



## AngloGold South American Region Mineração Morro Velho August 2001

José Gregório Ferreira da Mata

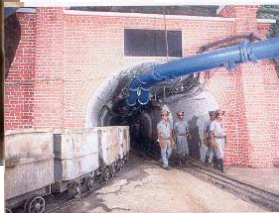
### History

#### Mineração Morro Velho

- ✘ Founded in 1834 by St. John Del Rey Mining Co., MMV is the oldest gold mine in operation in the world;
- ✘ In 1960, the company's assets were split – the gold assets controlled by a Brazilian banking group, and the iron ore assets by a local mining group;



Morro Velho



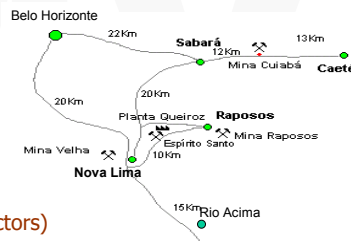
- ✘ The Anglo American group acquired MMV in 1975, and sold the assets to AngloGold in 1999.



# Operational Overview

## Fact Sheet

- ✘ Three operating mines
  - ✚ Mina Velha
  - ✚ Santa Cruz
  - ✚ Cuiabá
- ✘ One Plant
  - ✚ Queiroz
- ✘ 100% Owned by AngloGold;
- ✘ 2000 Production of 211 kOz Au;
- ✘ Op. cash costs of US\$138/Oz\*
- ✘ Mine life to 2015;
- ✘ Employs 1,400 people (including contractors)



**Morro Velho**

\* As at 2QTR 2001, including by-product credits and production royalties.



AngloGold South America, August 2001 – slide 3

# Geology

## Overview

- ✘ Regional Geology
  - ✚ MMV's mines are placed at the 'Iron Quadrangle' or IQ, located in the southeastern region in Brazil;
  - ✚ The IQ comprehends an area of 7,000 km<sup>2</sup>;
  - ✚ Geology structures include:
    - ~ Granite-gneissic terranes of Archean age;
    - ~ Archean greenstone belts of the Rio das Velhas Supergroup;
    - ~ Eo- and Mesoproterozoic, metasedimentary units of the Minas Supergroup, the Itacolomi Group and the Espinhaço Supergroup.<sup>(1)</sup>



**Morro Velho**

(1) Dorr, 1969



AngloGold South America, August 2001 – slide 4

# Geology

## Reserves and Resources

MMV Attributable (100%)

31 Dec 2000

		Reserves			Resources (Inclusive of Reserves)			
		Proven	Probable	Total	Measured	Indicated	Inferred	Total
Tonnes	million	2.9	5.9	<b>8.8</b>	6.0	16.7	18.3	<b>41.0</b>
Grade	g/t	7.52	7.93	<b>7.78</b>	6.45	8.08	6.82	<b>7.21</b>
Gold Ounces	Million	0.7	1.5	<b>2.2</b>	1.2	4.3	4.0	<b>9.5</b>

