorbed onto activated carbon granules in the same vessel. The loaded carbon is then separated from the pulp for subsequent gold removal by elution. The process is typically employed where there is a naturally occurring gold adsorbent in the ore

Carbon-in-Pulp

the recovery process in which gold is first leached from gold ore pulp by cyanide and then adsorbed onto activated carbon granules in separate vessels. The loaded carbon is then separated from the pulp for subsequent gold removal by elution

Carbon-in-Solution

the recovery process in which gold is first leached (typically from heaped ore) by cyanide solution and then adsorbed onto activated carbon granules in separate vessels. The loaded carbon is then separated from the barren solution for subsequent gold removal by elution

capital expenditure

specific project or ongoing expenditure for replacement or additional equipment, materials or infrastructure cash costs

namely direct mining costs, direct processing costs, direct general and administration costs, consulting fees, management fees, bullion transport and refining charges

channel

watercourse, also in this sense sedimentary material course

chert

granular silica

chip-sample

a method of sampling a rock exposure whereby a regular series of small chips of rock is broken off along a line across the face

chromite

a brownish black to iron-black mineral of the spinel group

clast

rock fragments formed in a sequence of sedimentary rocks

clean-up gold

gold recovered as part of a plant closure and demolition

co-kriging

kriging using more than one type of sampling data

comminution

the term used to describe the process by which ore is reduced in size in order to liberate the desired mineral from the gangue material in preparation for further processing

composite

combining more than one sample result to give an average result over a larger distance

concentrate

a metal-rich product resulting from a mineral enrichment process such as gravity concentration or flotation, in which most of the desired mineral has been separated from the waste material in the ore

conglomerate

detrital sedimentary rock

Conops

Continuous Operations

craton

a part of the earths crust that has attained stability and has been little deformed for a long period of geological time







221

221

**Annexure 7**

cross-cut

a horizontal underground drive developed perpendicular to the strike direction of the stratigraphy

crushing

initial process of reducing ore particle size to render it more amenable for further processing

cut-off-grade

the grade of mineralised rock which determines as to whether or not it is economic to recover its gold content by further concentration

dacite

a fine-grained extrusive rock

decline

a surface or sub-surface excavation in the form of a tunnel which is developed from the uppermost point downwards

desalination

chemical process of removing salt from contaminated water

design capacity

the unit throughput estimated for capital equipment under normal operating conditions

detrital

minerals occurring in sedimentary rocks, which were derived from pre-existing rocks either within or outside the basin of deposition

development

underground work carried out for the purpose of opening up a mineral deposit, includes shaft sinking, crosscutting, drifting and raising

development drilling

drilling to establish greater confidence in estimation

dextral

right hand displacement on a fault plane

diabase

rock type of basaltic composition

diamond drill

a rotary type of rock drill that cuts a core of rock that is recovered in long cylindrical sections

dilution

waste which is unavoidably mined with ore

dip

angle of inclination of a geological feature/rock from the horizontal

distal

distant from source

dolomite

a common rock-forming mineral. A sedimentary rock, of which more than 50% by weight consists of the mineral

dolomite

dore

unrefined gold, usually in bar form and consisting primarily of gold with smaller amounts of other precious and base metals, which will be further refined to high purity gold bullion

downcast

a ventilation system whereby air is forced downwards through a tunnel or shaft, from the point of entry by ventilation fans

drawpoint

an underground opening at the bottom of a stope through which broken ore from the stope is extracted

drill-hole

method of sampling rock that has not been exposed

dyke

thin, tabular, vertical or near vertical body of igneous rock formed by the injection of magma into planar zones of weakness

elution

the chemical process of desorbing gold from loaded activated carbon

epigenetic

feature being described had a separate genesis to the host material

erosion

the wearing-away of soil and rock by weathering, mass wasting, and the action of streams, glaciers, waves, wind and underground water

Evander Operations

a complex owned by Harmony and located on the East Rand comprising No.2 BU, No.5 BU, No.7 BU, No.8 BU and No.9 BU and the Rolspuit and Poplar Projects

extrusion

rock solidified from magma on the earth's surface

exploration capital

capital associated with continued gold production but not project specific





222

222

**Annexure 7**

facies

a rock unit defined by its composition, internal geometry and formation environment

fatality rate

number of deaths per million man hours worked

fault

the surface of a fracture along which movement has occurred

felsic

a mnemonic adjective derived from feldspar and applied to an igneous rock having abundant light-colored minerals

filtration

process of separating usually valuable solid material from a liquid

flotation

the process by which the surface chemistry of the desired mineral particles is chemically modified such that they preferentially attach themselves to bubbles and float to the pulp surface in specially designed machines. The gangue or waste minerals are chemically depressed and do not float, thus allowing the valuable minerals to be concentrated and separated from the undesired material

fluvial

pertaining to the processes and actions of a river/stream

flux

substance used to promote the melting of another substance to which it is added

fold

plastic deformation of previously horizontal rock strata

footwall

the underlying side of an orebody or stope

Free Gold

Free Gold Proprietary Limited

FS1 Plant

Free Gold No.1 Gold Plant

FS2 Plant

Free Gold No.2 Gold Plant

gangue

non-valuable components of the ore

graben

a block of rock that lies between two faults and has moved downward to form a depression between the two adjacent fault blocks. See also horst

grade

the measure of concentration of gold within mineralised rock

granite

a plutonic rock in which quartz makes up 10% to 50% of the felsic components

grantoid cupola

a granitic upward projection of an igneous intrusion into its roof

gravimetric finish

the determination of the gold content after fire assay by measurement of the mass of the resultant gold prill

greenstone

a field term for any compact dark-green altered or metamorphosed basic igneous rock that owes its colour to chlorite

hangingwall

the overlying side of an orebody or slope

Harmony

Harmony Gold Mining Company Limited

Harmony-way

general phrase describing operating principals and company codes of practice and reporting standards specifically developed and implemented by Harmony's management

Harmony Australian Operations

a group of assets owned by Harmony and located in Australia comprising Mt. Magnet & Cue BU operations and South Kalgoorlie BU

Harmony Canadian Operations

the Bisset asset owned by Harmony and located in Canada

Harmony Franchise Rules

Internal Company developed guidelines and procedures for reporting

Harmony Free State Operations

a complex owned by Harmony and comprising: Brand No.1/3 BU, Brand No.2 BU, Brand No.5 BU, Harmony No.2 BU, Merriespruit No.1 BU, Merriespruit No.3 BU, Masimong No.4 BU, Masimong No.5, BU Saaiplaas No.3 BU and Unisel No.1 BU

haulage

a horizontal underground excavation which is used to transport mined ore

head grade

the average grade of ore fed to a mill/plant







223

223

**Annexure 7**

hedging

taking a buy or sell position in futures market opposite to a position held in the cash/spot market to minimise the risk of financial loss from an adverse price change

High River

High River Gold Mines Limited; a company listed on AIM which owns, operates and has various interests in gold mining assets in the Russian Federation

Highland Gold

Highland Gold Mining Limited; a company listed on the TSE which has gold mining assets in the Russian Federation, Canada and West Africa

horst

a block of rock that lies between two faults and has moved upward relative to the two adjacent fault blocks. See also graben

homogenous

consisting of only one phase

hydrocyclone

a process whereby material is graded according to size by exploiting centrifugal forces of particulate materials

hydrothermal

process of injection of hot, aqueous, generally mineral-rich solutions into existing rocks or features

igneous

primary crystalline rock formed by the solidification of magma

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 exploration, sampling and testing information gathered through appropriate techniques 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 assumed but not verified geological and/or grade continuity. It is based on information gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drill-holes which may be limited or of uncertain quality and reliability

