**ANGLO AMERICAN PLATINUM LIMITED** 

## ORE RESERVES AND MINERAL RESOURCES REPORT 2018





### **OUR APPROACH TO REPORTING**

Amplats is a member of the Anglo American plc group, guided by the purpose and values of our parent while mindful of the complexities of our industry in developing our strategy. The synergies created by a common purpose, shared values and rigorous discipline underpin significant benefits for all stakeholders.

#### **INTEGRATED REPORT**

Our annual integrated report provides a holistic assessment of the group's ability to create value.

It includes information extracted from the annual financial statements and supplementary reports. It includes non-financial aspects which, if not managed, could have a material impact on our performance and on our business.

The report is developed for a range of stakeholders, including employees, local communities, non-governmental organisations (NGOs), customers, investors and government.

#### SUPPLEMENTARY REPORT

Detailed information supporting disclosures in the integrated report, as well as the GRI Standards index, mining charter performance and glossary.

Given the scale of change in our group (workforce, metrics and reporting standards), we could not provide comprehensive targets for the review period but have done so for 2019 and beyond, where relevant.

#### **REPORTING FRAMEWORK**

- International <IR> Framework of the International Integrated Reporting Council
- South African Companies Act 71 2008, as amended (Companies Act)
- JSE Listings Requirements
- King Report on Corporate Governance for South Africa 2016 (King IV<sup>TM\*</sup>)
- GRI (formerly Global Reporting Initiative) Standards 2016 guidelines
- Anglo American plc group safety and sustainable development (S&SD) indicators, definitions and guidance notes for non-financial indicators. These are available on request.

#### **ASSURANCE**

Financial and several non-financial aspects of this report and of our 2018 suite of reports are independently assured. The report of the external auditor on our summarised consolidated financial statements is on page 4 of the AFS, while the external assurer's report on specific non-financial indicators is on page 106 of the supplementary report.

Available in print and online as a pdf

#### **ANNUAL FINANCIAL STATEMENTS**

The audited annual financial statements present statutory and regulatory information required by the company's stock exchange listing.



#### **REPORTING FRAMEWORK**

- International Financial Reporting Standards (IFRS)
- Companies Act defined above
- JSE Listings Requirements

#### **ASSURANCE**

• The report of the external auditor on our financial statements is on page 4 of the AFS.

### ORE RESERVES AND MINERAL RESOURCES REPORT

In accordance with the JSE Listings Requirement, Amplats prepared its Mineral Resource and Ore Reserve statements for all its operations with reference to the SAMREC Code guidelines and definitions (2016 edition). Competent persons have been appointed to work on, and assume responsibility for, the Mineral Resource and Ore Reserve statements for all operations and projects, as required.



#### REPORTING FRAMEWORK

- JSE Listings Requirements
- SAMREC Code guidelines and definitions (2016 edition).

#### **ASSURANCE**

In compliance with the three-year external review and audit schedule:

 The Mineral Corporation conducted a detailed numerical audit of the data gathering, data transformation and reporting of Mineral Resources and Ore Reserves for Unki Mine.

<sup>\*</sup> Copyrights and trademarks are owned by the Institute of Directors in Southern Africa NPC and all of its rights are reserved.

### **CONTENTS**

# PURPOSE: RE-IMAGINING MINING TO IMPROVE PEOPLE'S LIVES

#### **Unlocking our full potential**

As unprecedented challenges in the global mining industry continue, Anglo American Platinum (Amplats) has proven its resilience and ability to manage change with a focused strategy that is unlocking our full potential and positioning our group for a sustainable future.

We are concentrating on elements within our control and building the foundations for continuous improvement. Our strategic focus is on value. We have therefore shaped our business to operate successfully in a fundamentally changed market – driving the transformation that will make us more robust, responsive and competitive. We have refined our portfolio by exiting certain assets and focused on continuous improvement as well as developing international markets for our products. Importantly, we are building strong relationships with all our stakeholders as our operations concentrate on optimising their potential.

- Refers to other pages in this report.
- SUPPORTING DOCUMENTATION ON THE WEBSITE

Integrated report
Full annual financial statements
Supplementary report
GRI referenced index
UN Global Compact Assessment
King IV application register



www.angloamericanplatinum.com/investors/annual-reporting/2018

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## ORE RESERVES AND MINERAL RESOURCES



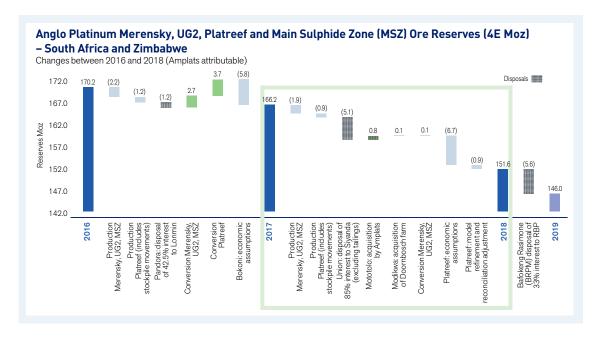
#### **GENERAL STATEMENT**

The Anglo American Platinum Limited (Amplats) method of reporting Ore Reserves and Mineral Resources is in accordance to the South African Code for Reporting of Exploration Results, Mineral Resources and Mineral Reserves (the SAMREC Code). The reporting of Mineral Resources and Ore Reserves for 2018 are aligned to changes prescribed in the SAMREC Code published in 2016. The estimates (tonnes and content) quoted in the report are on an attributable interest basis and the attributable interest is noted in the tabulations. The Anglo American plc Ore Reserves and Mineral Resources Report quotes the reported estimates on a 100% basis. Ore Reserve and Mineral Resource estimates are quoted as at 31 December 2018.

#### **ORE RESERVES**

The combined South African and Zimbabwean Ore Reserves have decreased by 8.7% from 166.2 4E Moz to 151.6 4E Moz in the review period. The reduction was primarily due to economic assumptions at Mogalakwena Mine, the disposal of the interest in Union Mine to Siyanda

Resources Proprietary Limited and production. The reduction of Ore Reserves has been partially offset by an increase in Ore Reserves at Tumela, Unki and Modikwa mines due to conversion of Mineral Resources to Ore Reserves.



At Mogalakwena Mine, pit shell optimisation and downgrading of some lower grade material to Mineralisation as a result of economic assumptions, combined with model refinement and production movements resulted in the Mogalakwena Platreef Ore Reserves decreasing by 8.5 4E Moz from 126.6 4E Moz in 2017 to 118.0 4E Moz in 2018 (–6.7 4E Moz due to economic assumptions, –0.5 4E Moz due to model refinement and -0.9 4E Moz due to production and stockpile movements). The combination of basket metal prices and exchange rate used to optimise the Mogalakwena pit is based on long-term forecasts in

a balanced supply/demand scenario. Mining costs are escalated in real terms to account for anticipated mining inflation, increasing mining depth and haul distance.

At Tumela Mine 0.6 4E Moz were converted to Ore Reserves from the exclusive Mineral Resources. At Unki Mine 0.5 4E Moz were added to the Ore Reserves due to planned mining area boundary changes. For Modikwa Mine the acquisition of additional ground obtained from Samancor Chrome (Doornbosch) together with conversion from Mineral Resource to Ore Reserves resulted in an additional 0.3 4E Moz.

#### **MINERAL RESOURCES**

The combined South African and Zimbabwean Mineral Resources, inclusive of Ore Reserves, decreased by 5.1% from 801.1 4E Moz to 760.5 4E Moz in the review period. This was primarily the result of the disposal of the interest in Union Mine to Siyanda (-39.2 4E Moz for Merensky and UG2 Reef and -0.6 4E Moz for the tailings dams).

#### **IMPACT OF PORTFOLIO REPOSITIONING STRATEGY**

Since 2013, Amplats has been executing a portfolio repositioning strategy comprising three core elements: a restructuring of mineral assets into a value-optimised portfolio, deriving full value from operations, and enhancing cost and financial performance.

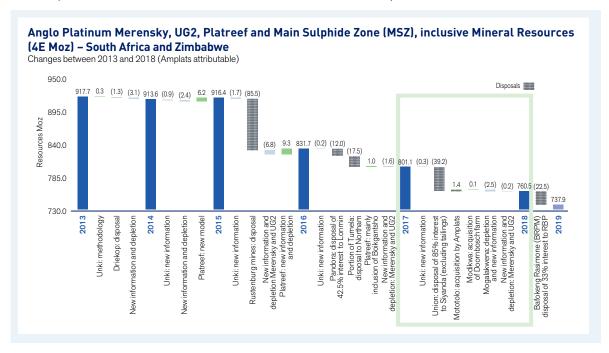
The restructuring component has resulted in:

- The disposal of the Rustenburg mining and concentrating operations to Sibanye-Stillwater
- Twickenham Mine project placed on care and maintenance
- Operations ceasing at Bokoni Mine following a decision by Atlatsa to place it under care and maintenance
- Interests in the Pandora Mine have been sold to Lonmin and the sale of a portion of Tumela Mine to Northam
- Interests in the Union Mine have been sold to Siyanda end of February 2018

- Interests in the Mototolo Mine have been acquired from Glencore and minority shareholder(s) end of October 2018
- During December 2018 the 33% stake in Bafokeng Rasimone Platinum Mine Joint Venture has been sold to Royal Bafokeng Platinum (RBP) and a section 11 application has been submitted to the Department of Mineral Resources. The effective date of transfer of the mining right is expected in June 2019 following the approval process for government. As a consequence Amplats will still report the relevant attributable percentage (33%)
- Ongoing engagements on interests in the Kroondal joint ventures.

To date the net impact of this strategy is a reduction of Mineral Resource inclusive of Ore Reserves of 39.9 4E Moz from 801.1 4E Moz to 760.5 4E Moz for the 2018 reporting period (39.2 4E Moz for the Union Merensky and UG2 reefs and 0.6 4E Moz for the Union tailings). A further 22.5 4E Moz reduction following closure of the Bafokeng Rasimone Platinum Mine transaction in 2019 will occur.

During this period Amplats has maintained output of profitable metal to market and significantly improved its financial performance through improved productivity, managing operating costs and reducing overhead cost and net debt – all on the foundation of a value-optimising mineral asset portfolio.



## DISPOSAL OF THE INTEREST OF UNION MINE TO SIYANDA RESOURCES PROPRIETARY LIMITED – 2018

**Mineral Resources inclusive of Ore Reserves** 

As part of the portfolio repositioning strategy, interests in the Union Mine were sold to Siyanda end of February 2018, resulting in:

- -14.7 4E Moz of Merensky Reef (85% attributable)
- -24.5 4E Moz of UG2 Reef (85% attributable)
- -0.6 4E Moz of tailings dams (85% attributable).