Morro Velho

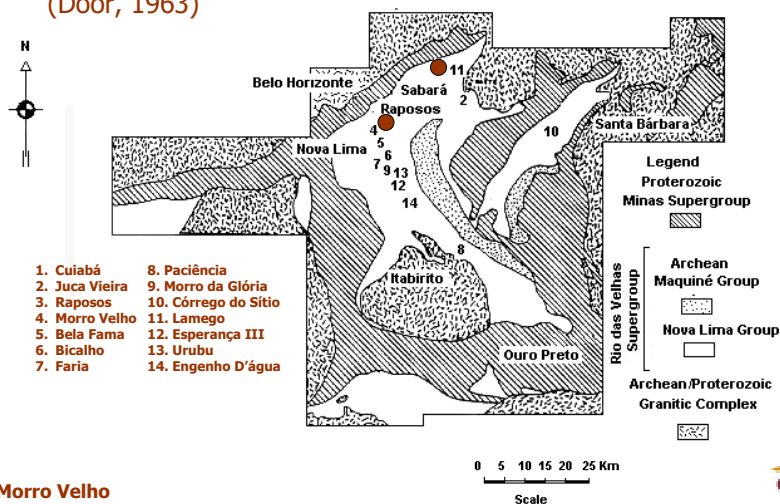


AngloGold South America, August 2001 – slide 5

# Geology

## Iron Quadrangle

### Geological map of the 'Iron Quadrangle' (Door, 1963)



Morro Velho



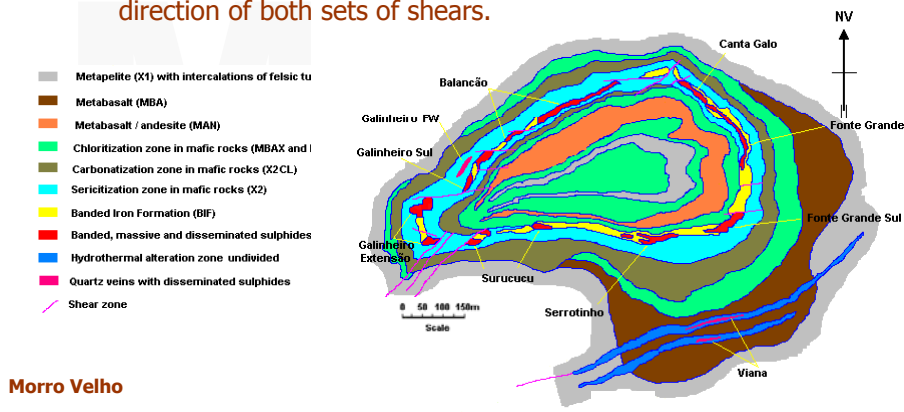
AngloGold South America, August 2001 – slide 6

# Geology

Cuiabá

## Geological map of Cuiabá mine

- ✦ Gold mineralisation hosted in a tubular fold;
- ✦ Orebodies essentially type 2 sulphides – pyrite and arsenopyrite; Ore grade and sulphidation increase in the direction of both sets of shears.



AngloGold South America, August 2001 – slide 7

# Operations

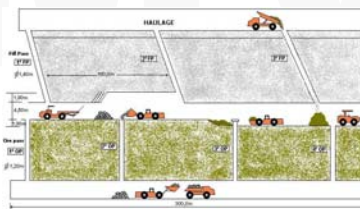
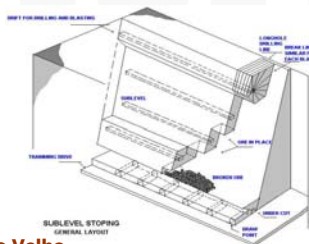
Mining

## Three mines in operation

- ✦ Cuiabá, U/G operation, 2,300 tpd
- ✦ Santa Cruz, O/P operation, 300 tpd
- ✦ Mina Velha, U/G operation, 500 tpd



✦ Cuiabá exploit eight orebodies, mined by cut-and-fill and sub-level stoping. Stopes are filled with waste rock and surface soils.