International Operations

International Operations comprising Harmony Australian Operations and Harmony Canadian Operations

intercalated

layered material that exists or is introduced between layers of a different character; relatively thin strata of one kind of material that alternate with thicker strata of some other kind

intrusive

pertaining to rocks formed by the injection of magma into pre-existing rock and solidified by cooling beneath the surface

inverse distance

interpolation method of assigning values from samples to blocks based on the distance of the samples to the block centroid

jaw crusher

a machine in which rock is broken by the action of steel plates

Kaapvaal Craton

the ancient, proto-continental crystalline basement of South Africa

Kalgold Operations

an open pit mine owned by Harmony and located near Mafikeng, North West Province, South Africa

kerogen-rich

the solid bituminous mineraloid substance in oil shales

komatite

an igneous suite of basaltic and ultramafic lavas and associated rocks

kriging

an interpolation method of assigning values from samples to blocks that minimises the estimation error

lava

fluid rock that issues from a volcano or fissure, also the same material solidified by cooling

leaching

dissolution of gold from crushed and ground material

lenticular

resembling in shape the cross-section of a lens





224

224

**Annexure 7**

leucoxene

a general term for fine-grained, opaque whitish alteration products of ilmenite

Level (mining level)

horizontal tunnel the primary purpose is the transportation of personnel and materials

lithological

geological description pertaining to different rock types

lock-up gold

gold locked as a temporary inventory within a processing plant, or sections thereof, typically milling circuits

lode-gneiss

deposit consisting of a zone of veins (gneiss abundance)

log-kurtosis

statistical parameter describing the peakedness of the curve of the log-frequency distribution of the population

log-mean

arithmetic average of the log values of the population

log-skewness

statistical parameter describing the asymmetry of the curve of the log-frequency distribution of the population

lognormal

term applied to a population whose distribution approximates to normality when the logarithms of the values are taken

log-variance

the square of the standard deviation of the log values of the population

LoM plans

Life-of-Mine plans

longwall mining

a mining method which incorporates breast mining over large continuous spans without the use of pillars

macro-kriging

type of kriging used for long range estimation where sampling information is sparse

mafic

an igneous rock composed chiefly of dark, ferromagnesian minerals

Maximum Operating Capacity

the maximum annual production projected in any given year during the LoM period measured in (ktpa)

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 exploration, sampling and testing information gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drill-holes. The locations are spaced closely enough to confirm geological and grade continuity

Merrill Crowe Process

the industrial process by which gold is precipitated from gold bearing solution by first de-aerating the solution and then adding powdered zinc and lead nitrate

Mesozoic

era of geological time between  $240 \times 10^6$

6

and  $63 \times 10^6$

6

years ago

metamorphism

structural and/or chemical alteration of rocks and minerals by heat, pressure and/or chemical processes

milling

a general term used to describe the process in which the ore is crushed and ground and subjected to physical or chemical treatment to extract the valuable metals to a concentrate or finished product

mill lock-up

the inventory of gold which has accumulated within milling circuits over a defined period

Mine Health and Safety Act

Mine Health and Safety Act, 29 of 1996

Mineral 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, estimated from specific geological evidence and knowledge, or interpreted from a well constrained and portrayed geological model. Mineral Resources are sub- divided in order of increasing confidence, in respect of geoscientific evidence, into Inferred, Indicated and Measured categories







225

225

## **Annexure 7**

### Mineral Reserve

the economically mineable material derived from a Measured and/or Indicated Mineral Resource. It is inclusive of diluting materials and allows for losses that may occur when the material is mined. Appropriate assessments, which may include feasibility studies, have been carried out, including consideration of and modification by, realistically assumed mining, metallurgical, economic, marketing, legal, environmental, social and governmental factors. These assessments demonstrate at the time of reporting that extraction is reasonably justified. Mineral Reserves are sub-divided in order of increasing confidence into Probable Mineral Reserves and Proved Mineral Reserve mineralised

rock in which minerals have been introduced to the point of a potential ore deposit

### Minerals Act

the Minerals Act, 50 of 1999

mini-longwall mining method

a mining method similar to the longwall mining method, but where panels are separated by strike stability pillars thus limiting the dip spans mined

### Mining Assets

a number of exploration and mining assets comprising Avgold's 100% interest in Target and Harmony's 100% interest in the Free Gold Joint Venture Company (Proprietary) Limited ("Free Gold"), a 100% interest in Randfontein Estates Limited, a 100% interest in Evander Gold Mining Company Limited, a 100% interest in Orkney and Welkom Operations, a 100% interest in Kalahari Goldridge Mining Company, Harmony Gold (Australia) Pty Limited, Harmony Gold (Canada) Inc, Harmony Free State and various Significant Exploration Properties

morphological

rock stratigraphy identified by its topographic features

molybdenite

a lead-grey hexagonal mineral

mylonite

a compact chertlike rock with a streaky or banded structure

mynpachten

originates from the Precious and Base Minerals Act 1908 of the Transvaal. The holder of mineral rights on private land entitled to prospect or mine a maximum of 1/4 of mineralised area. Practice discontinued in terms of Mining Rights Act 20/1967.

normal fault

fault in which the hangingwall moves downward relative to the footwall

nugget effect

a measure of the randomness of the grade distribution within a mineralised zone

oligomictic

a clastic sedimentary rock composed of only a few rock types

on-going capital

capital estimates of a routine nature which are necessary for sustaining operations such as replacement or additional equipment, materials or infrastructure

ordinary kriging

a common type of kriging used when sampling information is relatively dense

Orkney operations

a mining complex owned by Harmony and located in the vicinity of the town of Orkney comprising No.1 BU, No.2 BU, No.3 BU, No.4 BU, No.6 BU and No.7 BU

palaeocurrent

ancient water course direction

palaeotopographic

pertaining to ancient topography

payshoot

linear to sub-linear zone within a reef for which gold grades or accumulations are predominantly above the cut-off-grade

pillar

rock left behind to help support the excavations in an underground mine

placer

concentration of heavy minerals in a fluvial system

plunge

the inclination of a fold axis or other linear feature, measured in the vertical plane

P&P Valuation

Discounted Cash flows determined by cutting off the cash flow projections beyond the point that the total Proved and Probable Mineral Reserves have been depleted i.e. excluding LoM components projected from Measured and Indicated Mineral Resources that have not been converted to Mineral Reserve and/or Inferred Mineral Resources included into the LoM plan





226

226

**Annexure 7**

polymictic

describing clastic feel rock composed of more than one rock type

precipitation

the process of separating mineral constituents from solution by evaporation

pre-concentration

processing of the ore, usually screening, before treatment at the plant

President Steyn

President Steyn Gold Mine

Probable Mineral Reserve

the economically mineable material derived from a Measured and/or Indicated Mineral Resource. It is estimated with a lower level of confidence than a Proved Mineral Reserve. It is inclusive of diluting materials and allows for losses that may occur when the material is mined. Appropriate assessments, which may include feasibility studies, have been carried out and including consideration of and modification by, realistically assumed mining, metallurgical, economic, marketing, legal, environmental, social and governmental factors. These assessments demonstrate at the time of reporting that extraction is reasonably justified

project capital

capital expenditure which is associated with specific projects of a non-routine nature

Proterozoic

era of geological time between  $2.5 \times 10$

9

and  $570 \times 10$

6

years ago

Proved Mineral Reserve

the economically mineable material derived from a Measured Mineral Resource. It is estimated with a high level of confidence. It is inclusive of diluting materials and allows for losses that may occur when the material is mined. Appropriate assessments, which may include feasibility studies, have been carried out, including consideration of and modification by realistically assumed mining, metallurgical, economic, marketing, legal, environmental, social and governmental factors. These assessments demonstrate at the time of reporting that extraction is reasonably justified

proximal

near to a source

pyrite

iron sulphide mineral (FeS

2

)

pyrite stringers

a pyrite veinlet or filament, usually one of many, occurring in a discontinuous sub parallel pattern in host rock

pyrrhotite

iron sulphide mineral (Fe

1

-xS)

quartz

crystalline silica, the commonest gangue mineral of ore deposits

quartzite

metamorphic rock composed of quartz

Range (of a variogram)

the distance at which the variogram model becomes a constant

recumbent syncline

overturned syncline in which the axial surface is more or less horizontal  
reef

gold bearing sedimentary horizon in the Witwatersrand Basin

remnant

ore blocks left behind as a result of the underground mining method

reverse/thrust fault

fault in which hangingwall moves upwards relative to the footwall

rhyolite

a group of extrusive igneous rocks, typically porphyritic and commonly exhibiting flow texture