#### ACQUISITION OF MOTOTOLO MINE FROM GLENCORE ALLOYS – PLATINUM DIVISION AND OTHER MINORITY SHAREHOLDER(S) – 2018

**Mineral Resources inclusive of Ore Reserves** 

As part of the portfolio repositioning strategy, Amplats increased its stake in the Mototolo Mine from 50% to an 100%. The 40% transfer from Glencore to Amplats was completed end of October 2018, the remaining 10% from minority shareholder(s) has subsequently been acquired, resulting in:

■ +1.4 4E Moz of UG2 Reef (transfer from 50% to 100%).

### 

### **DISPOSAL OF BAFOKENG RASIMONE MINE – 2019**Mineral Resources inclusive of Ore Reserves

During December 2018 the 33% stake in Bafokeng Rasimone Platinum Mine Joint Venture was sold to Royal Bafokeng Platinum and a section 11 application has been submitted to the Department of Mineral Resources (DMR). The effective date of transfer of the mining right is expected in June 2019 following the approval process for government. Finalisation of this transaction would decrease the combined South African and Zimbabwean Mineral Resource inclusive of Ore Reserves by 3.0% from 760.5 4E Moz to 737.9 4E Moz (-22.5 4E Moz) based on the 2018 declaration.

- -11.9 4E Moz Merensky Reef (33% attributable)
- -10.7 4E Moz UG2 Reef (33% attributable).

#### **Ore Reserves**

Finalisation of the disposal of Amplats' share of Ore Reserves at Bafokeng Rasimone Mine would decrease the combined South African and Zimbabwean Ore Reserves by 3.7% from 151.6 4E Moz to 146.0 4E Moz (–5.6 4E Moz) based on the 2018 declaration (see waterfall chart on page 2).

- -3.6 4E Moz Merensky Reef (33% attributable)
- -2.0 4E Moz UG2 Reef (33% attributable).

#### **CHROMITE BY-PRODUCT FROM UG2 TAILINGS**

Under current market conditions, the recovery of saleable chromite concentrate from UG2 processing is economically viable. Recovery from inter-stage or final UG2 flotation tail streams produces saleable chromite product. The amount of chromite concentrate produced is directly linked to the UG2 Reef production and is recovered as a by-product during processing. Currently a chrome recovery plant is in operation, with a community partner, at Amandelbult. Chromite recoveries are between 12% and 16% from every tonne of UG2 ore processed (overall yield factor) when the  $\mathrm{Cr}_2\mathrm{O}_3$  content in the UG2 ore is greater than 20%. The contained monetary value of the chromite by-product is included when assessing UG2 Reef Ore Reserves where the chromite recovery plants are in production.

#### **INTERNAL CONTROLS**

Well established processes and protocols have ensured reliable Ore Reserves and Mineral Resources reporting.

In line with internal review and audit schedules and improvement initiatives, existing processes and reviews encompass:

#### Methodology

- Formal sign-off of the geological structure and geological discount factors; borehole and sample databases; and the Mineral Resource classification
- A Mineral Resource classification scorecard for consistent resourceclassification statements
- Various single and multiple disciplinary reviews in the framework of the business planning process
- Mine design and scheduling for consistent reserve reporting, which takes into account the Company's business plan and economic tail management process
- Further refinement of the Basic Resource Equation (BRE), an internal reconciliation of Mineral Resources segregated into the various business plans and investment centres
- The annual sign-off of the Mineral Resources and Ore Reserves.

#### **Information communicated**

- Mineral Resource and Ore Reserve waterfall charts indicating annual movements
- Prill and base-metal grade distribution of the Mineral Resources inclusive of Ore Reserves
- Spatial distribution of the Ore Reserve and Mineral Resource classifications of the major mines
- Reporting of Mineral Resources, inclusive of Ore Reserves
- Statement of Mineralisation.

#### **Resource and Reserve management database**

- Digital data capture of all relevant Mineral Resource and Ore Reserve information
- Integration with the Anglo American plc's group Resource and Reserve reporting management systems
- Internal database audit and approval.

#### **EXTERNAL REVIEWS**

External independent audits are executed to ensure that the Company's standards and procedures are aligned with world best practice and include both process and numerical estimates audits.

To comply with the three-year external review and audit schedule, The Mineral Corporation was contracted to conduct the following:

 A detailed numerical audit in 2018 of the data gathering, data transformation and reporting of Mineral Resources and Ore Reserves for Unki Mine.

The Mineral Corporation audit comprised reviews of the Unki Mine processes and numerical audits. No technical fatal flaws or material issues were identified in the detailed numbers audit of the Mineral Resource and Mineral Reserve estimates for Unki Mine. The Mineral Corporation state that the Mineral Resource estimates are supported by an extensive validated geological database and satisfy the SAMREC Code requirements for reasonable prospects for eventual economic extraction; and the Mineral Reserve estimates are based on a detailed Life of Mine Plan that has been tested for economic viability under a set of realistically assumed production levels, modifying factors and economic inputs.

#### **COMPETENCE AND RESPONSIBILITY**

In accordance with the Listings Requirements of the Johannesburg Stock Exchange Limited (JSE), Amplats prepared its Mineral Resource and Ore Reserve statements for all its operations with reference to SAMREC Code guidelines and definitions (the SAMREC Code, 2016 Edition). Competent persons have been appointed to work on, and assume responsibility for, the Mineral Resource and Ore Reserve statements for all operations and projects, as required.

The lead Competent Person with overall responsibility for the compilation of the 2018 Mineral Resources and Mineral Reserves Report is the executive head: technical, Dr Gordon Smith (PrEng). He confirms that the information on Mineral Resources and Ore Reserves in this report complies with the SAMREC Code and that it may be published in the form and context in which it was intended.

Dr Smith obtained the following qualifications from the University of the Witwatersrand: BSc (mining engineering), MSc in engineering, MBA and PhD. He has 40 years' mineral industry experience across precious, base and ferrous metals, chrome, diamonds, semi-precious stone, and coal operations. In this period, he has held a range of technical, managerial, and executive positions at Rio Tinto (Zimbabwe), Falcon Mines plc, the Chamber of Mines – research organisation, CSIR – mining technology, Snowden Mining Industry Consultants and Metora Mineral Resources prior to joining Amplats in 2003.

He is registered with the Engineering Council of South Africa (ECSA) as a professional mining engineer, registration number 930124. ECSA is based on the 1st floor, Waterview Corner Building, 2 Ernest Oppenheimer Avenue, Bruma Lake Office Park, Bruma, Johannesburg, 2198, South Africa.

All Competent Persons at the operations have sufficient relevant experience in the type of deposit and in the activity for which they have taken responsibility. Details of Amplats' Competent Persons are published on page 50 of this report and available from the company secretary on written request.

#### **RISK**

The geosciences and integrated planning departments follow risk management processes in order to systematically reduce risks relevant to the Mineral Resources and Ore Reserves estimation. Presently, no area of risk is considered significant using current controls. It is generally recognised that Mineral Resource and Ore Reserve estimations are based on projections that may vary as new information becomes available, specifically if assumptions, modifying factors and market conditions change materially. Since the parameters associated with these considerations vary with time, the conversion of Resources to Reserves may also change over time. For example, mining costs (capital and operating), exchange rates and metal prices may have significant impacts on the conversion of Resources to Reserves and the reallocation of Reserves back to Resources in cases where there is a reversal in the economics of a project or area. The assumptions, modifying factors and

market conditions therefore represent areas of potential risk. In addition, security of mineral right tenure or corporate activity could have a material impact on the future mineral asset inventory.



Gordon Smith PrEng, PhD, MBA, MSc (engineering),

BSc (mining engineering)

Engineering Council of South Africa (930124)

Executive head: technical

Anglo American Platinum 55 Marshall Street Johannesburg, South Africa

14 February 2019

#### **CHANGES IN THE ORE RESERVES AND MINERAL RESOURCES FOR 2018**

#### **Summary of Ore Reserve and Mineral Resource estimates**

The figures in the table below represent Amplats' attributable interests

	201	18	201	17
Classification	Million tonnes (Mt)	Contained metal 4E Moz	Million tonnes (Mt)	Contained metal 4E Moz
Ore Reserves <sup>1</sup> – South Africa	1,409.7	146.1	1,652.9	160.9
Ore Reserves <sup>1</sup> – Zimbabwe (Unki)	52.5	5.6	47.4	5.2
Ore Reserves¹ – South Africa and Zimbabwe	1,462.2	151.6	1,700.3	166.2
Mineral Resources exclusive of Ore Reserves <sup>2,4</sup> – South Africa Mineral Resources exclusive of Ore Reserves <sup>2,4</sup> – Zimbabwe (Unki)	4,784.2 169.7	564.7 23.2	4,989.1 176.5	595.4 23.8
Mineral Resources exclusive of Ore Reserves <sup>2</sup> - South Africa and Zimbabwe	4,953.9	587.9	5,165.6	619.2
Mineral Resources inclusive of Ore Reserves <sup>2,5</sup> – South Africa	6,275.8	730.3	6,589.6	770.6
Mineral Resources inclusive of Ore Reserves <sup>2,5</sup> – Zimbabwe (Unki)	224.9	30.2	226.7	30.5
Mineral Resources inclusive of Ore Reserves <sup>2</sup> – South Africa and Zimbabwe	6,500.7	760.5	6,816.3	801.1
Ore Reserves <sup>1</sup> – South Africa tailings			0.7	0.0
Mineral Resources exclusive of Ore Reserves <sup>2,4</sup> – South Africa tailings	72.3	1.9	86.6	2.5
Mineral Resources inclusive of Ore Reserves <sup>2,5</sup> – South Africa tailings	72.3	1.9	87.3	2.5

Note: 'Mineral Resources exclusive of Ore Reserves' and 'Scheduled Resources converted to Ore Reserves' are not additive because of modifying factors being applied during the conversion from resources to reserves. The above Mineral Resources excludes Sheba's Ridge Project in South Africa. This project reflects a 3E grade which is the sum of platinum, palladium and gold grades, whereas the other mines and projects reflect a 4E grade. For this project, see the tabulation below:

	20	18	20	7	
Classification	Million tonnes (Mt)	Contained metal 3E Moz	Million tonnes (Mt)	Contained metal 3E Moz	
Mineral Resources inclusive of Ore Reserves <sup>2</sup> – South Africa (Sheba's Ridge project) <sup>3</sup>			211.9	6.4	

<sup>&</sup>lt;sup>1</sup> The Ore Reserves reflect the total of Proved and Probable Ore Reserves.