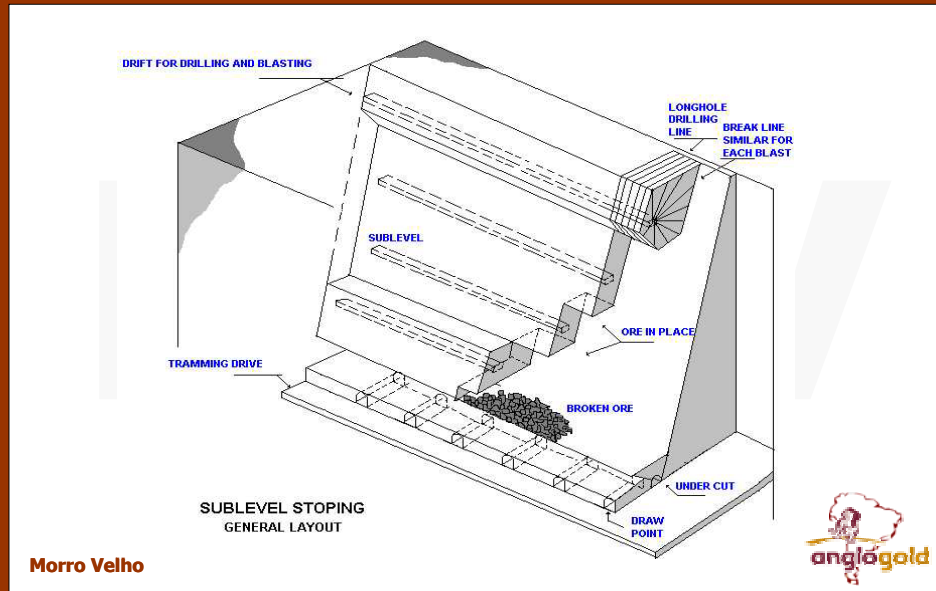
**Morro Velho**



AngloGold South America, August 2001 – slide 8

# Operations

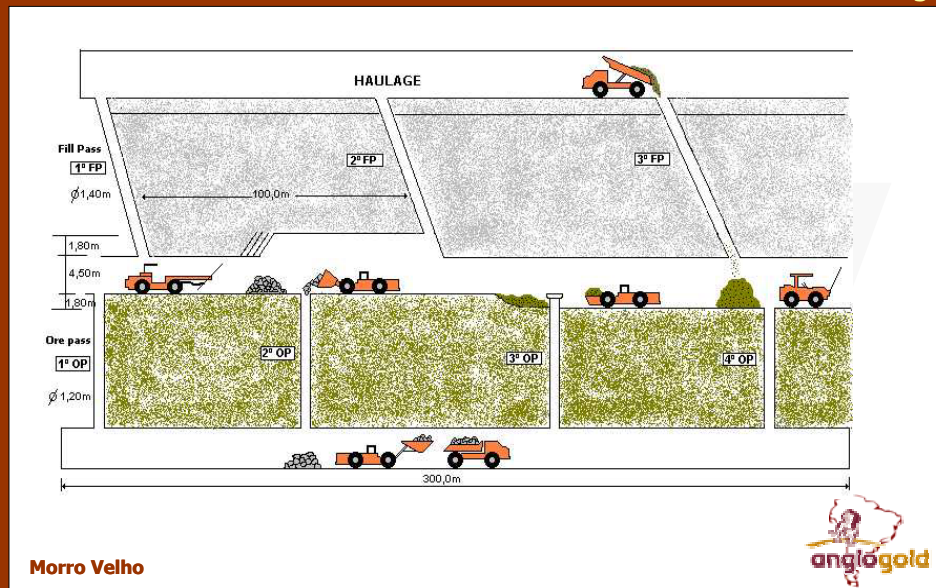
Mining



AngloGold South America, August 2001 – slide 9

# Operations

Mining

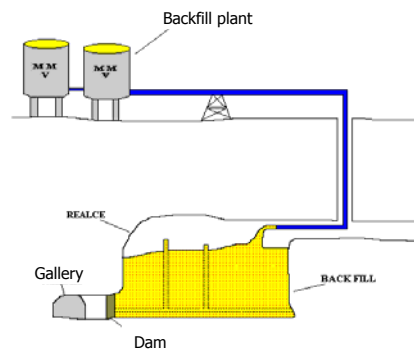


AngloGold South America, August 2001 – slide 10

## Operations

Mining

- ✘ Mina Velha mines ore by overhand cut-and-fill. Classified tailings from the Queiroz plant are used as backfill – 300 tpd.



Morro Velho



AngloGold South America, August 2001 – slide 11

## Operations

Processing

- ✘ Ore fed from three sources
  - ✚ Sulphide ore from Cuiabá, 17 Km from the plant - Ropeway;
  - ✚ Sulphide ore from Mina Velha, 9 Km from the plant – by truck;
  - ✚ Sulphide ore from Espírito Santo, 1 Km from the plant – by truck.
- ✘ Plant commissioned in 1985;
- ✘ Two process routes in separate circuits
  - ✚ Cuiabá
  - ✚ E. Santo/ Velha