SAMREC Code

South African Code for reporting of Mineral Resources and Mineral Reserves

scattered mining

conventional mining method which is applied in a non-systematic configuration

scheelite

a brown tetragonal mineral

scour

concentrated erosive action

sedimentary

pertaining to rocks formed by the accumulation of sediments, formed by the erosion of other rocks

seismic

earthquake or earth vibration including those artificially induced

Semi-variogram

a semi-variogram expresses the rate of change of the differences of grade (and other variables) as the separation between samples increases







227

227

**Annexure 7**

sequential grid mining

mining method incorporating dip pillars and mined on a grid system

sericite-altered

a white, fine grained potassium mica occurring in small scales and flakes as an alteration product of various aluminosilicate minerals

shale

a fine grained detrital sedimentary rock, formed by the compaction of clay, silt or mud

shaft

an opening cut downwards from the surface for transporting personnel, equipment, supplies, ore and waste

shear  
a deformation resulting from stresses that cause contiguous parts of a body to slide relative to each other in a direction parallel to their plane of contact

sichel `t'

an estimation for the mean of a lognormal distribution (2 or 3 parameters) assuming that random and independent samples have been taken

Significant Exploration Properties

a number of exploration prospects 100% owned by Harmony and comprising the Roslpruit gold project, the Poplar gold project and the Kalplats PGM project

sill

a thin, tabular, horizontal to sub-horizontal body of igneous rock formed by the injection of magma into planar zones of weakness

simple kriging

a type of kriging, which uses a known area mean value as well as sample values

sinistral

left hand displacement on a fault plane

slimes dams

storage facility for metallurgical plant waste product

slope reef

reef comprising a single pebble lag or with no conglomerate developed

smelting

a high temperature pyrometallurgical operation conducted in a furnace, in which the valuable metal is collected to a molten matte or dore phase and separated from the gangue components that accumulate in a less dense molten slag phase

South Africa

the Republic of South Africa

SRK Group

SRK Global Limited

stibnite

a lead-grey mineral

stockwork

a mineral deposit consisting of a three-dimensional network of planar to irregular veinlets closely enough spaced that the whole mass can be mined

stope

underground void created by mining

StopeCAD

integrated mine planning and design computer software

stratiform

strata-bound deposit in which the desired rock or ore constitutes, or is coextensive with, one or more rock layers.

Having the form of a layer or bed

stratigraphy

the science of rock strata

strike

direction of line formed by the intersection of strata surfaces with the horizontal plane, always perpendicular to the dip

direction

sub-crop

describing a rock stratum that unconformably underlies another rock stratum

sub-vertical shaft

an opening cut below the surface downwards from an established surface shaft

sulphide

sulphur bearing mineral

surface sources

ore sources, usually dumps, tailings dams and stockpiles, located at the surface

syncline

concave fold in stratified rock in which the strata dip down to meet in a trough

syngenetic

feature being described had a common genesis as its host material

tectonic

the forces involved in, or the resulting structures of, tectonics

terrace reef

reef formed as a conglomerate package representing higher grade areas

tertiary shaft

an opening cut below the surface downwards from an established sub-vertical shaft





228

228

**Annexure 7**

the Base Case

the Base Case as established as part of the Financial Models

the Financial Model

the financial model as developed by SRK

the Mine Health and Safety Act

the Mine Health and Safety Act, 29 of 1996

the Minerals Act

the Minerals Act, 50 of 1991

thickening

process of concentrating solid particles in suspension

tholeiitic

a basalt characterised by the presence of orthopyroxene

throw

the amount of vertical displacement

thrust fault

see reverse fault

total cash costs

all total cash costs are based on public quoted nominal production costs, include retrenchment costs, rehabilitation costs, corporate costs, by-product credits for silver, sundry revenues and exclude amortisation costs and inventory changes

total expenditure

all expenditures including those of a operating and capital nature

Trust Fund

a fund required by law to be set up, to which annual contributions are paid so that the remaining environmental liability of the operation is covered

Tshepong

Tshepong Gold Mine

tuff

a general term for all consolidated pyroclastic rocks

ultramafic

igenous rock composed chiefly of mafic minerals

unconformity

buried erosion surface separating two rock masses; older exposed to erosion for long interval of time before deposition of younger

upcast

a ventilation system whereby air is drawn upwards through a tunnel or shaft, from the point of entry by ventilation fans

uranite

an isometric metallic mineral, strongly radioactive

Vaal Reefs

Vaal Reefs Gold Mining Company Limited

vamping

a mining method used to recover higher grade ore left in mined stopes

variogram

statistical representation of the characteristics (usually grade)

virgin ground

ground that has had no previous mining activity within it

volcanics

rick types of a volcano

washout

the washing away of earth materials as a result of floods, or a place where such an event took place, also a channel produced in sedimentary deposit by the scouring action of flowing water and later filled with sediment

Welkom Operations

a mining complex owned by Harmony and located in the vicinity of the town of Welkom comprising No.1 BU, No.2 BU, No.3 BU, No.4 BU, No.6 BU and No.7 BU

West

Wits Operations

A complex owned by Harmony and located in the West Rand comprising Elandsrand, Deelkraal, Cooke No.1 BU, Cooke No.2 BU, Cooke No.3 BU and No.7 BU

Witwatersrand Basin

sedimentary basin in South Africa

wrench fault

a more or less vertical fault along which there has been strike separation

Zadra elution

a single step gold strip from loaded carbon comprising both elution and electrowinning in a closed circuit

zircon

a mineral







229

229

**Annexure 7**

**ABBREVIATIONS**

AARL

Anglo American Research Laboratory

ABET

Adult Basic Education and Training

ADS

American Depositary Shares

AIM

Alternative Investment Market of the LSE

ANFO

Ammonium Nitrate Fuel Oil

ARM

African Rainbow Minerals

ASAC

Anglo South Africa Capital (Proprietary) Limited

ASX

Australian Stock Exchange Limited

BCF

Black Chert Facies

BF

Block Factor

BIF

Banded Ironstone Formation

BPZ

Big Pebble Zone

BR

Basal Reef

BRP

Basal Reef Package

BRZ

Basal Reef Zone

BSX

Berlin Stock Exchange

BU

Business Units

CCT

Classified Cemented Tailings

CIL

Carbon-in-leach

CIP

Carbon-in-pulp

CIS

Carbon-in-solution

CONOPS

Continual Operations 365 days-a-year, 24 hours-a-day, implemented by a fourth shift pattern and on a variable roster system to ensure legal compliance with associated labour laws.

CoP

Code-of-Practice

CPI  
Consumer Price Index  
CPR  
Competent Persons' Report  
DCF  
Discounted Cash Flow  
DEP  
the Australian Department of Environmental Protection  
DIR  
the Australian Department of Industry & Resources  
DME  
Department of Minerals and Energy  
DWAF  
Department of Water Affairs and Forestry  
EIA  
Environmental Impact Assessment  
EL  
Elsburg Reef  
EMP  
Environmental Management Programme  
EMPR  
Environmental Management Programme Report  
ERR  
Energy Release Rate  
ESH  
Environmental, Safety and Health  
FoG  
Fall of Ground  
FSG  
Free State Goldfield





230

230

**Annexure 7**

FSO

Free State Operations

GAF

Gold Accounted For

GCF

Gold Called For

GIS

Geographical Information System

GoS

Gold on Surface

HIV

Human Immunodeficiency Virus

IDR

International Depository Receipts

IER

Independent Engineers Report

ISMS

Integrated Security Management System

ISSI

Integrated Seismic Systems International

JMS

Joint Metallurgical Scheme

JORC Code

1999 Australasian Code for Reporting of Mineral Resources and Ore Reserves

JSE

JSE Securities Exchange South Africa

JV

Joint Venture

KGF

Klerksdorp Goldfield

L

Level

LF

Lorraine Facies

LHD

Load Haul Dump (underground mechanised mining machine)