<sup>&</sup>lt;sup>2</sup> The Mineral Resources reflect the total of Measured, Indicated and Inferred Mineral Resources. The Mineral Resources are quoted after geological losses.

<sup>&</sup>lt;sup>3</sup> Uncertainty surrounding Mineral Rights paired with a review of the reasonable prospects for eventual economic extraction criteria, led to a downgrade of Mineral Resources to Mineralisation.

<sup>&</sup>lt;sup>4</sup> Exclusive Resources: Mineral Resources exclusive of the portion converted to Ore Reserves.

<sup>&</sup>lt;sup>5</sup> Inclusive Resources: Mineral Resources inclusive of the portion converted to Ore Reserves.



25 January 2019

**Dr Gordon Smith** 

Executive Head: Technical Anglo American Platinum Limited 55 Marshall Street Johannesburg, 2000

Dear Sir

### RE: AUDIT OF THE MINERAL RESOURCE AND MINERAL RESERVE ESTIMATES FOR UNKI MINE AS AT 31 DECEMBER 2018

#### **Background**

Mineral Corporation Consultancy (Pty) Limited (The Mineral Corporation) has undertaken an independent audit of the Mineral Resource and Mineral Reserve estimates for Unki Mine as at 31 December 2018. Unki Mine is an Anglo American Platinum Limited (AAPL) operation located on the Great Dyke in the southern part of Zimbabwe. AAPL commissioned The Mineral Corporation to complete the audit of the Mineral Resource and Mineral Reserve estimates for Unki Mine, which were prepared and signed off by Competent Persons from Unki Mine and AAPL. The audit was completed by Mineral Resource and Mineral Reserve Competent Persons from The Mineral Corporation following guidelines of the 2016 Edition of the South African Code for the Reporting of Exploration Results, Mineral Resources and Mineral Reserves (the SAMREC Code).

#### **Audit Methodology**

The audit comprised Process Audit and Detailed Numbers Audit components as described below. The Mineral Corporation's Competent Persons completed a confirmatory visit to Unki Mine during the period 3 to 5 December 2018.

The Process Audit entailed a systematic and detailed review of the key elements of the Mineral Resource and Mineral Reserve estimation processes undertaken in order to validate adherence to internal standards and the SAMREC Code, and to identify material errors and omissions or areas of improvement. The Mineral Corporation assessed adherence to these standards and procedures and to the SAMREC Code by Unki Mine with respect to the preparation and reporting of Mineral Resource and Mineral Reserve estimates by Unki Mine.

The Detailed Numbers Audit included detailed examination and validation of the base data that was utilised for geological modelling, estimation, classification and reporting of the Mineral Resource estimates for Unki Mine and the outputs of these processes. In addition, the Modifying Factors employed for the conversion of Mineral Resources to Mineral Reserves and the input data that was utilised for the development of the Life of Mine Plan were reviewed. Finally, The Mineral Corporation reviewed the Life of Mine Plan, results of the economic viability testing of the Life of Mine Plan and Mineral Reserve estimates for Unki Mine.

#### **Audit Findings and Conclusions**

The Mineral Corporation is satisfied with AAPL's Mineral Resource and Mineral Reserve governance framework and concludes that internal standards governing the preparation of Mineral Resource and Mineral Reserve estimates are being followed. Furthermore, following the internal standards would result in the reporting of Mineral Resource and Mineral Reserve estimates which are compliant with the SAMREC Code. Overall, the processes prescribed by the standards are in line with industry practice. The Mineral Corporation has provided Unki Mine and AAPL with recommendations for continuous improvement where relevant.

No technical fatal flaws or material issues were identified in the Detailed Numbers Audit of the Mineral Resource and Mineral Reserve estimates for Unki Mine. The Mineral Resource estimates are supported by an extensive validated geological database and satisfy the SAMREC Code requirements for reasonable prospects for eventual economic extraction. The Mineral Reserve estimates are based on a detailed Life of Mine Plan that has been tested for economic viability under a set of realistically assumed production levels, Modifying Factors and economic inputs.

These opinions do not imply that The Mineral Corporation has accepted the role of Competent Person for the purpose of reporting the 31 December 2018 Mineral Resource and Mineral Reserve estimates for Unki Mine. Such role resides with the nominated personnel of Unki Mine and AAPL.

Yours sincerely

**CONIACE MADAMOMBE** 

Director

MSc, BSc (Hons), MBA, Pr.Sci.Nat (400093/08), FGSSA

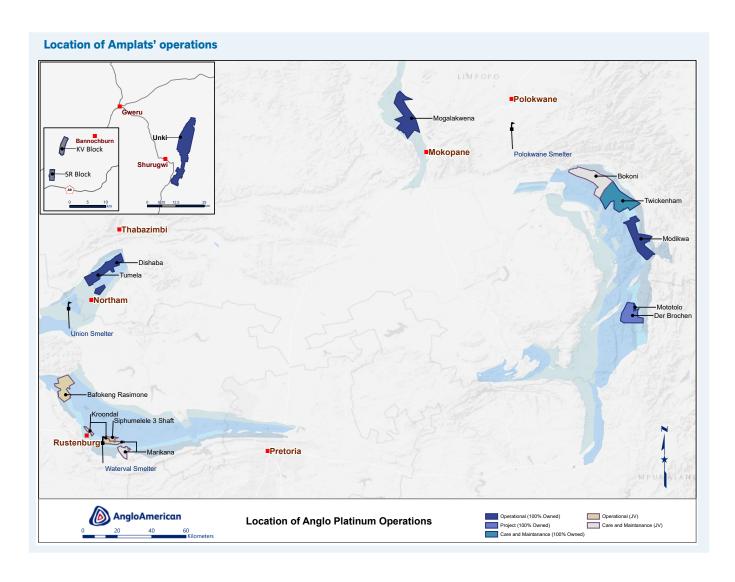
STEWART NUPEN Director

BSc (Hons), MBA, Pr.Sci.Nat (400174/07), FGSSA

DIRECTORS: JE Murphy (Managing), FH Gregory, AH Hart, RA Heins (British), C Madamombe (Zimbabwean), SRQ Nupen

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## ORE RESERVES AND \_\_\_\_\_\_ MINERAL RESOURCES CONTINUED



#### **MINERAL RESOURCES**

Amplats' Mineral Resources of platinum group metals (PGMs) occur exclusively within southern Africa and are hosted by two distinct layered intrusions: the Bushveld Complex in South Africa and the Great Dyke in Zimbabwe.

PGM Resources present within these two geological entities account for approximately 85% of the world's known platinum and 55% of the world's known palladium.

#### **The Bushveld Complex**

Formed over two billion years ago from multiple injections of magma into the earth's crust many kilometres below the earth's surface, the Bushveld Complex is geologically unique owing to its size, the uniformity of its layering and the extent of known mineral content. This saucer-shaped intrusion is over 350 kilometres wide, 250 kilometres long and up to 12 kilometres thick. Over time the rim of the intrusion has been exposed by erosion, revealing three separate main segments known as the Western,

Eastern and Northern limbs respectively. The Western Limb is split into two lobes (north-western and south-western) by the Pilanesberg Complex, remnants of an alkaline volcanic plug intruded into the Bushveld Complex about 1,250 million years ago. The Eastern Limb is split into two lobes (north-eastern and south-eastern lobes) by the northeast trending Steelpoort Fault. The exposed segments exhibit layering of pyroxenites, norites, gabbros, anorthosites and chromitites and this layering occurs across the entire extent of the Complex. Within the layers, Mineralisation is found within specific horizons containing chromium, iron, titanium, vanadium, nickel, copper and, more importantly for Amplats, the PGMs.

Economic concentrations of PGMs occur mainly within three distinct units within the Bushveld Complex: the Merensky Reef; the Upper Group 2 (UG2) Chromitite; and the Platreef. The Merensky Reef and the UG2 Reef occur around the Eastern and Western limbs of the Complex, while the Platreef is found only along the eastern edge of the Northern Limb.

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#### The Merensky Reef and the UG2 Reef

The Merensky and UG2 Reefs are narrow tabular orebodies that extend laterally over hundreds of square kilometres, resulting in extensive Mineral Resources. Their continuity, established over decades of exploration and mining, allows for the long-range extrapolation of data. The Merensky Reef has been the principal source of PGMs since it was first mined in 1925. However, with the depletion of shallow Merensky Resources, the UG2 Reef, which is found at a vertical distance of 16 to 400 metres below the Merensky Reef, depending on the location, has grown steadily in importance to the point where it now accounts for more than 50% of all the platinum-bearing ore processed in South Africa.

#### The Platreef

On the Northern Limb of the Bushveld, the Merensky and UG2 reefs are not developed. However, the Platreef, which is substantially thicker than either the Merensky Reef or the UG2 Reef, is present. The Platreef was mined briefly in the 1920s, but has been exploited on a large scale only since 1993. It has gradually become a significant contributor of PGMs for Amplats, especially in the most recent years with a re-positioned portfolio. The Platreef can be described as a thick sequence of mineralised zones occurring in a variety of rocks that range from pyroxenites (the predominant rock type) to calcsilicates. The contamination of Bushveld magma by xenoliths from the underlying Transvaal Supergroup contributes to the considerable range of lithologies, textures, mineralogy and alteration styles. In general, the economic thickness of the Platreef is such that it can support open-pit mining operations to depths far exceeding 400 metres below the surface at current prices and mining costs.

#### **Base metal Mineralisation**

The Merensky Reef and the Platreef in particular, yield meaningful quantities of nickel, copper and cobalt as by-products of PGMs. While the UG2 Reef has relatively low concentrations of the above metals, the beneficiation for the by-product chromium contributed considerable economic value more recently. Copper, nickel, cobalt and chromium are accounted for in the relevant economic evaluations.

#### **The Great Dyke**

The presence of platinum Mineralisation in the Great Dyke was first reported 100 years ago. The complexity of the ore zone, combined with low market prices in the 1970s, resulted in the failure of successful economic development of this resource, despite extensive drilling investigations and numerous trial mining operations carried out by several exploration companies. However, since the early 2000s renewed interest in PGM Mineralisation in the Great Dyke has been accompanied by the successful establishment of open cut and underground mining operations exploiting the PGM.

