South Deep: Finding It’s Feet
SOUTH DEEP SITE VISIT
13 February 2015
Nick Holland, Nico Muller and South Deep Team
Introduction
NICK HOLLAND
Chief Executive Officer
South Deep Gold Mine

A Gold Fields Franchise Asset

- One of the largest undeveloped ore bodies in the world
  - 76.2 Moz of Mineral Resources
  - 38.2 Moz of Mineral Reserves

- A low cost long life mine
  - +70-year LoM

- High level of confidence in the ore body

- The mine has been built

- Mechanised operations
South Deep Gold Mine

What did Gold Fields Acquire in 2007?

- Low resolution in geological block modelling and limited surface exploration drilling
- No robust Life of Mine plan underpinning reserves
- Shaft hoisting capacity limited to 202 ktpm (Main shaft only)
- Metallurgical plant capacity limited to 220 ktpm
- No development to access the ore body below 95 Level
- Old backfill system
- No underground workshop facilities to maintain large fleet
- Tailings facility was reaching full capacity
- Eskom power supply was limited to 80 MW and no emergency power supply
- Minimal underground cooling facilities and surface fans to develop New Mine
- Mining rate was at an average 80 ktpm (Mechanised 63%, Conventional 37%)
- Hostel accommodation inadequate

We Had To Build The Mine!
South Deep Gold Mine

Improved Accuracy and Confidence in Ore Body Modelling

Evolution of a Fit for Purpose Geological Modelling Process
South Deep Gold Mine

De-risking The Ore Body

3D Seismic Survey
(2003)
~20m resolution
Covers the whole lease area south of the wrench fault. Used to confirm the base of lava position as well as major structures.

Surface drilling
(2007-2013)
(49,536m)
600m x 600m grid
Used for facies boundaries, structural definition, stratigraphic modelling, assaying and resource estimation.

LIB Drilling
(Long Inclined Boreholes)
(13,023m)
300m x 300m grid
Used for structural definition, stratigraphic modelling, assaying and grade indication.

Grade Control Drilling
50m x 50m grid
Used for facies determination, structural definition, stratigraphic modelling, assaying and resource estimation.

Now One Of The Best Understood Ore Bodies In South Africa
South Deep Gold Mine

Mining Grades Versus Reserve Grades

Mining Grades (g/t)

<table>
<thead>
<tr>
<th>Year</th>
<th>Mining Grades (g/t)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>6.0</td>
</tr>
<tr>
<td>2011</td>
<td>5.5</td>
</tr>
<tr>
<td>2012</td>
<td>5.0</td>
</tr>
<tr>
<td>2013</td>
<td>4.5</td>
</tr>
<tr>
<td>2014</td>
<td>4.0</td>
</tr>
</tbody>
</table>

Actual Mined Grade

Reserve Grade

Positive Grade Reconciliation
## South Deep Gold Mine

### Infrastructure Status 2015 vs 2007

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td><strong>New Mine Development</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Development</td>
<td>Nil</td>
<td>17 km</td>
<td>2,416</td>
</tr>
<tr>
<td>- Ore handling capacity</td>
<td>200 ktpm</td>
<td>245 ktpm</td>
<td>489</td>
</tr>
<tr>
<td><strong>Twin Shaft Hoisting Capacity</strong></td>
<td>202 ktpm</td>
<td>370 ktpm</td>
<td>868</td>
</tr>
<tr>
<td><strong>New Mining Equipment</strong></td>
<td>-</td>
<td>Fleet upgraded</td>
<td>849</td>
</tr>
<tr>
<td><strong>Metallurgical Plant Capacity</strong></td>
<td>200 ktpm</td>
<td>330 ktpm</td>
<td>645</td>
</tr>
<tr>
<td><strong>FPT Backfill</strong></td>
<td>Nil</td>
<td>Plant commissioned</td>
<td>396</td>
</tr>
<tr>
<td><strong>Tailings Storage</strong></td>
<td>Limited</td>
<td>LOM TSF commissioned</td>
<td>389</td>
</tr>
<tr>
<td><strong>Surface Exploration Drilling</strong></td>
<td>Nil</td>
<td>9 holes completed</td>
<td>116</td>
</tr>
<tr>
<td><strong>Underground Refrigeration</strong></td>
<td>Nil</td>
<td>25.5 MwR</td>
<td>93</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4 x BAC’s</td>
<td>72</td>
</tr>
</tbody>
</table>