LoM plan

Life-of-Mine plan

LR

Leader Reef

LSE

London Stock Exchange plc

LTA

Lenders Technical Adviser

LTIFR

Lost Time Injury Frequency Rate, quoted in Mmhrs

NFSEC

Northern Free State (Exploration) Company

NYSE  
New York Stock Exchange, Inc  
MCF  
Mine Call Factor  
MF  
Modifying Factors  
MoU  
Memorandum of Understanding  
NNR  
National Nuclear Regulator  
Mmhrs  
Million man hours  
MRF  
Metallurgical Recovery Factor  
No  
Number  
NPV  
Net Present Value  
NUM  
National Union of Mineworkers  
PCF  
Plant Call Factor  
PGE  
Platinum Group Elements  
PLATO  
South African Council for Professional and Technical Surveyors  
PPI  
Purchase Price Index  
PPP  
Purchase Price Parity  
QIB  
Qualified Institutional Buyer







231

231

**Annexure 7**

RC

Reverse Circulation

RMB

Rand Merchant Bank

RoM

Run-of-Mine

RSA

Republic of South Africa

SS

Surface Sources

SAG

Semi-autogenous grinding

SAIMM

South African Institute of Mining and Metallurgy

SAMREC

South African Code for Reporting of Mineral Resources and Mineral Reserves

SARS

South African Revenue Service

SEC

United States Securities and Exchange Commission

SBU

Strategic Business Unit

SCF

Shaft Call Factor

SEC

United States Securities Exchange Commission

SF

Steyn Facies

SG

Specific Gravity

SIFR

Severe Injury Frequency Rate

SLFR

Shifts Lost Frequency Rate

SMU

Selective Mining Unit

SRK

Steffen, Robertson and Kirsten (South Africa) (Proprietary) Limited

SSO

Surface Sources Operations

STD

sexually transmitted disease

SW

Stoping width

sf

Surface

TEC

Total Employees Costed

TEIS

Total Employees in Service

TEMs

Technical Economic Models

TEPs

Technical Economic Projections

ToR

Terms of Reference

TSX

Toronto Stock Exchange

ug

underground

US

United States of America

VCR

Ventersdorp Contact Reef

VRO

Vaal River Operations

VRT

Virgin Rock Temperature

WACC

Weighted Average Cost of Capital, as determined by the market determined cost of debt and cost of equity considering the inflation, tax, interest and risk rates relevant to the socio-economic environment in which the Companies operate

WBQ

Waxy Brown Quartzite

WRCM

West Rand Consolidated Mines Limited

WRD

Waste Rock Dump

YTD

Year to Date





232

232

**Annexure 7**

**UNITS**

AUS\$

Australian dollar

cm

a centimetre

g

grammes

g/t

grammes per metric tonne - gold concentration

Ha

a Hectare

kg

a kilogram

km

a kilometre

km

2

a square kilometre

koz

a thousand ounces

kt

a thousand metric tonnes

ktpa

a thousand metric tonnes per annum

ktpm

a thousand tonnes per month

m

a metre

m

2

a square metre

m

3

a cubic metre

MI

a million litres

Moz

a million ounces

oz

a fine troy ounce equalling 31.10348 grammes

t

a metric tonne

tm

-3

density measured as metric tonnes per cubic metre

°

degrees

`

minutes

%

percentage

US\$

United States dollar

US\$k

thousand United States dollar

US\$m

million United States dollar

US\$/oz

United States dollar per ounce

ZAR

South African rand

ZAR/kg

South African rand per kilogram

ZAR'm

million South African rand

ZAR/t

South African rand per metric tonne

ZAR:US\$

South African rand per United States dollar







233

233

## **Appendage 1**

### **Annexure 7**

#### **OTHER INVESTMENTS**

##### **ANGLOVAAL MINING LIMITED (33,9%)**

Anglovaal Mining Limited ("Avmin") is listed on the JSE and has a number of assets that are in production or in the project phase, principally comprising:

.  
a 42,2% interest in Avgold Limited ("Avgold") that wholly-owns and operates the Target gold mine located in the Free State Province, South Africa;

.  
a 50,3% interest in Assmang Limited ("Assmang") whose assets comprise various manganese, iron ore and chrome operations located in South Africa;

.  
a 55,0% interest in Two Rivers Platinum (Pty) Limited ("Two Rivers") which has an interest in the platinum rights on the farm Dwarsrivier located in the Mpumalanga Province, South Africa; and

.  
a 100,0% interest in the Nkomati Mine ("Nkomati") a nickel producer located near Machadodorp, South Africa with copper, cobalt and platinum also produced as by-products.

Target is a deep level gold mine that has been recently developed to exploit the various reefs that comprise the Eldorado Fan, situated adjacent to the Loraine Mine. The Eldorado Fan comprises a 100m thick stacked series of Elsburg Reefs separated by barren quartzites overlain by younger Dreyerskuil Reefs. A fully mechanised sub-level stoping type mining method was introduced to extract the ore with rock transport being affected by a number of inclined conveyors to the shaft hoisting facilities at Loraine Mine.

Assmang operates three divisions corresponding to the manganese, iron ore and chrome commodity types that are the focus of its operations. The manganese and iron ore assets of Nchwaning and Beeshoek, respectively, are located in the Northern Cape Province. The manganese alloys are produced at smelting and refining facilities located in the KwaZulu-Natal Province. The chrome ore is mined at the Dwarsrivier mine and the alloys are produced at Machadodorp, both located in Mpumalanga Province. The Dwarsrivier open cast chrome mine and beneficiation plant was officially opened in October 2000. The mine, owned and operated by Assmang, is situated approximately 30km from Steelpoort and 60km from Lydenburg in the Mpumalanga Province.

Two Rivers comprises a joint venture with Impala Platinum Holdings Limited ("Implats") (45.0%) which is investigating the development of a platinum mine at the farm Dwarsrivier. It is expected that Two Rivers will be an underground mine using a system of surface declines to transport people, equipment and ore and produce at a level of some 160koz to 170koz per annum for approximately 20 years.

At Nkomati the Massive Sulphide Body is a small, high-grade orebody containing nickel, copper, cobalt, platinum, palladium, rhodium, gold and silver. The orebody is accessed by means of two vertical shafts and a decline to a depth of some 450m and mined by mechanised methods. The milled ore is passed through a flotation circuit from which two types of concentrates are produced. The high grade copper and PGM concentrate is then sent to Rustenburg for smelting, while the high-grade nickel concentrate is sent to Botswana for smelting and to Zimbabwe for refining.

##### **BENDIGO MINING NL (31,6%)**

Bendigo Mining NL ("Bendigo") is listed on the ASX and comprises the New Bendigo Gold Project that has tenements of approximately 450km

2

that cover the entire Bendigo goldfield and environs in Victoria State, Australia. Gold was first discovered at Bendigo in 1851 and it is estimated that 22Moz have been produced from up until production ceased in 1954. Bendigo acquired the leases in 1993 and has since undertaken a systematic evaluation of data and a series of geological, metallurgical and engineering studies. The development of an underground mine is reported to be well-advanced and the initial focus is on two lines of reef, Sheepshead and Deborah, where drilling to date has defined an Inferred Mineral Resource of 1.8Mt at 12g/t gold and a further exploration and bulk sampling programme is planned.





234

234

**Appendage 1**

**Annexure 7**

**ABELLE LIMITED (83,0%)**

Abelle Limited ("Abelle") is listed on the ASX and in January 2003, Abelle merged with Aurora Gold. Operations comprise a number of gold projects at various stages of development, principally:

.  
a 100,0% interest in the Morobe Project in Papua New Guinea with an option to acquire the balance;

.  
a 100,0% interest in the Wafi Project Papua New Guinea; and

.  
a 100,0% interest in the Gidgee Gold Mine, Western Australia.