The Great Dyke, located in Zimbabwe, occurs as a major ultramafic layered intrusion, over 500 kilometres in length, trending in a northeasterly direction. It comprises upper mafic and lower ultramafic rocks

that cut across the dominantly Archaean rocks of the Zimbabwe Craton. PGM and associated base metal Mineralisation is developed within the uppermost pyroxenite horizon that covers over 720 square kilometres of the Great Dyke.

Amplats' major interest lies in the Shurugwi Complex and, more specifically, the Unki Special Mining Lease (SML) where the Main Sulphide Zone (MSZ) occurs. The total estimated PGM Resources of the Great Dyke are estimated at 249 Moz 4E (Oliver Barker, Platinum Map of Southern Africa, Banzi, 4th edition, 2011) of which Amplats hold currently about 9%. Although the mineralised zone is characterised by the absence of identifiable markers, this risk has been successfully negated through the application of handheld X-ray fluorescence (XRF) technology as well as regular underground sampling of the mineralised horizon enabling optimal extraction of maximum value ore. The base metals occur as disseminated inter-cumulus Fe-Ni-Cu sulphides.

Resources outside current mining and advanced project areas have been quantified over a conventional Mining Resource width of 120 centimetres. This will be reviewed and adapted once mining-optimisation studies have been completed.

#### **EXPLORATION AND MINE GEOLOGY**

Exploration activities continued on all owned and managed Amplats properties, with the focus on supplying geological information and mitigating risk in support of the Company's business plan and prospecting works programme compliance.

A majority of the Exploration budget for 2018 was spent on the Mogalakwena Complex, followed by the underground assets Unki, Dishaba and Tumela mines as well as near-mine targets on the Northern Limb and finally Der Brochen, which in the context of the recent acquisition of the Mototolo Mine is gaining in strategic importance. Synergies between these two assets will guide extraction strategies and associated exploration efforts in future.

Exploration on prospecting permits is progressing in line with the work programme schedules and the environmental management programmes submitted to the government's Department of Mineral Resources.

Exploration continues for the Great Dyke in Zimbabwe, to obtain more information on Mineral Resources, specifically in support of the mine extraction strategy for the Unki Platinum Mine SML.

Excluding the non-managed joint ventures, 251 surface drill holes were drilled in 2018, equating to 95,586 metres of diamond drilling. In addition to this, 203 drill holes amounting to 13,011 metres of underground exploration drilling were conducted.

A total of 109,000 metres of RC drilling was completed at the Mogalakwena operations for use in value-based ore control. These holes are not used in the resource estimation process, however are critical for

value-based decision making due to the close spacing and superior sample quality compared to blasthole information. This drilling supports the increased integrity of business planning and the operational execution of the business plans.

Exploration activities in 2018 were conducted well within the safety targets, with one lost-time injury at the Der Brochen Project being recorded for the year. A safety highlight was the achievement of six years LTI-free underground drilling operations at the Amandelbult Complex during 2018.

Amplats had 26 diamond drill rigs operating on surface and 15 drill rigs engaged in underground exploration activities (excluding JVs). Drilling remains one of the primary tools in determining and evaluating our Mineral Resources, and our extensive and structured drilling programmes reflect this systematic approach to generate value, replace depleted Reserves and ensure sustainability of the organisation. Diamond drilling, primarily using BQ core, is employed for most of the holes drilled. Reef intersections with core recovery of 100% are sampled and assayed, and resultant data are used in constructing Mineral Resource models. In addition, comprehensive efforts are now made through geometallurgical test programmes to harness further value from the mine value chain understanding ore type characteristics and its impact in processing, especially for the Mogalakwena's Platreef.

A standard set of quality assurance and quality control (QA/QC) processes are in place to validate sampling and analytical data collection steps. Additional deflections are also drilled on all reef intersections to increase confidence in the estimation parameters. A total of 947 underground sample sections amounting to 15,260 samples as well as 52,615 drill hole samples (both surface and underground) were collected during 2018 (excluding JVs) and were processed according to well defined protocols, systems and QA/QC.

Where mine planning has reached an advanced stage, underground mapping, together with a variety of additional drill hole and surface to near-surface imaging tools, are employed to determine the geological structure and associated geological discount factors/losses as well as competency of the ground targeted for development and reef extraction. Over and above the routine tasks, advanced and innovative techniques are continuously tested to improve the quality of supporting data obtained to enhance derived models and interpretations ahead of mine workings.

#### **MINERAL RESOURCES**

The Mineral Resource models for all underground and open-pit operations are updated annually or as and when trigger criteria are reached. The basic principles relating to Mineral Resource estimates have remained unchanged during 2018. The Mineral Resource evaluation is reviewed and signed off by a team of Competent Persons.

The resource classification approach is based on a weighted scorecard evaluating various geological and geostatistical considerations followed by a team appraisal of the process driven results, followed by a fully documented sign off on the final classification for all sites. For underground operations, the minimum Mineral Resource widths are aligned with in stope-support methodology and mining equipment have remained largely unchanged in 2018. The PGE cut-off criteria for the open-pit operations at Mogalakwena also remain unchanged from previous year's reporting.

A virgin rock temperature of  $75^{\circ}$  C is still considered to be the practical limit to mining (given current technology constraints, metal prices and energy costs), and continues to form the perimeter of declared Inferred Mineral Resources within the mining rights of Tumela Mine and Twickenham Mine as well as the Bokoni JV. Amplats will continue to review the deposits down-dip of this limit based on changing geological information, mining technology and metal prices.

Amplats subscribes to a continuous risk management process to systematically reduce risks relevant to Mineral Resources and Ore Reserves underpinned by annual internal and external numerical and process audits on predetermined cycles.

As part of its ongoing management process, Amplats has further maintained the basic resource equation (BRE) to establish a consistent and auditable process for tracking and reconciling movements in Mineral Resources and Mineral Inventories underpinned by the reasonable prospect for eventual economic extraction (RPEEE) criteria specified in the SAMREC Code. This equation encompasses processes from all the technical disciplines in order to ensure that the publication of Mineral Resource and Ore Reserve data is aligned with the Company's business plan, and with technical and economic considerations.

Further understanding and quantification of the Company's full endowment potential on and around its current holdings progressed well during 2018 and will target further value and future growth potential from its portfolio in due course.

(Aug)

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Johannesburg 14 February 2019

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#### **ORE RESERVES**

#### **Converting Mineral Resources to Ore Reserves**

The process of defining the Ore Reserves from the Mineral Resources has not changed materially for the 2018 reporting cycle. The process, as previously defined and applied, adheres to the approved Amplats policy, and has been reviewed in terms of Anglo American group policy.

Reserves associated with Mototolo Mine, acquired by Anglo American Platinum in November 2018 (previously a non-managed joint venture with Glencore), have been incorporated, as generated by Glencore Competent Persons, in the 2018 reporting cycle. Resource and Reserve declarations at Mototolo will be fully aligned with the Anglo American Platinum process during 2019.

#### Merensky, UG2 and MSZ underground operations

Only those current operations and approved projects in execution, that are featured in the business plan, are included as Reserves.

In the process of continuous improvement Anglo American Platinum continues to use a three-stage reconciliation of the year-on-year changes.

The first stage is a spatial reconciliation which defines the impact of boundary changes, face position adjustments, mine design changes as well as areas which are no longer economically viable for the current price forecasts. The second stage of the reconciliation defines the changes in the resource model which is updated yearly with the new drilling and sampling data. The final stage of the reconciliation defines the changes in the modifying factors being applied to the mine design to produce the production profile.

The application of modifying factors (technical; mining; geotechnical; processing and recovery; financial; legal; market; infrastructure; and social/governmental) is implemented in three distinct phases:

 Mine design and scheduling. Applied to the criteria included in establishing the mine design and scheduling are modifying factors that have an impact on dilution of the Resource (ie stope width versus Resource width, tertiary development and other waste mining done on the reef horizon) and modifying factors that define mining losses (ie non-mineable pillars and reef in hanging/reef in foot mining inefficiencies).

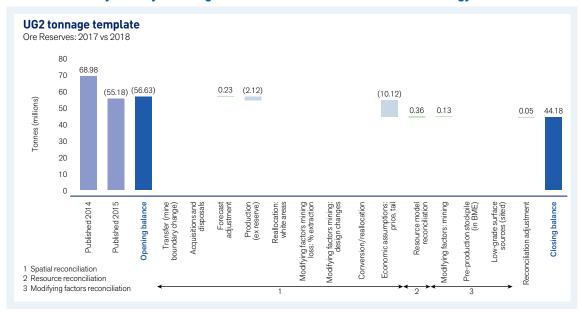
To derive a Mineable Resource, appropriate mine design and layouts are applied to the Resource areas as dictated by current mining methods. It is important to note that the Mineable Resource excludes material contained in regional or bracket pillars that comprise part of the overall mine design. In developing a Scheduled Resource, the Mineable Resource is scheduled according to the relevant production requirements.

- Processing. Those modifying factors that influence the efficiency of processing and recovery are applied to the Scheduled Resource. The result is a Mineable Reserve.
- 3. Economics. The subsequent application of modifying factors that influence the economic aspects of the mining operation results in a portion of the Scheduled Resource not being converted into Reserve. This portion, known as the 'uneconomic tail', reverts to Mineral Resources to be considered in subsequent planning processes. Its exclusion results in a Scheduled Reserve that is equivalent to the operation's Published Reserve.

For the purposes of Reserve conversion, only the Measured Resource and the Indicated Resource categories are used.

The Scheduled Reserves are peer reviewed and signed off by the Competent Person(s).

#### Waterfall chart of year-on-year changes created from the reconciliation methodology



#### Platreef open-pit operations

Value-based ore control (VBOC) principles have been introduced to the Reserve definition process at the Mogalakwena operation as part of a continuous drive to increase value. This initiative considers the full value, and associated cost, of all metal components in pit shell optimisation and resultant operational scheduling.

The geological model is converted to a mining model by regularising the model to make it appropriate for the mining equipment being used. The modifying factors of dilution and recoverability of the minerals and the economic parameters including metal prices, mining and processing costs are added to the regularised model to create a model that defines the value per tonne of ore in situ. This model is then used in the pit optimisation to generate the final pit shell.

The pit shell is scheduled to ensure that the most value accretive ore available is sent to the mill for processing.

The total ore in the schedule from the measured and indicated resource categories that is processed through the mill is then declared as the Reserves. The Scheduled Reserves are peer reviewed and signed off by the Competent Person(s).

#### Rock dumps (surface sources)

Bulk samples taken on historical surface-rock dumps have demonstrated the intermittent presence of low-grade reef material. This stems from historical haulage development on PGM-bearing markers such as the Pseudo 1 Reef, and from historical suboptimal ore-handling processes.