* Expenditure 2009 to date

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We Have Built The Mine - Transition To Build Up Enabled
### Infrastructure Status 2015 vs 2007 (Continued)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>93 Level Main Workshop Equipping</td>
<td>Nil</td>
<td>70 Cat 1 machines</td>
<td>33</td>
</tr>
<tr>
<td>Single Accommodation Upgrades</td>
<td>Nil</td>
<td>922 single rooms</td>
<td>70</td>
</tr>
<tr>
<td>Eskom Power Supply - Emergency Power Supply</td>
<td>80 MW, Nil</td>
<td>160 MW, 15 MW</td>
<td>51</td>
</tr>
<tr>
<td>Mechanised Training Facilities</td>
<td>Nil</td>
<td>Technical and practical capacities</td>
<td>26</td>
</tr>
<tr>
<td>Mega Surface Store</td>
<td>Nil</td>
<td>3,600 m²</td>
<td>15</td>
</tr>
<tr>
<td>Sustaining Capital</td>
<td></td>
<td></td>
<td>1,235</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td><strong>7,769</strong></td>
</tr>
</tbody>
</table>

*Expenditure 2009 to date*
South Deep Gold Mine

Evolution of Mining Since 2006

1998
- Limited mechanised mining commences
- Convention al destress

2007
- April 2007 Gold Fields acquires 100% of South Deep Gold Mine

2008
- Destress mining mechanised
- All conventional mining, including VCR, stopped

2009
- Horizontal destress and Longhole Stopping commences

2013
- Crush pillars introduced

2015
- 96% of current mine destressed vs 66% in 2007 (Reserve 2.2 Moz)
- 9% of Phase 1 NoW destressed (Reserve 11.3 Moz).
- Current mine = 10 years of mining @ 80 ktpm

Increased Mechanisation = Improved Safety
2014 Intervention

● People Strategy
  • Short term
    › Rightsizing of workforce through voluntary separation process
  • Medium term
    › Recruit South African Team from limited pool of skills
  • Long term
    › Grow South African skills pool through bespoke mechanised mining training

● Fleet Availability and Utilisation
  • Decongest the mine
  • Cat A equipment reduced from 126 to 75
  • Fast-track Mega Workshop on 93-level
  • Upgrade satellite workshops
  • Replace key equipment

● Ore handling infrastructure
  • Fast-tracked additional ore passes and other key infrastructure
South Deep Gold Mine

Safety Related Ground Support Intervention

- Growing momentum in H1 2014 interrupted in May
- Four-month suspension of production for ground support in 2014
- Knock-on effects into 2015
  - Destress
  - Long-hole open stopes delayed

Acceleration of Medium Term People Strategy

- Medium and long-term people strategy accelerated
  - Recruiting South African leadership skills
  - Growing the South African skills pool
- Introduction of new team under Nico Muller
- Australian Team downscaled – key role in skills transfer and training

70% of Production Areas Curtailed For Four Months
Observations After First 100 Days
NICO MULLER
Executive Vice President: South Africa Region
Leadership: Structure

Strength and Stability Required
Leadership: The People (continued)

Blessed Mazibuko  
Head of Finance  
09 Jan 2015

Bonny Sebola  
Head of Sustainable Development

Ulrich Sibilski  
Head of Environment  
15 Sep 2014

Tumelo Nkisi  
Head of Human Resources  
09 Jan 2015

Jana Strydom  
Head of Legal & Compliance  
19 Nov 2014

Manie Keyser  
Head of Mineral Resource Management

Building the Team
<table>
<thead>
<tr>
<th>Position</th>
<th>Appointment Date</th>
<th>Qualifications and Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>EVP South Africa</td>
<td>01 Oct 2014</td>
<td>BSc Mining Engineering, 20 years experience in South African mining, underground hard rock mechanized experience at De Beers, Anglovaal, African Rainbow Minerals (Two Rivers) and Royal Bafokeng Platinum. Involved in establishing Target Gold Mine - similar ore body and mining methods to South Deep.</td>
</tr>
<tr>
<td>Nico Muller</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VP South Deep</td>
<td>09 Jan 2015</td>
<td>NHD Mining Engineering, General Manager at Two Rivers Platinum (300 ktpm mechanized board and pillar operations) from 2009 to 2014, previous leadership experience at Anglo Platinum Rustenburg operations</td>
</tr>
<tr>
<td>Adriaan de Beer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Head of Mining</td>
<td>09 Jan 2015</td>
<td>Mine Managers Certificate, Section Manager at Lonmin from 2010 to 2012 and then promoted to Mining leader at Lonmin in December 2012. 3.1 (a) from June 2014. Extensive mechanized mining experience at Lonmin and Two Rivers (2 years as Mining Leader).</td>
</tr>
<tr>
<td>Francois van Heerden</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Head of Engineering</td>
<td>01 Feb 2015</td>
<td>Bachelors of Commerce, Graduate Mechanical Engineer, 16 years experience in Central African gold mining, 26 years South African mining experience. Maintenance and Engineering leadership experience with Gold Fields Ltd, AngloGold Ashanti, Anglo American and GenCor Mining.</td>
</tr>
<tr>
<td>Errol Drake</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Andre Marais</td>
<td>(Jan 1980)</td>
<td></td>
</tr>
</tbody>
</table>
South Deep Gold Mine