The Morobe Project has four exploration licences covering an area of 966km

2

in the Wau district of the Morobe Province,

Papua New Guinea. In October 2002 a positive feasibility study was completed that envisages production of 310koz of gold and 5Moz of silver per annum at a production rate of 5Mtpa over an eight-year life.

The Wafi gold/copper deposit is located some 55km from the Morobe Project and comprises four exploration licences covering an area of 990km

2

. The deposit is thought to comprise a porphyry copper-gold pipe overprinted with a high sulphidation gold phase. An infill diamond drilling programme is underway and a series of scoping metallurgical tests have been commissioned to characterise the refractory sulphide mineralisation.

The Gidgee Gold Mine located in Western Australia is currently producing from the underground Swan Bitter operation only. Evaluation of open pit operations is continuing with a view to restarting this year. For the nine months to the March quarter 2003 Gidgee produced 34koz at a cash cost of A\$483 per ounce.

Abelle has interests in various other projects including: Mt. Munro in Kalimantan; a 16,4% interest in Mida Resources Limited; the Credo JV at Mt. Pleasant, Western Australia and various other exploration projects in Australia.





**Annexure 8**

**Independent reporting accountants' report on the pro forma financial effects of the specific issue**

"The Directors

Harmony Gold Mining Company Limited

PO Box 2

Randfontein

1760

7 April 2004

Dear Sirs

**INDEPENDENT REPORTING ACCOUNTANTS' REPORT ON THE UNAUDITED PRO FORMA FINANCIAL INFORMATION OF HARMONY GOLD MINING COMPANY LIMITED ("Harmony")**

**INTRODUCTION**

Harmony proposes a specific issue for cash of convertible bonds to domestic and international investors to raise R1,7 billion, convertible into approximately 14 million Harmony shares ("the Specific Issue").

We report on the unaudited pro forma financial effects of Harmony after the Specific Issue ("the pro forma financial effects"), included as paragraph 9.2 of the circular to shareholders to be dated on or about 15 April 2004 ("the Circular").

The unaudited pro forma financial effects have been prepared for illustrative purposes only and to provide information as to how the Specific Issue will impact on the financial position and results of Harmony after the Transaction and the Avgold Offer (both as defined in the Circular). Because of its nature, the unaudited pro forma financial effects may not give a fair reflection of Harmony's financial position nor the effect on future earnings.

At your request, and for purposes of the Specific Issue, we present our report on the pro forma financial effects of Harmony in compliance with the Listings Requirements of the JSE Securities Exchange South Africa ("JSE").

**RESPONSIBILITIES**

The directors of Harmony are solely responsible for the preparation of the pro forma financial effects to which this independent reporting accountants' report relates, and for the financial statements and financial information from which it has been prepared.

It is our responsibility to form an opinion on the unaudited pro forma financial effects and to report our opinion to you. We do not accept any responsibility for any reports previously given by us on any financial information used in the compilation of the pro forma financial effects, beyond that owed to those to whom those reports were addressed at their dates of issue.

**BASIS OF OPINION**

Our work, which did not involve any independent examination of any of the underlying financial information, consisted primarily of comparing the unadjusted financial information to the unaudited published quarterly financial results of Harmony for the six months ended 31 December 2003, considering the evidence supporting the adjustments to the unaudited pro forma financial effects, recalculating the amounts based on the information obtained and discussing the pro forma financial effects with the directors of Harmony.

Because the above procedures do not constitute an audit or a review in accordance with Statements of South African Auditing Standards, we do not express any assurance on the fair presentation of the unaudited pro forma financial effects.

Had we performed additional procedures or had we performed an audit or review of the financial statements in accordance with Statements of South African Auditing Standards, other matters might have come to our attention that would have been reported to you.

**OPINION**

In our opinion:

- the unaudited pro forma financial effects have been properly compiled on the basis stated;
- such basis is consistent with the accounting policies of Harmony; and
- the adjustments are appropriate for the purposes of the unaudited pro forma financial effects in terms of Section 8.29 of the JSE Listings Requirements.

Yours faithfully

**PricewaterhouseCoopers Inc**

*Chartered Accountants (SA)*

*Registered Accountants and Auditors*

Sunninghill"

235







236

**Annexure 9**

**Details of material loans to the Harmony group**

At

At

**31 December**

**30 June**

Notes

**2003**

**2003**

**R'm**

**R'm**

**Unsecured**

Senior unsecured fixed rate bonds

(a)

1 200

1 200

Fair value adjustment

(34)

(30)

*Less:* Amortised discount and bond issue costs

(13)

(15)

**Total unsecured long term borrowings**

1 153

1 154

**Secured**

BAE Systems Plc

(b)

60

68

*Less:* Short-term portion

(60)

(68)

-

-

BOE Bank Limited loan

(c)

312

375

*Less:* Short-term portion

(125)

(125)

187

250

AngloGold Limited

(d)

347

161

*Less:* Short-term portion

-

-
347
161
Gold Fields Limited
(e)
7
4
<i>Less: Short-term portion</i>
(2)
(1)
5
3
Nedbank Limited
(f)
850
850
<i>Less: Amortised issue costs</i>
(4)
(4)
846
846
BOE Bank Limited loan
(g)
447
-
<i>Less: Short-term portion</i>
(122)
-
325
-
<b>Total secured long-term borrowings</b>
1 710
1 260
<b>Total long-term borrowings</b>
2 863
2 415

**Notes:**

(a)

On 16 June 2001, Harmony launched and priced an issue of senior unsecured fixed rate bonds in an aggregate principal amount of R1 200 million, with semi-annual interest payable at a rate of 13% per annum. These bonds will be repayable on 14 June 2006, subject to early redemption at Harmony's option. The bonds are listed on the Bond Exchange of South Africa. The bonds were issued to settle existing debt and fund the purchase of Elandskraal and New Hampton. Subject to certain exceptions, as long as the bonds are outstanding, Harmony will not permit encumbrances on its present or future assets or revenues to secure indebtedness for borrowed money, without securing the outstanding bonds equally and ratably with such indebtedness, except for certain specified permitted encumbrances. Including in the amortisation charge as per the income statement is R2,5 million (June 2003: R5,0 million) for amortisation of the bond issue costs.

(b)

The loan from BAE Systems Plc is a US dollar denominated term loan of R60 million (\$9 million) (June 2003: R68 million (\$9 million)) for financing the design, development and construction of a facility for the manufacture and sale of value-added gold products at Harmony's premises in the Free State. The loan is secured by a nottimes covering

bond over certain gold proceeds and other assets and is repayable in full on 30 April 2004. The loan bears interest at Libor plus 2% which is accrued daily from the drawdown date and interest is repayable on a quarterly basis.





237

(c)

On 18 April 2002 Harmony entered into a term loan facility of R500 million with BOE Bank Limited for the purpose of partially funding Harmony's acquisition of shares in the ArmGold/Harmony Free Gold Joint Venture Company (Proprietary) Limited ("FreeGold") and loans made by Harmony to FreeGold in connection with the acquisition of mining assets. The facility is collateralised by a pledge of Harmony's shares in FreeGold and is guaranteed by Randfontein, Evander, Kalgold and Lydenburg Exploration Limited. The loan is repayable in full on 23 April 2006 by way of eight semi-annual capital instalments which are due beginning 23 October 2002. The loan bears interest at a rate equal to the JIBAR rate for deposits in Rand plus 1,5% plus specified costs, which is accrued daily from the drawdown date and is payable quarterly in arrears commencing 23 July 2002. The following restrictive covenants apply:

(i)

a consolidated net worth must be more than R4 600 million;

(ii) the total debt to earnings before interest, tax, depreciation and amortisation ("EBITDA") ratio not to exceed 1.5; and

(iii) EBITDA to total debt service ratio should not be less than 3.5.