Owing to the difficulty of effectively evaluating large-scale rock dumps, surface-rock dumps across operations are not reported on under the Ore Reserve and Mineral Resource estimates. Instead, they are categorised as Deposits.

Where concentrator capacity is available, rock dumps that have indicated potential are further sampled and evaluated on a localised basis for processing as part of surface-sources material.

#### Tailings storage facilities (surface sources)

Operational tailings dams are not fully evaluated and therefore not reported on as part of the published Ore Reserves. Dormant or non-operational dams may be evaluated and separately reported on as Probable Ore Reserves when relevant. The treatment of tailings is sensitive to both price and volume, which results in tailings dam material being reported on only as Probable Reserves.

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Senior principal mining engineer Anglo American Business Planning

Johannesburg 14 February 2019

### MINERAL RESOURCES AND ORE RESERVES: DEFINITION OF VARIOUS TERMS

The Mineral Resources and Ore Reserves of the Group are classified, verified and reported on in accordance with statutory, stock exchange and industry/professional guidelines. The classifications and reporting are based on the South African Code for the Reporting of Exploration Results, Mineral Resources and Mineral Reserves (the SAMREC Code – 2016 Edition) and on the Code of the Joint Ore Reserves Committee of the Australian Institute of Mining and Metallurgy (the JORC Code).

Reporting is by professionals with appropriate experience in the estimation, economic evaluation, exploitation and reporting of Ore Reserves and Mineral Resources relevant to the various styles of Mineralisation under consideration. The Group's experience with the various orebodies it is engaged in estimating, evaluating and mining spans decades, resulting in a thorough understanding of the factors relevant to assessing their economic potential.

Where Ore Reserves and Mineral Resources have been quoted for the same property, Resources are reported on both inclusive and exclusive of the material converted to Reserves, ie one table reports on Resources that exclude those Resources converted to Reserves while the other includes these Resources.

Attention is drawn to the fact that Resources are reported on over a minimum practical mining width (SAMREC Code, clause 24), because the widths of the Merensky and the UG2 Reefs are generally less than 70 centimetres. In the case of the UG2 Reef, however, there are many areas where additional hanging wall dilution is also included owing to geotechnical considerations. This additional low-grade material usually has a width of less than 30 centimetres, but this may increase locally to as much as one metre. The UG2 Reef, particularly in the Eastern Limb, may also contain pyroxenite lenses of internal waste and these are included as dilutants in the Resource declaration. The Mineral Resources are estimated over a practical minimum mining width suitable for the deposit known as the 'Resource Cut'. The Resource Cut width takes cognisance of the mining method and geotechnical aspects in the hanging wall or footwall of the reef. The conversion of the Resource Cut to an appropriate Reserve width would include additional dilution incurred as the result of geotechnical and mining considerations. The minimum mining width over which Mineral Resources are declared is 90 centimetres for Der Brochen Merensky Reef and greater at other mines/projects.

All Mineral Resources are reported on after the exclusion of appropriate known and unknown geological losses.

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#### **Definitions: Mineral Resources**

"A 'Mineral Resource' is a concentration or occurrence of solid material of economic interest in or on the earth's crust in such form, grade or quality and quantity that there are reasonable prospects for eventual economic extraction. The location, quantity, grade, continuity and other geological characteristics of a Mineral Resource are known, estimated or interpreted from specific geological evidence and knowledge, including sampling. Mineral Resources are subdivided, and must be so reported, in order of increasing confidence in respect of geoscientific evidence, into Inferred, Indicated or Measured categories". (SAMREC Code, clause 24)

It should be noted that the continuity of the Bushveld Complex orebodies, coupled with the expectation of a robust demand for platinum group elements (PGEs) and associated metals well into the future, allows the PGE industry to classify large volumes of the three mineralised layers as 'Resources' under the different categories defined in the SAMREC Code and described below. Amplats takes cognisance of cut-off grades (derived from information on pay limits in the mining operations) and of 'reasonable and realistic prospects for eventual economic extraction' over a period of 30 to 50 years.

The Resources classification process is underpinned by a sign-off procedure carried out by a team of Competent Persons. The team considers a spatial scorecard of geological, historical mining, quality control and geostatistical aspects that are appropriately weighted for each particular orebody when assigning the classification.

Measured Mineral Resources: "that part of a Mineral Resource for which quantity, grade or quality, densities, shape and physical characteristics are estimated with confidence sufficient to allow the application of Modifying Factors to support detailed mine planning and final evaluation of the economic viability of the deposit. Geological evidence is derived from detailed and reliable exploration, sampling and testing and is sufficient to confirm geological and grade or quality continuity between points of observation. A Measured Mineral Resource has a higher level of confidence than that applying to either an Indicated Mineral Resource or an Inferred Mineral Resource. It may be converted to a Proved Mineral Reserve or to a Probable Mineral Reserve". (SAMREC Code, clause 28)

Indicated Mineral Resources: "that part of a Mineral Resource for which quantity, grade or quality, densities, shape and physical characteristics are estimated with sufficient confidence to allow the application of Modifying Factors in sufficient detail to support mine planning and evaluation of the economic viability of the deposit. Geological evidence is derived from adequately detailed and reliable exploration, sampling and testing and is sufficient to assume geological and grade or quality continuity between points of observation". (SAMREC Code, clause 27)

Inferred Mineral Resources: "that part of a Mineral Resource for which quantity and grade or quality are estimated on the basis of limited geological evidence and sampling. Geological evidence is sufficient to imply but not verify geological and grade or quality continuity. An Inferred Resource has a lower level of confidence than that applying to an Indicated Mineral Resource and must not be converted to a Mineral Reserve. It is reasonably expected that the majority of Inferred Mineral Resources could be upgraded to Indicated Mineral Resources with continued exploration". (SAMREC Code, clause 27)

#### **Definitions: Ore Reserves**

"An 'Ore Reserve' is the economically mineable part of a Measured and/or Indicated Mineral Resource. It includes diluting materials and allowances for losses, which may occur when the material is mined or extracted and is defined by studies at pre-feasibility or feasibility level as appropriate that include application of Modifying Factors. Such studies demonstrate that, at the time of reporting, extraction could reasonably be justified. The reference point at which Mineral Reserves are defined, usually the point where the ore is delivered to the processing plant, must be stated. It is important that, in all situations where the reference point is different, such as for a saleable product, a clarifying statement is included to ensure that the reader is fully informed as to what is being reported". (SAMREC Code, clause 35). Ore Reserves are subdivided, in order of increasing confidence, into Probable Ore Reserves and Proved Ore Reserves.

**Probable Ore Reserves:** "the economically mineable part of an Indicated, and in some circumstances, a Measured Mineral Resource. The confidence in the Modifying Factors applying to a Probable Mineral Reserve is lower than that applying to a Proved Mineral Reserve". (SAMREC Code, clause 36)

**Proved Ore Reserves:** "the economically mineable part of a Measured Mineral Resource. A Proved Mineral Reserve implies a high degree of confidence in the Modifying Factors". (SAMREC Code, clause 37)

## ORE RESERVES AND MINERAL RESOURCES ESTIMATES

as at 31 December 2018

#### **ORE RESERVES**

#### By reef (4E)

The figures in the table below represent Amplats' attributable interests:

		Ore Reser Million to	ves (ROM) nnes (Mt)	Gra 4E ç		Containe 4E to		Containe 4E N	
Reef	Classification	2018	2017	2018	2017	2018	2017	2018	2017
South Africa									
Merensky Reef	Proved	21.6	25.3	4.75	4.76	103	121	3.3	3.9
	Probable	12.1	13.0	4.47	4.62	54	60	1.7	1.9
	Total	33.7	38.3	4.65	4.71	157	181	5.0	5.8
UG2 Reef	Proved	137.0	161.3	4.05	4.21	556	679	17.9	21.8
	Probable	38.7	54.2	4.14	3.87	160	209	5.2	6.8
	Total	175.7	215.5	4.07	4.12	716	888	23.0	28.6
Platreef	Proved	727.8	840.6	3.06	2.86	2,227	2,404	71.6	77.3
	Proved primary ore stockpiles	23.1	13.1	2.42	2.26	56	30	1.8	1.0
	Total proved	750.9	853.7	3.04	2.85	2,283	2,434	73.4	78.2
	Probable	408.5	504.5	3.25	2.86	1,328	1,443	42.7	46.4
	Probable primary ore stockpiles	40.9	40.9	1.47	1.47	60	60	1.9	1.9
	Total probable	449.4	545.4	3.09	2.76	1,388	1,503	44.6	48.3
	Total	1,200.3	1,399.1	3.06	2.81	3,671	3,937	118.0	126.6
All reefs	Proved	909.5	1,040.3	3.23	3.11	2,942	3,234	94.5	103.9
	Probable	500.2	612.6	3.20	2.89	1,602	1,772	51.5	57.0
	Total	1,409.7	1,652.9	3.22	3.03	4,544	5,006	146.1	160.9
Zimbabwe									
Main Sulphide Zone	Proved	25.4	13.8	3.35	3.50	85	48	2.7	1.5
(MSZ)	Probable	27.0	33.6	3.26	3.41	88	115	2.8	3.7
Unki Mine	Total	52.5	47.4	3.30	3.44	173	163	5.6	5.2
South Africa and Zi	imbabwe								
All reefs	Proved	934.9	1,054.1	3.24	3.11	3,027	3,282	97.3	105.5
(including MSZ)	Probable	527.3	646.2	3.21	2.92	1,690	1,887	54.3	60.7
	Total	1,462.2	1,700.3	3.23	3.04	4,717	5,169	151.6	166.2
South Africa – tailii	ngs						_		
Tailings	Proved								
	Probable		0.7		1.24		1		0.0
	Total		0.7		1.24		1		0.0

#### **ORE RESERVE FOOTNOTES**

**General** Rounding of figures may result in computational discrepancies. Estimates of 0.0 represent numbers less than 0.05.

#### **Explanation of abbreviations**

4E grade is the sum of platinum, palladium, rhodium and gold grades in grams per tonne (g/t). The reported grades are as delivered to the concentrator for processing.

Contained metal is presented in metric tonnes and million troy ounces.

Moz: 4E million troy ounces.

 $\label{eq:Mt:Million} \mbox{Mt: Million tonnes. Tonnes are quoted as dry metric tonnes.}$ 

ROM: Reserves are reported as run-of-mine (ROM) ore after all modifying factors have been applied.

as at 31 December 2018

#### **ORE RESERVE FOOTNOTES** continued

#### **General** continued

#### **Concentrator recoveries**

Concentrator recoveries for Merensky Reef range from 85% to 87%, UG2 Reef from 82% to 85%, Platreef from 77% to 82% and Main Sulphide Zone from 80% to 83%.