Geology: Quality Ore Body

- Massive, multi-layered (16 reef horizons)
- 38.2 Moz reserve, 70+ years life of mine
- Well developed exploration programme and resource modelling
- High predictability

The Value Inherent in South Deep Remains, But May Be Longer Dated
South Deep Gold Mine

Proven Mining Methods

- Deep level massive mining
  - Destress
  - Drifting, benching, longhole stoping
- Fully mechanised
- Improved safety, productivity and costs
- Destress pilot tests (4.5x4.5m, inclined slot)
- Key constraint: support installation
  - One pass support system
  - Destress pilot projects
  - Backfill: Full plant tailings
- UG workings not ideal
  - Roadways
  - Water management
  - Ventilation control and temperatures
  - Backlog support

The Value Inherent in South Deep Remains, But May Be Longer Dated
Drifting and Benching

- Width - 6m
- Height - 5 to 15m
- Length - up to 60m
- Selective targets < 15m thickness
- Drifts 315 tonnes per blast
- Benches 670 tonnes per blast
South Deep Mining Methods

Longhole stoping (detail)

Longhole Stoping
- Width - 15m
- Height - 15 to 45m
- Length - up to 60m
- Large targets > 15m thickness
- 4,500 tonnes per blast
South Deep Mining Methods

Horizontal destress with longhole stoping

- Conceptualised reef block with surrounding waste material at a depth of 2,700 m
South Deep Mining Methods

Horizontal destress with longhole stoping

- Cut-out for mining method description
Horizontal destress with longhole stoping

- Sinking of a shaft and development into the target where destressing can start
Horizontal destress with longhole stoping

- Destressing continuing
Horizontal destress with longhole stoping

- Destressing continuing
South Deep Mining Methods

Horizontal destress with longhole stoping

- Destress continuing
South Deep Mining Methods

Horizontal destress with longhole stoping

- Second destress cut in progress
Destress cut – mining sequence

- Establishment of a destress cut

Destress mining dimensions:

- Width: 5.0m
- Height: 2.5m
Destress cut – mining sequence

• Once a sufficient area is destressed the initial destress accessed are enlarged to a height of 5.5m.
  
  This allows access for bigger equipment used in longhole stoping.
Destress cut – mining sequence

- Continuation
South Deep Mining Methods

Destress cut – mining sequence

- Completed destress cut
Destress cut – destress envelope

- Destressed envelope – stresses reduced from 80 Mpa (insitu) to between 35 and 40 Mpa
- Mimics conditions at a depth of 1,200 m below surface (actual 2,700 m below surface)

- A destress zone above and below the destress cut is established allowing large excavations in close proximity of one another
Destress cut – destressed reserves

- On average every ton of destress mining makes available 7.2 tonnes of targeted reserves
- Each destress cut destresses on average 155 Koz of longhole stoping reserves
- Longhole stopes accessed from one destress cut
Destressed targets

- Detress envelopes describing the what is available for mining (destressed)
South Deep Mining Methods

Horizontal destress with longhole stoping

- Third destress cut started
- Longhole stoping starts – retreat mining from the outer limits toward the main access
South Deep Mining Methods

Horizontal destress with longhole stoping

- Longhole stoping and destressing continuing
- Initial longhole stope backfilled
• The spiral ramp system accesses destress cut at 17m vertical intervals
South Deep Mining Methods

Development

- Longhole stoping and destressing continuing
- Initial longhole stope backfilled

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South Deep Mining Methods

Horizontal destress with longhole stoping

- Longhole stoping and destressing continuing
- Initial longhole stope backfilled

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At a steady state a project such as this will produce at an average rate of 46 Ktpm
South Deep Gold Mine

Infrastructure

- 2009 ramp up capital project
  - Approved  R8.4 billion (2009 terms)
  - Expenditure to date  R7.8 billion

- Primary infrastructure in place to support mine ramp up

- Key issues :
  - Ore handling infrastructure
  - Planned maintenance

Installed Infrastructure

- Shaft infrastructure and hoisting capacity (330 ktpm)
- Ore handling system (220 ktpm – railbound)
- Ventilation and refrigeration capacity to support production plans
- Gold plant expansion (330 ktpm)
- Tailings storage facility suitable for life of mine
- Backfill plants (CCT & FPT) and shaft piping
- Underground mega trackless workshop (93L)

Remaining Infrastructure Construction

- On-going New Mine development (100L, 105L 110L)
- Ore handling system (330 ktpm conveyor belts)
- UG backfill reticulation (FPT)
- Pumping (deferred to 2018)
- Ice Plant (deferred to 2020)
South Deep Gold Mine