(d)

On 24 December 2001 FreeGold entered into an agreement with AngloGold to purchase its FreeGold assets for R2 881 million. R1 800 million was payable on 1 January 2002 at the call rate from this date until the 10th business day after the date of fulfilment of the last of the conditions precedent. R400 million is payable on 1 January 2005 at no interest charge. The balance of the consideration was payable five business days before AngloGold was obliged to pay recoupment tax, Capital Gains Tax and any other income tax on the disposal of the assets at no interest charge. Harmony's portion of the outstanding balance at 31 December 2003 was R347 million (June 2003: R161 million), which was proportionately consolidated.

(e)

On 1 July 2002 FreeGold entered into an agreement with St. Helena Gold Mines Limited, a fully owned subsidiary of Gold Fields Limited, to purchase its St. Helena assets for approximately R129 million. R120 million was payable on 29 October 2002, being the effective date after the fulfilment of all the conditions precedent. The balance of approximately R9 million is payable by way of a 1% royalty on turnover, monthly in arrears, for a period of 48 months, commencing on the 10th of the month following the effective date. Harmony's portion of the outstanding loan balance at 31 December 2003 was R7 million (June 2003: R4 million), which was proportionately consolidated.

(f)

On 8 May 2003 Harmony entered into a term loan agreement with Nedbank Limited for R850 million. The purpose of this term loan agreement was to fund the acquisition of 17,25% of Anglovaal Mining Limited. This term loan was paid in two tranches, the first tranche of R611 million was paid on 8 May 2003 and the second tranche of R239 million was paid on 13 May 2003. The loan is secured with guarantees provided by Evander Gold Mines Limited, Randfontein Estates Limited, Kalahari Goldridge Mining Company Limited and Lydenburg Exploration Limited and by a pledge of the shares acquired. The loan is repayable in full on 8 November 2004. The loan bears interest at the 3-month JIBAR rate, plus a margin of 1,5% as well as stamp duties, liquid and reserving costs all converted to a nacq (nominal amount compounded quarterly) rate. Interest is repayable on a quarterly basis. Including in the amortisation charge as per the income statement is R0,25 million (June 2003: R0,5 million) for amortisation of the loan costs.

(g)

The loan was obtained by ARMgold for the purpose of providing to FreeGold ARMgold's 50% of the purchase consideration of the FreeGold assets, payable to AngloGold Limited. The loan will be repaid over a four-year period in bi-annual instalments of R89 580 194, the first was on 31 December 2002 and the final instalment will be on 30 June 2006. The loan carries interest, compounded monthly, at a fixed interest rate of 15,49%. The loan is secured by the following:

(i)

ARMgold's shares in the ARMgold/Harmony Freegold Joint Venture Company (Pty) Limited; and

(ii)



ARMgold's interest in (a) FreeGold (b) the proceeds to ARMgold from the exercise of call options of Harmony set out in the FreeGold Joint Venture Agreement (c) the proceeds to ARMgold of put options purchased by the company to create downside protection on the gold price (d) all amounts owing to ARMgold by the distribution account, being the account to which all distributions by the ARMgold/Harmony Freegold Joint Venture Company (Pty) Limited to ARMgold in the form of the distribution on shares or repayments of interest or capital in respect of unsecured shareholders' loans, must be credited. There were no balances on this account at 31 December 2003 and 30 June 2003, respectively.





238

## **Annexure 10**

### **Agreements relating to the acquisitions and disposals of companies, businesses and properties**

#### **Local acquisitions and disposals**

1.

In financial year ended 30 June 2000, Harmony acquired 100% of the issued ordinary share capital and 96,5% of the warrants to purchase ordinary shares of Randfontein Estates Limited, or Randfontein, a South African gold producer. Randfontein sold 491 905 ounces of gold in the year ended 30 June 2003, which were included in Harmony's gold sales for fiscal 2003.

2.

On 9 April 2001, Harmony completed the purchase of the assets and specified liabilities of the Elandskraal mines from AngloGold Limited, or AngloGold, a South African gold mining company. The Elandskraal mines sold 366 614 ounces of gold in fiscal 2003, which were included in Harmony's gold sales in fiscal 2003.

3.

On 23 April 2002, FreeGold completed the acquisition of the Joel, Tshepong, Matjhabeng and Bambanani mines, associated infrastructure and other mineral rights in the Free State province of South Africa, or the FreeGold assets, from AngloGold. The shares of FreeGold are owned equally by Harmony and ARMgold. During Harmony's fiscal 2003, sales from the FreeGold assets amounted to 1 155 428 ounces of gold and Harmony's interest in these sales totalled 577 714 ounces (referred to as "attributable ounces").

4.

On 24 May 2002 FreeGold announced that it had reached an agreement in principle with Gold Fields Limited to acquire the assets of St. Helena gold mine for a gross sale consideration of R120 million plus royalty payments. The acquisition of the assets, continues the consolidation of the Free State goldfields.

5.

In terms of an agreement reached on 22 April 2003, Harmony jointly with ARMgold, acquired a 34,5% shareholding in Avmin for an aggregate consideration of R1,7 billion.

6.

With effect from 21 July 2003, Harmony acquired an 11,5% shareholding in Avgold Limited in exchange for the issue of 6 960 964 new Harmony shares.

7.

In September 2003, Harmony acquired the entire issued share capital of ARMgold.

#### **Offshore acquisitions and disposals**

1.

In Australia, Harmony acquired New Hampton Goldfields Limited, or New Hampton, with effect from 1 April 2001, and Hill 50 Limited, or Hill 50, with effect from 1 April 2002. Harmony closed its offer for all of the shares of New Hampton on 12 July 2001, and subsequently completed a compulsory acquisition of the remaining shares and options under the rules of the Australian Stock Exchange Limited. Harmony closed its offer for all of the shares and listed options of Hill 50 on 3 May 2002 and subsequently completed a compulsory acquisition of the remaining shares and options under the Rules of the Australian Stock Exchange Limited. In an effort to increase efficiency and reduce corporate expenditures, in the quarter ended 30 June 2002 Harmony integrated New Hampton's Jubilee operations with Hill 50's New Celebration operations to form the South Kalgoorlie operations and combined the corporate offices of New Hampton and Hill 50 in Perth. With effect from 1 April 2002, Harmony reports the New Hampton and Hill 50's operating results together with an "Australian Operations" segment, which is further segmented into the Big Bell operations, the Mt. Magnet operations and the South Kalgoorlie operations (consisting of the Jubilee and New Celebration operations). The total ounces included in Harmony's gold sales for fiscal 2003 was 498 120 ounces.

2.

In December 2001, Harmony acquired a 31,8% equity interest in Bendigo Mining NL, or Bendigo, a single project Australian gold mining development company.

3.

In June 2002, Harmony acquired a 32,5% equity interest in Highland Gold Mining Limited, or Highland Gold, a privately held company organised under the laws of Jersey, Channel Islands that holds Russian gold mining assets and

mineral rights. On 14 October 2003, Harmony announced that it had sold its shareholding in Highland Gold Mining Limited in a placing arranged by City Capital Corporation Limited in London. The price of £2,05 per share achieved in the placing valued the shareholding at approximately R830 million.

4.

In May and June 2002, Harmony acquired a 21% equity interest in High River Gold Mines Limited, or High River, a company organised under the laws of Ontario, Canada that is listed on the Toronto Stock Exchange and holds gold mining assets in Russia, Canada and West Africa. On 17 October 2003, Harmony announced that it had sold 17 074 861 common shares of High River Gold in a placing arranged by BMO Nesbitt Burns. The price achieved was C\$1,75 per share. Harmony realised an amount of US\$22.5 million.

5.

On 26 February 2003 Harmony agreed to subscribe for new shares and announced its intention to make a public take-over offer for Australian-listed producer Abelle Limited, or Abelle. Harmony currently owns 84% of the shares in Abelle.

6.

On 2 December 2003, Harmony announced its intention to sell Bissett to San Gold Resources for C\$7.5 million. The terms of the letter of intent stated that there would be a 90-day option and due-diligence period. During this period, three payments of C\$50,000 will be made at intervals of 2, 30 and 60 days. At the end of the three-month period, San Gold can complete the transaction by paying the company C\$3.5 million in cash and C\$4.0 million, either in cash or by an issue of San Gold shares.