#### Ore Reserve pay limit

The pay limits are directly linked to the 2018 Business Plan which takes into account platinum group elements (PGE), Base Metals and other credits. The pay limit is based on 'Cost 4' which consists of 'Direct Cash Cost' (on and off-mine), 'Other Indirect Costs' and 'Stay-in-Business Capital' (on and off-mine). The range is a function of various factors including depth of the orebody, geological complexity, mining method, infrastructure and economic parameters. The in-situ Merensky and UG2 Reefs Ore Reserve pay limit for the Amplats managed mines is 3.9 g/t (4E). The pay limit for MSZ is 3.3 4E g/t and the Platreef in-situ pay limit is 2.5 4E g/t. The pay limit for the Platreef stockpiles varies between 1.0 g/t and 1.7 g/t (4E).

#### **Disposal**

During 2018 the disposal of the interest in Union Mine to Siyanda Resources Proprietary Limited has been concluded. The approval of the sale by the Competition Commission was granted on 13 September 2017. The effective date of the sale was 1 February 2018.

Amplats has sold its interest in the Bafokeng Rasimone Platinum Mine JV and the transaction has been submitted for approval to the South African Department of Mineral Resources in terms of section 11 of the Mineral and Petroleum Resources Development Act. The effective date of transfer of the Mining Right is expected in 2019 following the completion of the approval process. The Ore Reserves are therefore still reported.

#### Acquisition

Until September 2018 Amplats' interest in the Mototolo Mine was 50%. End of October 2018 Amplats acquired the Glencore share of 40% which resulted in an increase of Amplats' interest to 90%. The remaining 10% from minority shareholder(s) has subsequently been bought, resulting in a 100% ownership of Mototolo Mine by Amplats.

During 2018, Modikwa Mine acquired the Mining Right within the Doornbosch farm from Samancor Chrome. Most of the UG2 Mineral Resources in this area have been converted to Ore Reserves.

#### **South Africa**

The Ore Reserve 4E content decreased by 9.2% to 146.1 4E Moz (2017: 160.9 4E Moz) and the tonnage decreased by 15% to 1,409.7 Mt (2017: 1,652.9 Mt). This was primarily as a result of economic assumptions at Mogalakwena Mine and the sale of the interest in Union Mine to Siyanda:

■ Mogalakwena Mine – economic assumptions:	-6.7 4E Moz ⇒ -160.7 Mt
■ Union Mine – disposal:	-5.1 4E Moz ⇒ -36.3 Mt
<ul> <li>Merensky Reef, UG2 Reef and Platreef – production:</li> </ul>	-2.6 4E Moz ⇒ -22.6 Mt
■ Dishaba Mine – reallocation of Ore Reserves to Mineral Resources:	-1.3 4E Moz ⇒ -8.0 Mt
■ Mogalakwena Mine – model refinement:	-0.5 4E Moz ⇒ -25.8 Mt

The decrease in the Ore Reserves is partly offset by:

■ Conversion of Mineral Resources to Ore Reserves at the following mines:

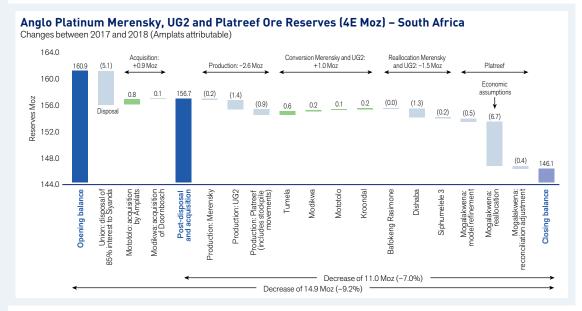
Tumela Mine - mainly UG2 Reef: +0.6 4E Moz ⇒ +4.6 Mt
 Modikwa Mine: +0.2 4E Moz ⇒ +2.8 Mt
 Mototolo Mine - acquisition by Amplats: +0.8 4E Moz ⇒ +6.0 Mt

Excluding the disposal of the interest in Union Mine to Siyanda, the total year-on-year South African Ore Reserve content decreased by 7.0% mainly due to economic assumptions at the Mogalakwena Mine.

#### **ORE RESERVE FOOTNOTES** continued

### South Africa continued

For more information, see the waterfall chart below. The waterfall chart is based on the total of Proved and Probable Ore Reserves attributable to Amplats.



1 The definitions for the waterfall charts are on page 49.

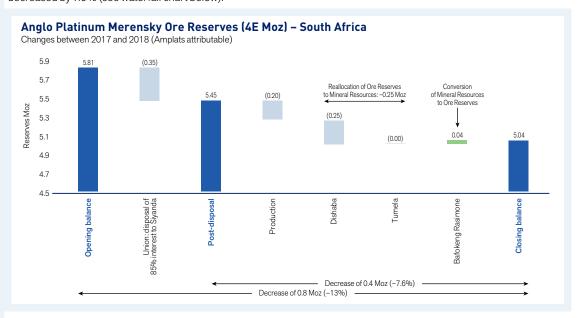
#### By reef

#### **Merensky Reef**

The Ore Reserve 4E ounce content decreased by 13% to 5.0 4E Moz (2017: 5.8 4E Moz) and the tonnage decreased by 12% to 33.7 Mt (2017: 38.3 Mt), primarily due the sale of the interest in Union Mine to Siyanda and other factors:

- Union Mine disposal: -0.35 4E Moz ⇒ -2.1 Mt
- Dishaba Mine reallocation of Ore Reserves to Mineral Resources:
   −0.25 4E Moz ⇒ −1.5 Mt
- Production: -0.20 4E Moz ⇒ -1.4 Mt

Excluding the disposal of the interest in Union Mine to Siyanda, the total year-on-year Merensky Reef Ore Reserve content decreased by 7.6% (see waterfall chart below).



as at 31 December 2018

#### **ORE RESERVE FOOTNOTES** continued

#### **UG2** Reef

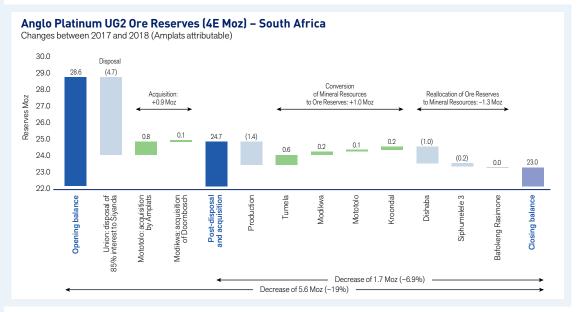
The Ore Reserve 4E ounce content decreased by 19% to 23.0 4E Moz (2017: 28.6 4E Moz) and the tonnage decreased by 18.5% to 175.7 Mt (2017: 215.5 Mt) mainly as a result of the sale of the interest in Union Mine to Siyanda and other factors:

Union Mine - disposal: -4.7 4E Moz ⇒ -34.2 Mt
 Production: -1.4 4E Moz ⇒ -12.1 Mt
 Dishaba Mine - reallocation of Ore Reserves to Mineral Resources: -1.0 4E Moz ⇒ -6.5 Mt

The decrease in the Ore Reserves is partially offset by the increase in Ore Reserves at Tumela, Modikwa, Kroondal and Mototolo mines due to conversion of Mineral Resources to Ore Reserves:

Turnela Mine: +0.6 4E Moz ⇒ +4.6 Mt
 Modikwa Mine: +0.2 4E Moz ⇒ +2.8 Mt
 Kroondal Mine: +0.2 4E Moz ⇒ +1.7 Mt
 Mototolo Mine: +0.1 4E Moz ⇒ +0.7 Mt
 and at Mototolo Mine due to acquisition by Amplats: +0.8 4E Moz ⇒ +6.0 Mt

Excluding the disposal of the interest in Union Mine to Siyanda, the total year-on-year UG2 Reef Ore Reserve content decreased by 6.9% (see waterfall chart below).



#### **ORE RESERVE FOOTNOTES** continued

#### Platreef -Mogalakwena

The pay limit grade for Platreef is 2.5 4E g/t for the in-situ reserves and it varies between 1.0 g/t and 1.7 g/t (4E) for the stockpiles.

The Ore Reserves 4E ounce content (inclusive of primary ore stockpiles) decreased by 6.8% to 118.0 4E Moz (2017: 126.6 4E Moz) and the tonnage decreased by 14% to 1,200.3 Mt (2017: 1,399.1 Mt) mainly due to the following:

■ Economic assumptions:

■ Downgrading of some lower grade material to Mineralisation: -4.2 4E Moz ⇒-93.3 Mt ■ Pit shell redesign at Mogalakwena and Zwartfontein South pits: -2.5 4E Moz ⇒ -67.4 Mt ■ Ex-pit production: -1.8 4E Moz ⇒ -17.9 Mt ■ Model refinement: -0.5 4E Moz ⇒ -25.8 Mt

Stockpile movements account for:

will not be withheld.

The anticipated Life-of-Mine Plan (LOMP) exceeds the current mining right expiry date (2040). An application for an extension to the mining right will be submitted at the appropriate time. There is reasonable expectation that this extension

+0.8 4E Moz ⇒+10.0 Mt

The published Ore Reserve stockpile does not include oxidised and calc-silicate material; this material is included in the Mineral Resource statement.

#### **Probable primary** ore stockpiles

Platreef Proved and Stockpile is mined ore that is stored on surface for future treatment. It is reported separately as Proved and Probable Ore Reserves but included in the total Platreef Ore Reserves. Run-of-Mine (ROM) stockpiles are reported as Proved and long-term stockpiles as Probable Ore Reserves. Increase in the ROM stockpile is due to production.

#### Main Sulphide Zone (MSZ) - Unki

The pay limit grade is 3.3 4E g/t and the planned stoping width is 204cm.

MSZ is the orebody mined at Unki Mine. As of 2010, an effective 100% interest in Southridge Limited (Unki Platinum Mine) is reported, subject to the finalisation of the indigenisation laws by the Zimbabwean government. The Ore Reserves for the MSZ relate to the Unki East Mine only. The reserve life for Unki decreased to 24 years due to a higher planned mining rate.

The Ore Reserve 4E ounce content increased by 6.5% to 5.6 4E Moz (2017: 5.2 4E Moz) and the tonnage increased by 11% to 52.5 Mt (2017: 47.4 Mt) mainly due to additional Mineral Resources converted to Ore Reserves as a result of a revised mine design.