Morro Velho

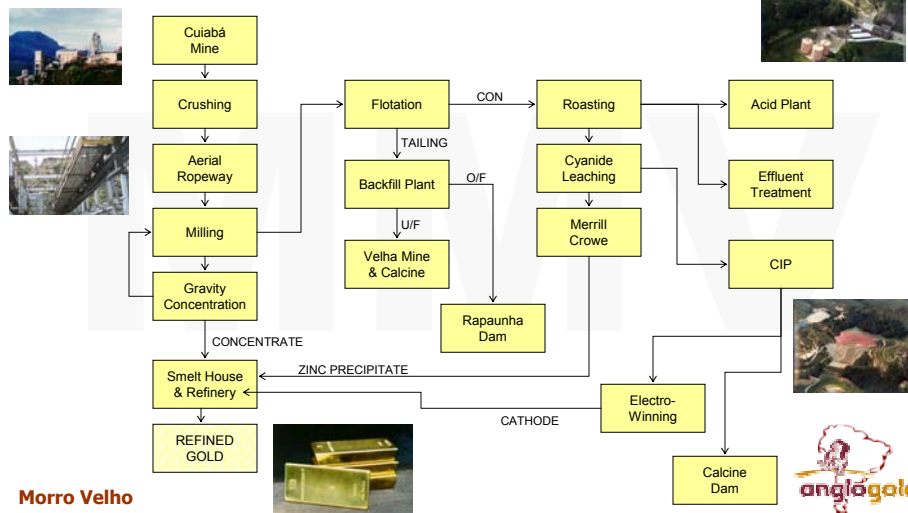


AngloGold South America, August 2001 – slide 12

# Operations

## Processing

### Flowsheet for Cuiabá circuit (refractory)

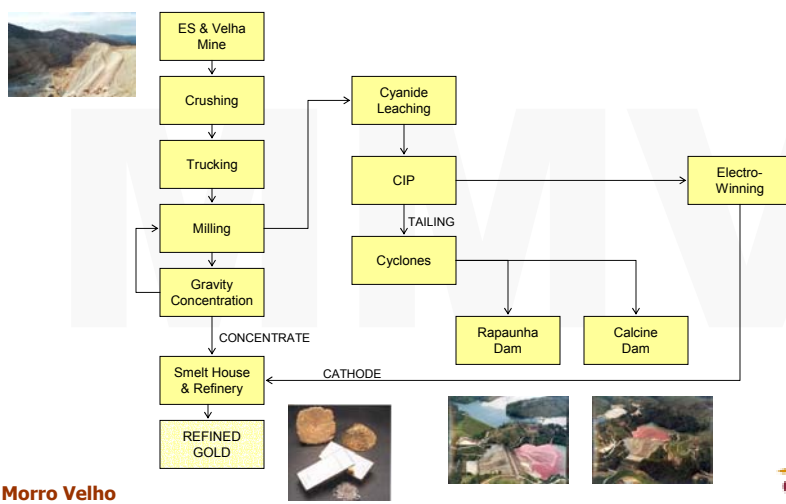


AngloGold South America, August 2001 – slide 13

# Operations

## Processing

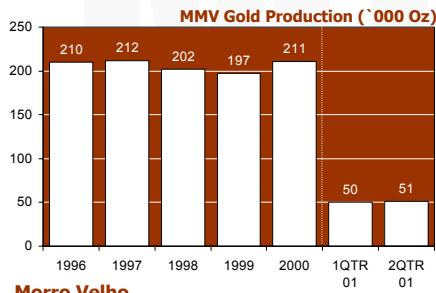
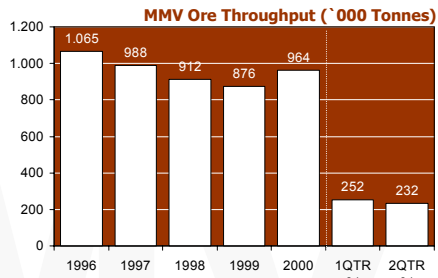
### Flowsheet for E. Santo/Velha circuit (non-refractory)