239

**Annexure 11**

**Material changes in the financial or trading position of Harmony**

Between the date of the last audited financial statements of Harmony, being 30 June 2003 and the date of this circular, the following material changes in the financial or trading position of Harmony have occurred:

1.

On 14 October 2003, Harmony announced that it had sold its 31,7% shareholding in Highland Gold Mining Limited in a placing arranged by City Capital Corporation Limited in London. The price of £2,05 per share achieved in the placing valued the shareholding at approximately R830 million.

2.

On 17 October 2003, Harmony announced that it had sold 17 074 861 common shares of High River Gold. The price of achieved was C\$1.75 per share. Harmony realised an amount of US\$22,5 million.

3.

During March 2004, Harmony sold Bissett to San Gold Resources for C\$7.5 million. The purchase consideration was discharged by payment in cash and the issue of shares in San Gold Resources.

4.

On 15 March 2004, Harmony announced its intention to propose an off-market cash offer to acquire all the ordinary shares, listed options and unlisted options in Abelle Limited (Australia) that it did not already own. The Harmony offer was valued at approximately R620 million or A\$125 million. The offer for Abelle consists of the following: A\$2.00 for each Abelle share, A\$1.70 for each of the listed options in Abelle and a price equal to the difference between the cash price offered to Abelle shareholders and the exercise price for each of the unlisted options. The offers were made by Harmony's wholly-owned subsidiary, Harmony Gold (Australia) Pty Limited, which currently holds 83.2% of Abelle's ordinary shares and 69.7% of Abelle's listed options. The offers are conditional on the fulfilment of certain conditions, including Harmony obtaining the necessary regulatory approvals and confirmations from the Foreign Investment Review Board, the South African Reserve Bank and Papua New Guinea regulatory authorities.







240

**Annexure 12**

**Price history of Harmony shares on the JSE**

**High**

**Low**

**Closing**

**Volume**

**(cents)**

**(cents)**

**(cents)**

**Quarterly 2002**

March

13 360

7 000

12 740

59 093 052

June

18 730

11 000

14 200

86 643 890

September

18 150

10 350

16 700

78 034 135

December

16 520

11 550

14 700

61 230 817

**Quarterly 2003**

March

15 620

8 650

9 760

68 846 490

June

11 750

7 100

9 850

102 654 014

September

11 800

8 370

9 950

89 630 043

December

10 975

9 220

10 850

62 632 935

**Monthly 2003**

January

15 620

13 100

13 100

24 945 829

February

13 600

10 540

11 050

23 470 805

March

11 390

8 650

9 760

20 429 856

April

9 850

7 100

7 700

19 952 328

May

11 070

7 900

10 539

62 449 097

June

11 750

9 600

9 850

20 252 589

July

10 480

8 370

9 239

39 201 794

August

10 750

8 800

10 445

20 769 767

September

11 800

9 715

9 950

29 658 482

October

10 975

9 220

10 600

25 092 309

November

10 580

9 302

10 120

15 400 296

December

10 950

9 300

10 850

22 140 330

**Monthly 2004**

January

12 260

10 450

10 901

17 153 140

February

11 500

9 750

10 130

16 016 551

**Daily 2004**

1 March

10 440

10 025

10 320

641 131

2 March

10 320

10 001

10 264

1 155 452

3 March

10 400

10 240

10 335

524 914

4 March

10 550

10 370

10 450

716 925

5 March

10 639

10 490

10 500

1 268 318

8 March

10 500

10 300

10 351  
728 155  
9 March  
10 300  
10 059  
10 178  
437 263  
10 March  
10 300  
10 145  
10 250  
596 886  
11 March  
10 180  
9 920  
9 920  
309 210  
12 March  
10 149  
9 850  
9 852  
728 360  
15 March  
10 100  
9 705  
9 705  
365 933  
16 March  
9 701  
9 503  
9 576  
446 404  
17 March  
9 800  
9 613  
9 784  
594 052  
18 March  
10 299  
9 901  
10 220  
1 499 179  
19 March  
10 340  
10 160  
10 160  
1 118 208  
23 March  
10 230  
9 950  
10 000

768 286  
24 March  
10 220  
10 000  
10 000  
528 852  
25 March  
10 149  
9 830  
9 985  
778 272  
26 March  
10 494  
10 045  
10 359  
485 127  
29 March  
10 250  
9 980  
9 990  
927 164  
30 March  
9 900  
9 651  
9 849  
1 191 842  
31 March  
10 000  
9 781  
9 860  
1 569 855  
1 April  
9 850  
9 640  
9 725  
2 882 077  
2 April  
9 800  
9 255  
9 580  
1 833 141  
5 April  
9 520  
9 310  
9 310  
995 352







241

**Harmony Gold Mining Company Limited**

Incorporated in the Republic of South Africa

Registration number 1950/038232/06

("Harmony" or "the company")

**Directors**

P T Motsepe (*Chairman*), Z B Swanepoel (*Chief Executive*), F Abbott, Dr M M M M Bakane-Tuoane, F Dippenaar, V N Fakude, T S A Grobicki, W M Gule, M W King, D S Lushaba, M F Pleming, Lord Renwick of Clifton KCMG\*, C M L Savage, Dr S P Sibisi, D V Simelane, Dr R V Simelane, M V Sisulu

**Secretary**

M P van der Walt

*\*British*

**Notice of general meeting**

*Terms defined in the Listings Requirements of the JSE Securities Exchange South Africa ("JSE") shall, unless the context clearly indicates otherwise, bear the same meaning where used in this notice.*

Notice is hereby given that a general meeting of Harmony will be held on Friday, 7 May 2004 at 10:00 at Harmony's corporate office, Randfontein Office Park, corner Main Reef Road and Ward Avenue, Randfontein to consider, and if deemed fit, to pass, with or without modification, the following ordinary resolutions:

**ORDINARY RESOLUTION NUMBER 1**

"Resolved that the directors of the company be and are hereby authorised, as a specific authority in terms of section 221 of the Companies Act, 1973, a specific issue in terms of the Listings Requirements of the JSE and as provided for in Articles 2, 2A, 3 and 129 of the company's articles of association, to create and issue for cash up to a maximum of 1 700 (one thousand seven hundred) bonds convertible into new ordinary equity shares of the company ("New Ordinary Shares"), with a principal amount of R1 000 000 (one million Rand), or integral multiples thereof, (each "Convertible Bonds"), comprising a maximum aggregate subscription price of R1 700 000 000 (one billion seven hundred million Rand), substantially on and substantially subject to the terms and conditions set out in the circular to which this notice is attached and such further terms and conditions as the directors may in their discretion deem fit, provided that the:

(a) issue of the Convertible Bonds is approved by the JSE;

(b)

Convertible Bonds will not be issued to non-public shareholders, as defined in paragraphs 4.25 to 4.27 of the Listings Requirements of the JSE;

(c) Convertible Bonds will be denominated in Rands and will be issued at 100% of their principal amount;

(d)

issue of the Convertible Bonds will be subject to the company providing the holders of its securities with a fair and reasonable statement, complying with Schedule 5 to the Listings Requirements of the JSE, from an independent professional expert acceptable to the JSE indicating that the issue of the Convertible Bonds is fair and reasonable to the holders of the company's securities; and

(e) Convertible Bonds will not be issued to a related party/ies as described in paragraph 10 of the Listings Requirements of the JSE."

*The approval of a 75% majority of the votes cast by shareholders present or represented by proxy at the general meeting, excluding any parties and their associates participating in the issue of the Convertible Bonds, is required for this resolution to be effective.*

**ORDINARY RESOLUTION NUMBER 2**

"Resolved that the directors of the company be and are hereby authorised, as a specific authority in terms of section 221 of the Companies Act, 1973, to allot and issue the New Ordinary Shares on and subject to the terms and conditions of the Convertible Bonds."