Trackless Fleet

- 2014 fleet rationalisation

<table>
<thead>
<tr>
<th>Description</th>
<th>Fleet Size</th>
<th>2013</th>
<th>2014</th>
<th>Var%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drill Rigs</td>
<td>26</td>
<td>11</td>
<td></td>
<td>-58%</td>
</tr>
<tr>
<td>LP Drill Rigs</td>
<td>21</td>
<td>11</td>
<td></td>
<td>-48%</td>
</tr>
<tr>
<td>Simbas</td>
<td>5</td>
<td>5</td>
<td></td>
<td>0%</td>
</tr>
<tr>
<td>LHDs</td>
<td>25</td>
<td>16</td>
<td></td>
<td>-36%</td>
</tr>
<tr>
<td>LP LHDs</td>
<td>25</td>
<td>15</td>
<td></td>
<td>-40%</td>
</tr>
<tr>
<td>Dump Trucks</td>
<td>20</td>
<td>13</td>
<td></td>
<td>-35%</td>
</tr>
<tr>
<td>Secondary Support</td>
<td>4</td>
<td>4</td>
<td></td>
<td>0%</td>
</tr>
<tr>
<td>Total</td>
<td>126</td>
<td>75</td>
<td></td>
<td>-40%</td>
</tr>
</tbody>
</table>

- Efficiency gains not realised
- Negative impact on net volumes

Key issues
- Operating conditions
- Equipment use / operations
- Maintenance infrastructure
- Planned maintenance compliance
- Skills & quality of maintenance
- Performance management

Trackless Fleet Management Represents A Significant Improvement Opportunity
South Deep Gold Mine

Sustainability: Health & Safety

- Continual improvement
- Mechanised mining
- 2008
  - Concluded mining on VCR (conventional)
  - Phased out conventional destress
- 2014
  - 3 x fatalities related to trackless equipment
  - Safety related mine stoppages
- Strong platform for further improvement
- Zero harm philosophy

Zero Harm Philosophy Supported by Mechanised Mining Methods
Social Commitment Provides an Enabling Business Platform

South Deep Gold Mine

Sustainability: Charter & SLP

- Social and Labour Plan
- Shared value projects
- HRD commitments

Business Development Centre
- Facilitates training and business opportunities
- Easy access – local community / SMME’s

Housing and Living Conditions
- 13 X Poortjie Houses for the elderly Q4 2014
- 150 x Westonaria houses Q4 2014
- Hostel conversion Q4 2014

SMME Training
- Training of local community SMMEs

Bakery
- Managed and operated by local community

Hillshaven Garment Factory
- Managed and operated by local community
South Deep Gold Mine

Sustainability: Responsible Environmental Stewardship

● Water Management Projects
  - Storm water separation channels (Q2 2015)
  - Water treatment capacity increase from 3 ML/day to 5 ML/day (Q2 2015)
  - Tailings storage facility dust alleviation and run off reduction
  - Rehabilitation and lining of old return water dam (Q4 2016)
  - Ground water modelling to determine plume mitigation (Q3 2015)

● Rehabilitation and pollution management
  - Rehabilitation of the old South waste rock dump (End Q2 2015)
  - Environmental Management Systems according to best practice international standards (ISO14001 certified)
  - International Cyanide Management Institute (ICMI) compliant

Environmental Stewardship Protects The Future
South Deep Gold Mine

Delivery and Performance

Historical Ounces Planned

2014 Events
- Mine stoppages due to support intervention
- Safety stoppages due to 3 x fatalities
- Fleet reduction
- Restructuring

On-going constraints
- Knock-on effect of 2014 ground support intervention
- Revised geotechnical rules
- Reduction in fleet
- Gradual move to one-pass support installation regime

Poor Track Record

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Conclusions

- The value inherent in South Deep undoubtedly remains
  - Quality ore body
  - Installed infrastructure
  - Proven mining methods & technology
  - Strong social and environment agenda
  - Constraints are well documented

- Known weaknesses
  - Leadership
  - Management
  - Design
  - Operation

- May take longer

First Fix The Base And Then Grow With Confidence
South Deep Gold Mine

The Way Forward

Redefine core purpose

- Fix the base
- Cash flow

Leadership

- Organisational design (level 1 complete)
- Leadership and direction (level 1 complete)
- Vertical penetration

Core Strategies

- Support installation
- Backfill
- Water management
- Roadways
- Management systems
- Planned maintenance
- Stores / inventory management
- Skills development

Operational Excellence

- Work practices
- Performance management
- Continuous improvement targets
- Operational flexibility / predictability
- Confident base
- Rebase growth
- Continue with New Mine Development
- Earn further capital investment

Systematic, Simplify, Start With The Basics
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Questions?