AngloGold South America, August 2001 – slide 14

# Performance

## Production

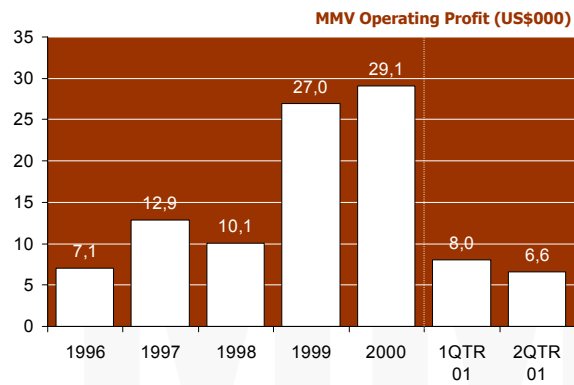


Morro Velho

AngloGold South America, August 2001 – slide 15

# Performance

## Operating Profit

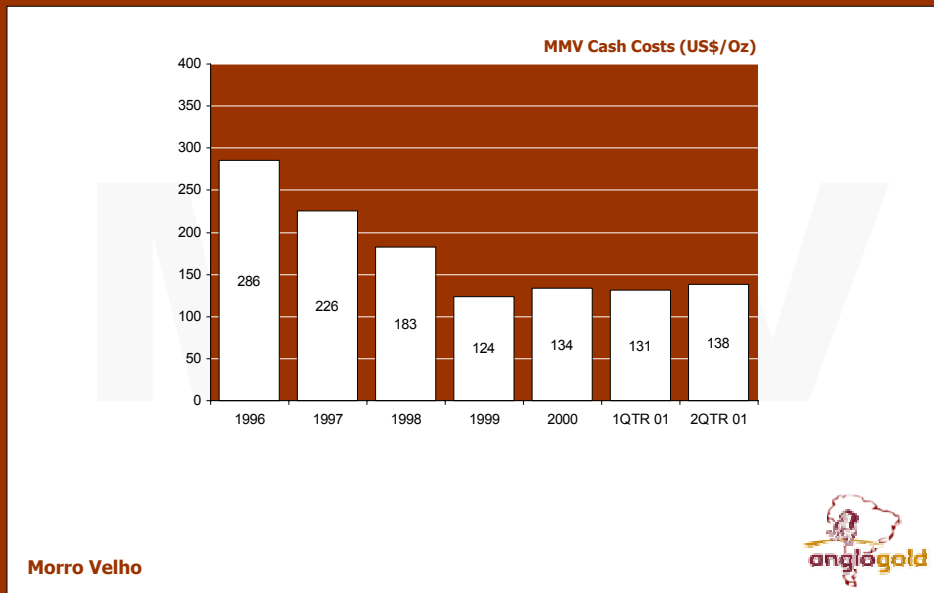


Morro Velho

AngloGold South America, August 2001 – slide 16

# Performance

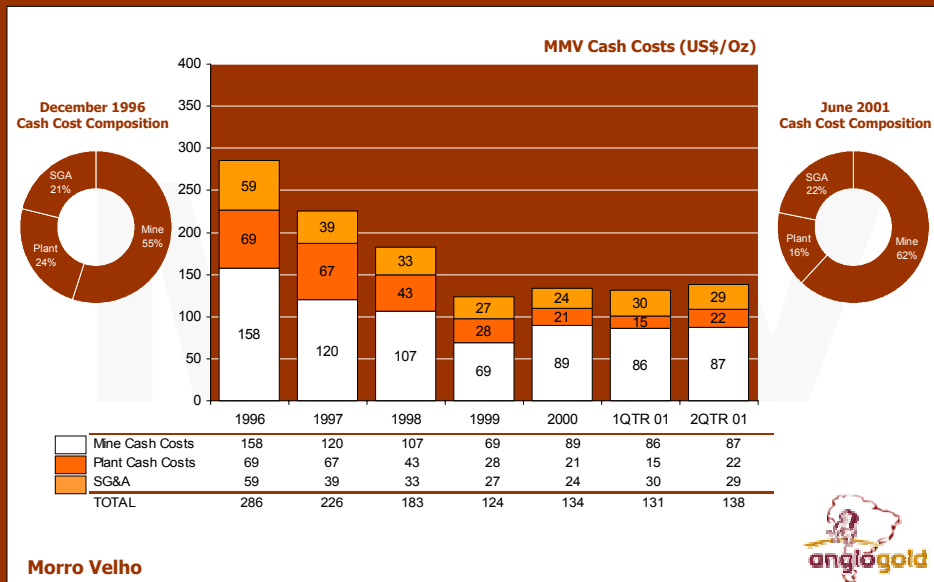