**ORDINARY RESOLUTION NUMBER 3**

"Resolved that the directors of the company be and are hereby authorised to allot and issue equity securities (including the grant or issue of options or convertible securities that are convertible into an existing class of equity securities) for cash (or the extinction or payment of any liability, obligation or commitment, restraint(s), or settlement of expenses) on such terms and conditions as the directors may from time to time at their sole discretion deem fit, but subject to the

following requirements of the JSE:





242

(a) the equity securities which are the subject of the issue for cash must be of a class already in issue, or where this is not the case, must be limited to such securities or rights that are convertible into a class already in issue;

(b) the equity securities must be issued to public shareholders, as defined in paragraphs 4.25 to 4.27 of the Listings Requirements of the JSE and not to related parties;

(c) securities which are the subject of general issues for cash:

(i) in the aggregate in any one financial year may not exceed 15% of the company's relevant number of equity securities in issue of that class (for purposes of determining the securities comprising the 15% number in any one year, account must be taken of the dilution effect, in the year of issue of options/convertible securities, by including the number of any equity securities which may be issued in future arising out of the issue of such options/convertible securities);

(ii) of a particular class, will be aggregated with any securities that are compulsorily convertible into securities of that class, and, in the case of the issue of compulsorily convertible securities, aggregated with the securities of that class into which they are compulsorily convertible;

(iii) as regards the number of securities which may be issued (the 15% number), shall be based on the number of securities of that class in issue added to those that may be issued in future (arising from the conversion of options/convertible securities), at the date of such application:

(1) less any securities of the class issued, or to be issued in future arising from options/convertible securities issued, during the current financial year;

(2) plus any securities of that class to be issued pursuant to:

(aa) a rights issue which has been announced, is irrevocable and is fully underwritten; or

(bb) an acquisition which has had final terms announced may be included as though they were securities in issue at the date

of application; and

(d) the maximum discount at which equity securities may be issued is 10% of the weighted average traded price of such equity securities measured over the 30 business days prior to the date that the price of the issue is determined or agreed by the directors of the company. The JSE will be consulted for a ruling if the company's securities have not traded in such 30-business day period."

*The approval of a 75% majority of the votes cast by shareholders present or represented by proxy at the general meeting is required for this resolution to be effective.*

#### **ORDINARY RESOLUTION NUMBER 4**

"Resolved that any one of the directors of the company be and is hereby authorised to sign all such documents and do all such things as may be necessary for or incidental to the implementation of the ordinary resolutions to be proposed at the general meeting at which this ordinary resolution number 4 will be proposed."

#### **VOTING AND PROXIES**

Each shareholder of the company who, being an individual, is present in person or by proxy, or being a company, is represented at the general meeting, is entitled to one vote on a show of hands. On a poll, each shareholder present in person or by proxy or represented shall have one vote for every share held by such shareholder. A shareholder entitled to attend and vote at the general meeting may appoint one or more proxies to attend, speak and vote in his/her stead. A proxy need not be a shareholder of Harmony.

Certificated shareholders and own-name dematerialised shareholders who are unable to attend the general meeting, but wish to be represented thereat must complete and return the attached form of proxy (blue) to the transfer secretaries of the company, Ultra Registrars (Proprietary) Limited or Capita Registrars, to reach them by no later than 10:00 on Wednesday, 5 May 2004. The completion of a form of proxy will not preclude a shareholder from attending, speaking and voting at the general meeting to the exclusion of the proxy so appointed.

Dematerialised shareholders, other than those who have elected "own name" registration who wish to attend the general meeting, must request their Central Securities Depository Participant ("CSDP") or broker to provide them with a Letter of Representation or must instruct their CSDP or broker to vote by proxy on their behalf in terms of the agreement entered into between the shareholder and its CSDP or broker.

By order of the board

**HARMONY GOLD MINING COMPANY LIMITED**

**M P van der Walt**

*Secretary*

Virginia

15 April 2004







**Harmony Gold Mining Company Limited**

(Incorporated in the Republic of South Africa)

(Registration number 1950/038232/06)

("Harmony" or "the company")

**Form of proxy**

For use by certificated and "own name" dematerialised shareholders of Harmony ("shareholders") at a general meeting of the company to be held at Harmony's Corporate Office, Randfontein Office Park, Corner Main Reef Road and Ward Avenue, Randfontein at 10:00 on Friday, 7 May 2004 ("the general meeting").

I/We

(NAME IN BLOCK LETTERS)

being the holder/s of

shares in the company, do hereby appoint:

1.

or failing him/her,

2.

or failing him/her,

3. the chairman of the general meeting,

as my/our proxy to act for me/us and on my/our behalf at the general meeting which will be held for the purpose of considering and, if deemed fit, passing, with or without modification, the ordinary resolutions to be proposed thereat and at any adjournment thereof, and to vote for or against the resolutions and/or abstain from voting in respect of the shares registered in my/our name/s, in accordance with the following instructions (see note 2):

**Number of votes on a poll (one vote per share)**

**For**

**Against**

**Abstain**

Ordinary resolution number 1

Ordinary resolution number 2

Ordinary resolution number 3

Ordinary resolution number 4

Signed at

on

2004

Signature

Assisted by me (where applicable)

(**Note:** A shareholder entitled to attend and vote is entitled to appoint a proxy to attend, speak and vote in his/her stead. Such proxy need not

also be a shareholder of the company.)

**Please read the notes on the reverse side hereof.**





**NOTES:**

1.

A certificated or "own-name" dematerialised shareholder may insert the name of a proxy or the names of two alternatives proxies of the certificated or "own name" dematerialised shareholder's choice in the space/s provided, with or without deleting "the chairman of the general meeting", but any such deletion must be initialled by the certificated or "own-name" dematerialised shareholder. The person whose name appears first on the form of proxy and who is present at the general meeting will be entitled to act as proxy to the exclusion of those whose names follow.

2.

A certificated or "own-name" dematerialised shareholder's instructions to the proxy must be indicated by the insertion of the relevant number of votes exercisable by that shareholder in the appropriate box provided. Failure to comply with the above will be deemed to authorise the proxy to vote or to abstain from voting at the general meeting as he/she deems fit in respect of all the certificated shareholder's votes exercisable thereat. A certificated or "own-name" dematerialised shareholder or the proxy is not obligated to use all the votes exercisable by the shareholder or by the proxy, but the total of the votes cast and in respect of which abstention is recorded may not exceed the total of the votes exercisable by the certificated or "own-name" dematerialised shareholder or by the proxy.

3.

This duly completed form of proxy must be received by the company's transfer secretaries, Ultra Registrars (Pty) Limited, 11 Diagonal Street, Johannesburg, 2001 (PO Box 4844, Johannesburg, 2000) or Capita IRG plc, trading as Capita Registrars, The Registry, 34 Beckenham Road, Beckenham, Kent BR3 4TU, England, by no later than 10:00 on Wednesday, 5 May 2004.

4.

The completion and lodging of this form of proxy will not preclude the relevant certificated or "own name" dematerialised shareholder from attending the general meeting and speaking and voting in person thereat to the exclusion of any proxy appointed in terms hereof.

5.

Documentary evidence establishing the authority of a person signing this form of proxy in a representative or other legal capacity must be attached to this form of proxy unless previously recorded by the company's transfer secretaries or waived by the chairman of the general meeting.

6.

Any alteration or correction made to this form of proxy must be initialled by the signatory/ies.

7.

Every person present and entitled to vote at the general meeting as a registered member or as a representative of a body corporate shall on a show of hands have one vote only, irrespective of the number of shares such person holds or represents, but in the event of a poll, such person or representative will have one vote per share.

8.

Dematerialised shareholders, other than those with "own-name" registration who wish to attend the general meeting, must request their CSDP or broker to provide them with a Letter of Representation or they must instruct their CSDP or broker to vote by proxy on their behalf in terms of the agreement entered into between the shareholders and their CSDP or broker.





**SIGNATURES**

Pursuant to the requirements of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized.

Dated: April 23, 2004

Harmony Gold Mining Company Limited

By:

/s/ Frank Abbott

Name: Frank Abbott

Title: Chief Financial Officer