■ Production: -0.2 4E Moz ⇒ -1.9 Mt

#### **Tailings**

Due to the disposal of the Union Mine dormant storage facility no further Ore Reserve is reported.

as at 31 December 2018

#### **ORE RESERVES**

#### By mine (4E)

The figures in the table below represent Amplats' attributable interests:

Peserve								Contained metal 4E Moz	
life*	Classification	2018	2017	2018	2017	2018	2017	2018	2017
	Proved	4.0	6.3	5.11	4.92	21	32	0.7	1.0
	Probable	4.8	4.5	4.89	5.18	23	23	0.8	0.8
	Total	8.8	10.8	4.99	5.03	44	55	1.4	1.8
	Proved	85.8	94.5	4.50	4.54	387	430	12.4	13.8
	Probable	8.9	8.1	4.43	4.53	39	36	1.3	1.2
	Total	94.7	102.5	4.49	4.54	426	466	13.7	15.0
15	Proved Probable	0.1	0.1	5.72	5.75	1	1	0.0	0.0
	Total	0.1	0.1	5.72	5.75	1	1	0.0	0.0
	Proved	40.3	39.5	4.65	4.73	188	187	6.0	6.0
	Probable	0.1	0.1	4.46	4.51	0	0	0.0	0.0
	Total	40.4	39.5	4.65	4.73	188	187	6.0	6.0
>22	Proved	4.0	6.2	5.10	4.91	20	31	0.6	1.0
	Probable	4.8	4.5	4.89	5.18	23	23	0.8	0.8
	Total	8.8	10.7	4.98	5.02	43	54	1.4	1.7
	Proved	45.5	55.0	4.37	4.41	199	243	6.4	7.8
	Probable	8.8	8.0	4.43	4.53	39	36	1.3	1.2
	Total	54.3	63.0	4.38	4.43	238	279	7.6	9.0
>22	Proved	727.8	840.6	3.06	2.86	2,227	2,404	71.6	77.3
	Probable	408.5	504.5	3.25	2.86	1,328	1,443	42.7	46.4
	Total	1,136.4	1,345.1	3.13	2.86	3,555	3,847	114.3	123.7
	Proved	23.1	13.1	2.42	2.26	56	30	1.8	1.0
	Probable	40.9	40.9	1.47	1.47	60	60	1.9	1.9
	Total	63.9	54.0	1.81	1.66	116	90	3.7	2.9
	Proved		1.2		4.68		5		0.2
	Probable		1.0		5.67		6		0.2
	Total		2.1		5.13		11		0.4
	Proved		29.0		4.39		127		4.1
									0.6
			34.2		4.30		146		4.7
	Proved								
									0.0
									0.0
21	Proved	17.5	17.8	4.66	4.70	82	84 31	2.6	2.7 1.0
	Dealeald:	7.0	7 -						1 (
	Probable	7.3	7.5	4.20	4.15	31		1.0	
	Total	24.9	25.4	4.52	4.54	113	115	3.6	3.7
									3.7 0.4 1.7
	Reserve life*  15  >22  >22	Reserve life*  Classification  Proved Probable  Total  Proved Probable  Total  15 Proved Probable  Total  Proved Probable  Total  >22 Proved Probable  Total  >22 Proved Probable  Total  Total  Proved Probable  Total  Proved Probable  Total  Total	Reserve life*         Classification         2018           Proved Probable         4.0 Probable         4.8           Total         8.8         8.8           Proved Probable         8.9         94.7           15         Proved Probable         0.1 Probable           Total         0.1 Proved Probable         40.3 Probable           Total         40.4         922 Proved Probable         4.0 Probable           Total         8.8         8.8         9.7 Proved Probable         4.0 Probable           Total         8.8         9.7 Probable         4.0 Probable	Reserve life*         Classification         2018         2017           Proved Probable         4.0         6.3 Probable         4.8         4.5           Total         8.8         10.8         94.5 Probable         94.5 Probable         94.5 Probable         94.5 Probable         94.7         102.5         10.1 Probable         0.1 Probable <td>Reserve life*         Classification         2018 2017         2018 2017           Proved Probable         4.0 6.3 5.11 4.89           Total         8.8 10.8 4.99           Proved Probable         8.9 8.1 4.43           Total         94.7 102.5 4.49           15 Proved Probable         0.1 0.1 5.72           Proved Probable         0.1 0.1 5.72           Proved Probable         40.3 39.5 4.65           Proved Probable         40.1 0.1 4.46           Total         40.4 39.5 4.65           Proved Probable         4.0 6.2 5.10           Proved Probable         4.8 4.5 4.89           Total         8.8 10.7 4.98           Proved Probable         4.8 4.5 3.0           Proved Probable         4.8 8.0 4.43           Total         54.3 63.0 4.38           &gt;22         Proved Probable         40.5 5.04.5 3.25           Total         1,136.4 1,345.1 3.13           Proved Probable         40.9 40.9 1.47           Total         1,136.4 1,345.1 3.13           Proved Probable         40.9 40.9 1.47           Total         1.2 2.1           Proved Probable         1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0</td> <td>Reserve life*         Classification         2018         2017         2018         2017           Proved Probable         4.0         6.3         5.11         4.92           Probable         4.8         4.5         4.89         5.18           Total         8.8         10.8         4.99         5.03           Probable         8.9         8.1         4.43         4.53           Total         94.7         102.5         4.49         4.54           15         Proved         0.1         0.1         5.72         5.75           Probable         0.1         0.1         5.72         5.75           Probable         0.1         0.1         5.72         5.75           Probable         0.1         0.1         5.72         5.75           Proved         40.3         39.5         4.65         4.73           &gt;22         Proved         4.0         6.2         5.10         4.91           Probable         4.8         4.5         4.89         5.18           Total         3.8         10.7         4.98         5.02           Proved         45.5         55.0         4.37         441</td> <td>Reserve life         Classification bulled in the life         Ore Reserve (Mt) Million tonus (Mt)         Grade 4E g/t 4E g/t 4E ton 4E ton (Mt)         Containe 4E ton 4E ton (Mt)         Containe 4E ton (Mt)         August 2017         2018         2017         2018         Pol 18         2018         2018         2018         2017         2018         August 2017         2018         2017         2018         Pol 2018         2018</td> <td>Reserve life*         Classification         2018         2017         2018         2018         2018         2018         2018         2018         2018         2018         2018         2018         2018         2018         2018         2</td> <td>  Proved</td>	Reserve life*         Classification         2018 2017         2018 2017           Proved Probable         4.0 6.3 5.11 4.89           Total         8.8 10.8 4.99           Proved Probable         8.9 8.1 4.43           Total         94.7 102.5 4.49           15 Proved Probable         0.1 0.1 5.72           Proved Probable         0.1 0.1 5.72           Proved Probable         40.3 39.5 4.65           Proved Probable         40.1 0.1 4.46           Total         40.4 39.5 4.65           Proved Probable         4.0 6.2 5.10           Proved Probable         4.8 4.5 4.89           Total         8.8 10.7 4.98           Proved Probable         4.8 4.5 3.0           Proved Probable         4.8 8.0 4.43           Total         54.3 63.0 4.38           >22         Proved Probable         40.5 5.04.5 3.25           Total         1,136.4 1,345.1 3.13           Proved Probable         40.9 40.9 1.47           Total         1,136.4 1,345.1 3.13           Proved Probable         40.9 40.9 1.47           Total         1.2 2.1           Proved Probable         1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0	Reserve life*         Classification         2018         2017         2018         2017           Proved Probable         4.0         6.3         5.11         4.92           Probable         4.8         4.5         4.89         5.18           Total         8.8         10.8         4.99         5.03           Probable         8.9         8.1         4.43         4.53           Total         94.7         102.5         4.49         4.54           15         Proved         0.1         0.1         5.72         5.75           Probable         0.1         0.1         5.72         5.75           Probable         0.1         0.1         5.72         5.75           Probable         0.1         0.1         5.72         5.75           Proved         40.3         39.5         4.65         4.73           >22         Proved         4.0         6.2         5.10         4.91           Probable         4.8         4.5         4.89         5.18           Total         3.8         10.7         4.98         5.02           Proved         45.5         55.0         4.37         441	Reserve life         Classification bulled in the life         Ore Reserve (Mt) Million tonus (Mt)         Grade 4E g/t 4E g/t 4E ton 4E ton (Mt)         Containe 4E ton 4E ton (Mt)         Containe 4E ton (Mt)         August 2017         2018         2017         2018         Pol 18         2018         2018         2018         2017         2018         August 2017         2018         2017         2018         Pol 2018         2018	Reserve life*         Classification         2018         2017         2018         2018         2018         2018         2018         2018         2018         2018         2018         2018         2018         2018         2018         2	Proved

#### **ORE RESERVES** continued

#### By mine (4E) continued

The figures in the table below represent Amplats' attributable interests:

	Reserve			ves (ROM) nnes (Mt)	7	ade g/t			Contained metal 4E Moz	
South Africa	life*	Classification	2018	2017	2018	2017	2018	2017	2018	2017
Kroondal (50%)	6	Proved	8.0	7.6	2.78	2.68	22	20	0.7	0.7
UG2 Reef		Probable		2.5		2.78		7		0.2
		Total	8.0	10.1	2.78	2.70	22	27	0.7	0.9
Modikwa (50%)	>24	Proved	7.9	5.9	4.49	4.70	36	28	1.1	0.9
UG2 Reef		Probable	15.9	15.7	4.27	4.59	68	72	2.2	2.3
		Total	23.9	21.6	4.34	4.62	104	100	3.3	3.2
Mototolo (from 50% [2017] to 100%	5	Proved	11.9	6.5	4.16	4.02	50	26	1.6	0.8
[2018])		Probable								
UG2 Reef		Total	11.9	6.5	4.16	4.02	50	26	1.6	0.8
Siphumelele 3 (100%)	12	Proved	20.7	14.9	2.46	2.45	51	37	1.6	1.2
UG2 Reef		Probable		8.6		2.43		21		0.7
		Total	20.7	23.6	2.46	2.44	51	58	1.6	1.9

#### **ORE RESERVE FOOTNOTES BY MINE/PROJECT**

#### General

- \* Reserve life: the scheduled extraction period in years for the total Ore Reserves in the approved Life-of-Mine Plan, considering the combined reefs production (as applicable) within the current mining right. Where applicable, an application to extend the mining right will be submitted at the appropriate time and there is reasonable expectation that such an extension will not be withheld.
- \*\* For reconciliation purposes the total Ore Reserves from the individual mines (Tumela and Dishaba) have been tabulated to enable a comparison with the previously reported Amandelbult Complex.