## Cash Costs



AngloGold South America, August 2001 – slide 17

# Performance

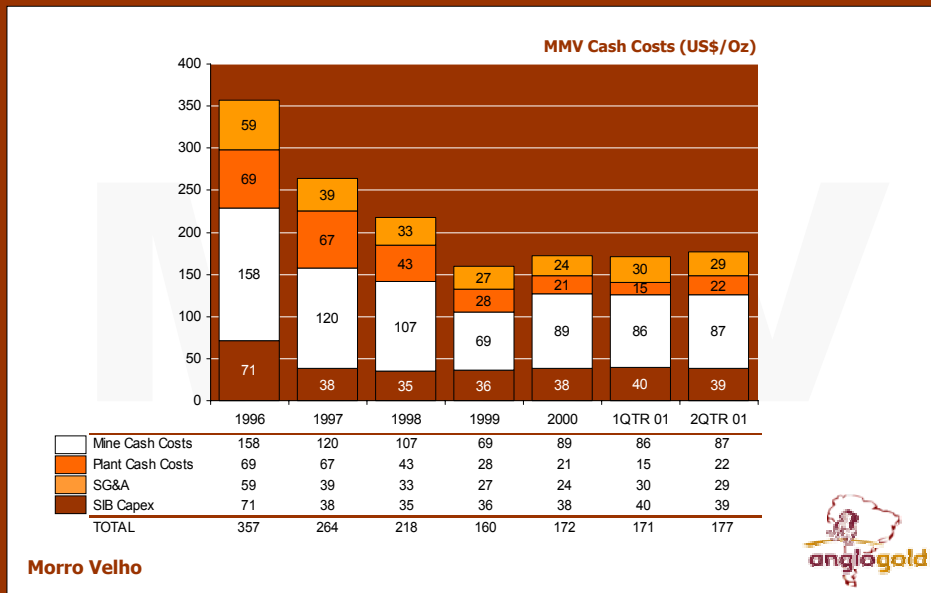
## Cash Costs



AngloGold South America, August 2001 – slide 18

# Performance

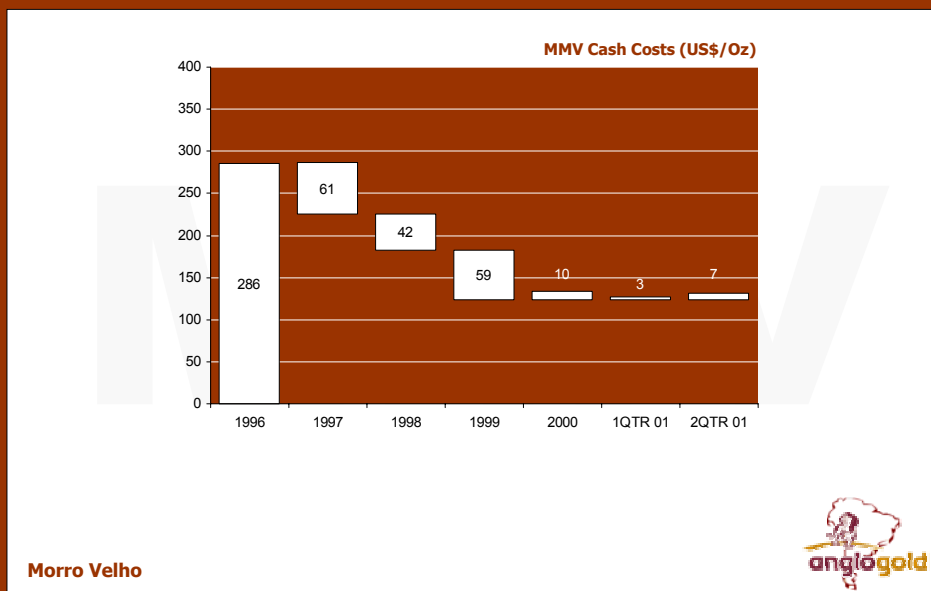
## Cash Costs



AngloGold South America, August 2001 – slide 19

# Performance

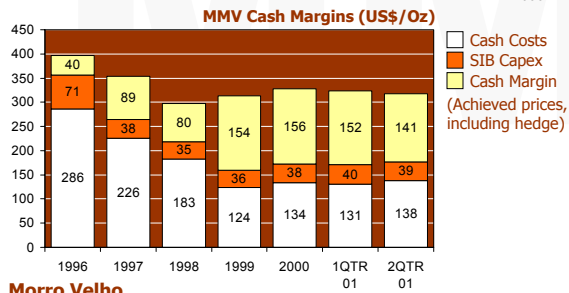
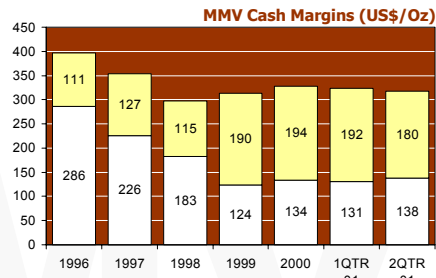
## Cash Costs



AngloGold South America, August 2001 – slide 20

# Performance

## Cash Margins

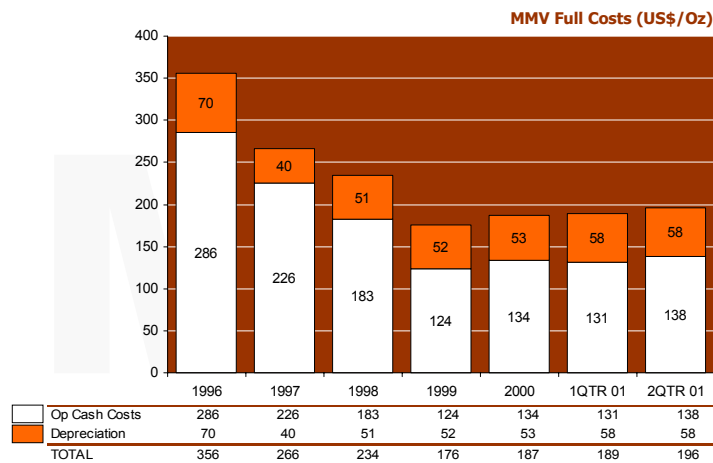


Morro Velho

AngloGold South America, August 2001 – slide 21

# Performance

## Full Costs



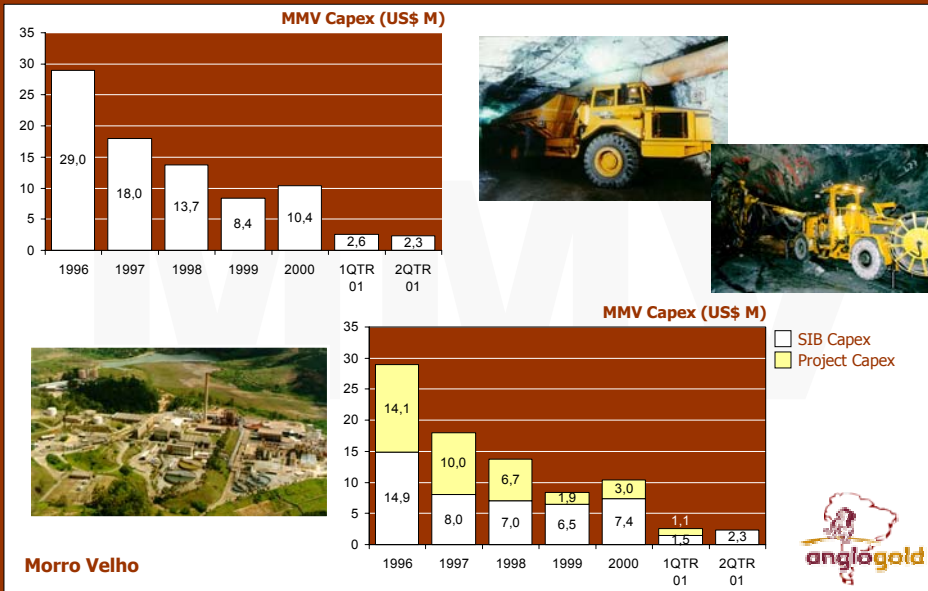
Morro Velho



AngloGold South America, August 2001 – slide 22

# Performance

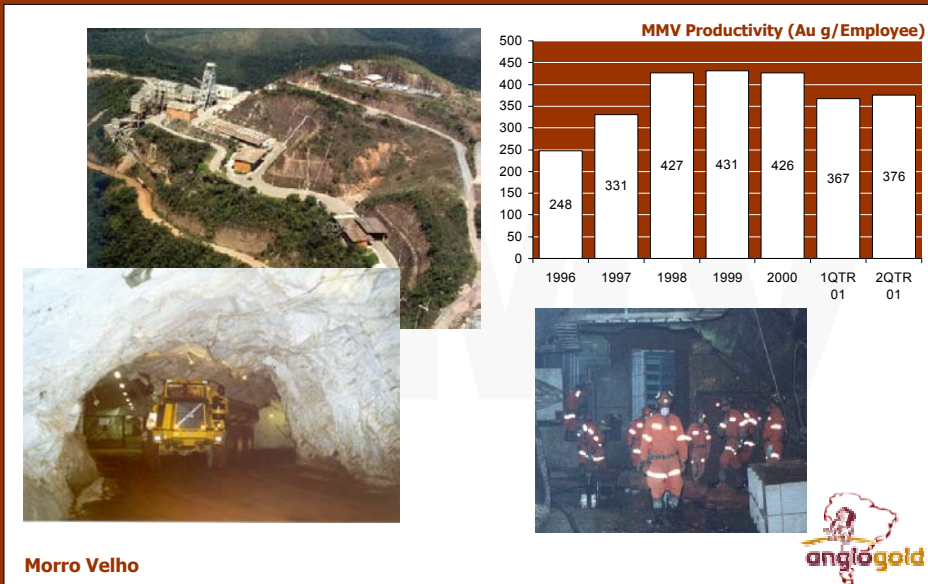
# Capital Expenditure



AngloGold South America, August 2001 – slide 23

# Performance

# Productivity

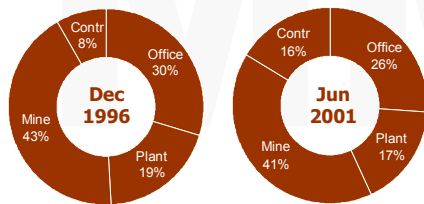
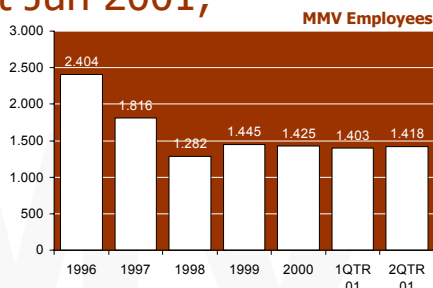


AngloGold South America, August 2001 – slide 24

# Management

## Human Resources

- ✘ 1,400 employees as at Jun 2001;
- ✘ Focused Training;
- ✘ Continuous revision;
- ✘ Social role of MMV.



Morro Velho

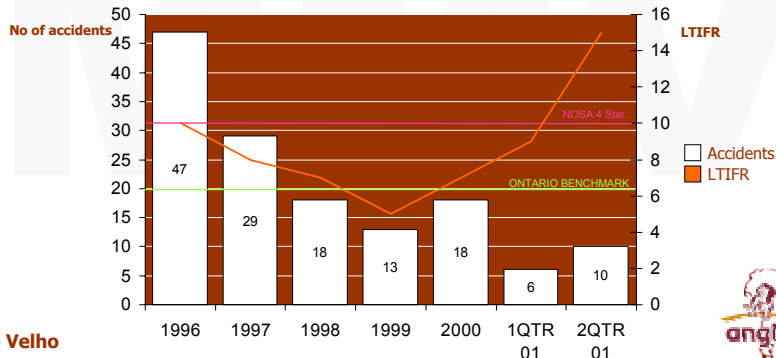


AngloGold South America, August 2001 – slide 25

# Management

## Safety and Health Management

- Standard approach adopted by the group;
- Implementing the NOSA system;
- Expectation of achieving three stars in 2001 and four in 2002.



Morro Velho

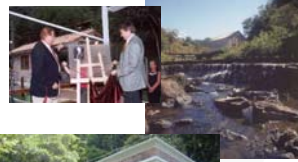


AngloGold South America, August 2001 – slide 26

## Management

## Environment

- ✘ Dedicated internal team liaising with governmental entities and external consultants;
- ✘ Constant monitoring of current trends in environmental risk management;



Morro Velho

- ✘ CEA - Centro de Educação Ambiental Harry Oppenheimer
  - ✘ Community work
  - ✘ Brand Image



AngloGold South America, August 2001 – slide 27

## Looking Forward

## Challenges

- ✘ Replacement of ore from Mina Velha and other sources (non-refractory ore feeding the plant);
- ✘ Bridge technical gaps for future expansion of Cuiabá Mine;
- ✘ Constant review of SG&A costs at MMV;
- ✘ Constant improvement in Health & safety



Morro Velho



AngloGold South America, August 2001 – slide 28

## Looking Forward

### Growth Opportunities

#### ✘ Organic Growth

- ✘ Five projects - could increase production by 50%;
- ✘ Desktop studies completed in June 2001;
- ✘ Decision on best route to be taken.

#### ✘ Córrego do Sítio

- ✘ Oxide ore potential defined;
- ✘ Sulphide ore potential under study.



#### ✘ Cuiabá Expansion

Morro Velho



AngloGold South America, August 2001 – slide 29



#### Certain Forward-Looking Statements

Certain statements contained in this document, including without limitation, those concerning: (i) the economic outlook for the gold mining industry, (ii) expectations regarding gold prices and production, (iii) the completion and commencement of commercial operations of certain of the company's exploration and production projects, and (iv) the company's liquidity and capital resources and expenditure, contain certain forward-looking statements concerning the company's operations, economic performance and financial condition. Although the company believes that the expectations reflected in such forward-looking are reasonable, no assurance can be given that such expectations will prove to have been correct. Accordingly, results could differ materially from those set out in the forward-looking statements as a result of, among other factors, (i) changes in economic and market conditions, (ii) success of business and operating initiatives, (iii) changes in the regulatory environment and other government actions, (iv) fluctuations in gold prices and exchange rates, and (v) business and operational risk management.