Rounding of figures may result in computational discrepancies. Estimates of 0.0 represent numbers less than 0.05. 4E grade is the sum of platinum, palladium, rhodium and gold grades in grams per tonne (g/t).

#### **Tumela**

The Ore Reserve pay limit grade is  $3.94 \, \mathrm{E}$  g/t and the planned stoping width is  $154 \, \mathrm{cm}$  for the Merensky and for the UG2 Reef. The reserve life for the mine (UG2 and Merensky Reefs) decreased to  $15 \, \mathrm{years}$  (2017: 23 years) as a result of implementing a mechanisation project in a part of the mine.

The Merensky Ore Reserve 4E ounce content is unchanged at 0.02 4E Moz.

The UG2 Ore Reserve 4E ounce content is unchanged at 6.04E Moz but the tonnage increased by 2.3% to 40.4 Mt (2017: 39.5 Mt).

Production: -0.5 4E Moz ⇒ -3.7 Mt
 Conversion: +0.6 4E Moz ⇒ +4.6 Mt

#### Dishaba

The Ore Reserve pay limit grade is 3.9 4E g/t and the planned stoping width is 151cm for the Merensky Reef and 161cm for the UG2 Reef. The anticipated Life-of-Mine Plan exceeds the current mining right expiry date (2040).

The Merensky Ore Reserve 4E ounce content decreased by 19% to 1.4 4E Moz (2017: 1.7 4E Moz) and the tonnage decreased by 18% to 10.7 Mt (2017: 8.8 Mt) mainly due to a revised mine design.

Reallocation: -0.25 4E Moz ⇒ -1.5 Mt
 Production: -0.1 4E Moz ⇒ -0.45 Mt

The UG2 Ore Reserve 4E ounce content decreased by 15% to 7.6 4E Moz (2017: 9.0 4E Moz) and the tonnage decreased by 14% to 54.3 Mt (2017: 63.0 Mt) due to a revised mine design.

Reallocation: -1.0 4E Moz ⇒ -6.5 Mt
 Production: -0.3 4E Moz ⇒ -2.2 Mt

as at 31 December 2018

#### **ORE RESERVE FOOTNOTES BY MINE/PROJECT** continued

#### Union

Due to the sale of Union Mine to Siyanda, Amplats' attributable interest decreased from 85% to 0%.

#### Bafokeng Rasimone

The figures quoted are as at end of December 2018. Reserve figures are provided by BRPM, which is managed by Royal Bafokeng Platinum.

The Merensky Ore Reserve 4E ounce content decreased marginally to 3.6 4E Moz (2017: 3.7 4E Moz) and the tonnage decreased marginally to 24.9 Mt (2017: 25.4 Mt) mainly due to production.

The UG2 Ore Reserve 4E ounce content decreased slightly to 2.0 4E Moz (2017: 2.1 4E Moz) and the tonnage decreased slightly to 16.5 Mt (2017: 17.1 Mt) mainly due to reallocation of Ore Reserves to Mineral Resources and due to production. Some Ore Reserves have been downgraded from Proved to Probable Ore Reserves.

#### Kroondal

Amplats' attributable interest is 50%. The figures quoted are as at end of December 2018 and reflect the attributable interest only. UG2 Reef figures are as per the Kroondal pooling-and-sharing agreement, managed by Sibanye-Stillwater.

The UG2 Ore Reserve 4E ounce decreased by 19% to 0.7 4E Moz (2017: 0.9 4E Moz) and the tonnage decreased by 21% to 8.0 Mt (2017: 10.1 Mt) due to production.

#### Modikwa

Amplats' attributable interest is 50%. The figures quoted are as at end of December 2018 and reflect the attributable interest only. UG2 Reef figures reported are as per Modikwa Platinum JV management.

The UG2 Ore Reserve 4E ounce content increased by 4.1% to 3.3 4E Moz (2017: 3.2 4E Moz) and the tonnage increased by 11% to 23.9 Mt (2017: 21.6 Mt) mainly as a result of conversion of Mineral Resources to Ore Reserves and due to the acquisition of the Mining Rights of Doornbosch farm. Some Ore Reserves have been downgraded from Proved to Probable Ore Reserves:

■ Conversion or Mineral Resources to Ore Reserves:

+0.24E Moz ⇒ +2.8 Mt

Acquisition of Mineral Rights of Doornbosch:

+0.1 4E Moz ⇒ +0.5 Mt

#### Mototolo

Due to the acquisition Mototolo Mine by Amplats at the end of October 2018, the attributable interest increased from 50% to 100%. The figures quoted for 2017 reflect the 50% attributable interest, the figures quoted as at end of December 2018 reflect 100%. UG2 Reef figures reported are as per Mototolo management. Only five years' Ore Reserves are declared as per Glencore policy.

The UG2 Ore Reserve 4E ounce doubled to 1.6 4E Moz (2017: 0.8 4E Moz) and the tonnage doubled to 11.9 Mt (2017: 6.5 Mt).

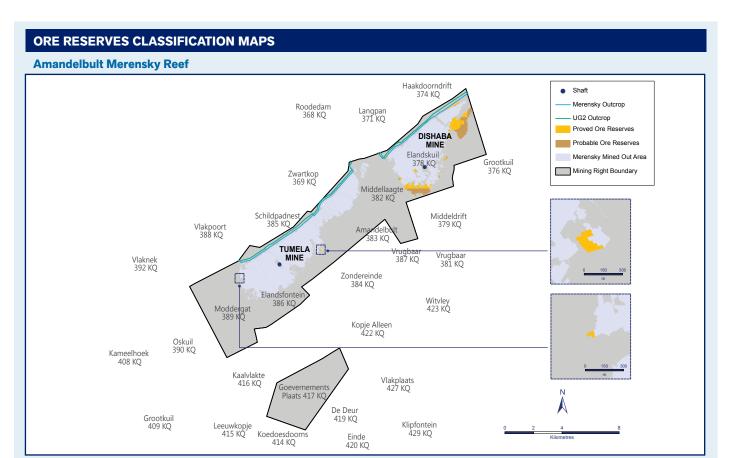
### Siphumelele 3 shaft

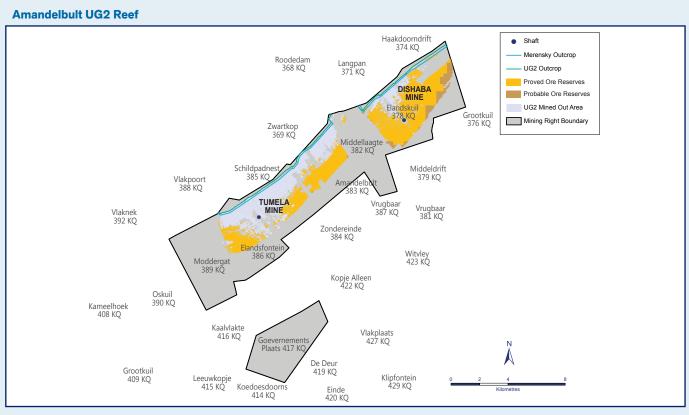
The Siphumelele 3 shaft is mined on a royalty basis from Kroondal Mine (Sibanye-Stillwater). Figures are provided by Sibanye-Stillwater.

The UG2 Ore Reserve 4E ounce content decreased by 11% to 1.6 4E Moz (2017: 1.9 4E Moz) and the tonnage decreased by 12% to 20.7 Mt (2017: 23.6 Mt) mainly due to production.

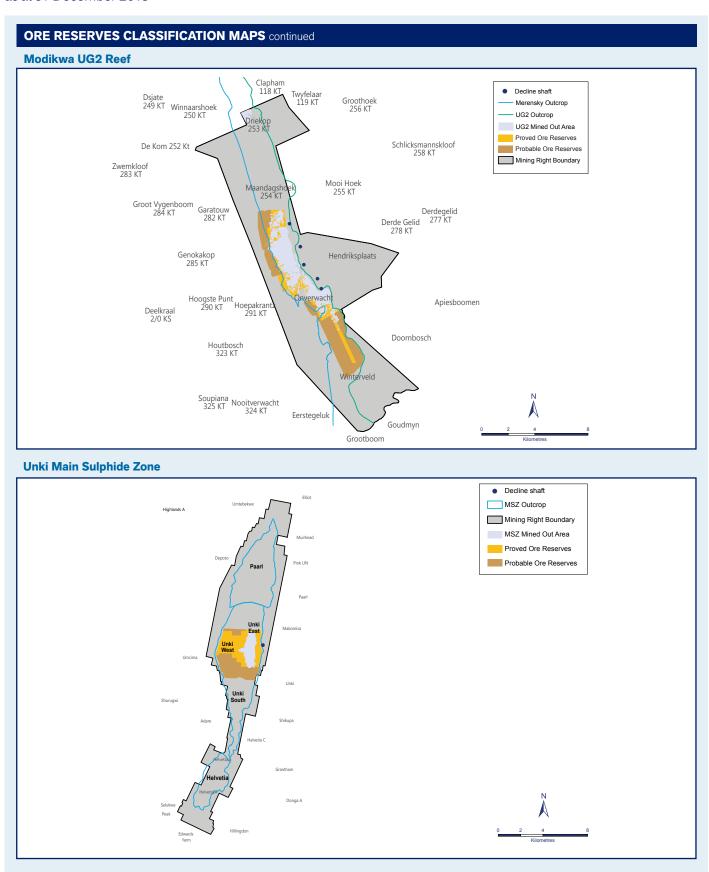
#### Marikana, Bokoni and Twickenham

Marikana, Bokoni and Twickenham mines remain on care and maintenance and hence no Ore Reserves are reported.





as at 31 December 2018



#### **MINERAL RESOURCES**

#### By reef exclusive of Ore Reserves (4E)

The figures in the table below represent Amplats' attributable interests:

			Resources Innes (Mt)	Gra 4E (		Containe 4E to		Containe 4E N	
Reef	Classification	2018	2017	2018	2017	2018	2017	2018	2017
South Africa									
Merensky Reef	Measured	188.1	208.0	5.23	5.33	983	1,109	31.6	35.7
•	Indicated	266.2	297.5	5.15	5.23	1,372	1,557	44.1	50.0
	Measured and Indicated	454.3	505.5	5.18	5.27	2,355	2,666	75.7	85.7
	Inferred in LOMP*	2.6	2.3	7.80	7.57	21	17	0.7	0.6
	Inferred ex LOMP*	474.5	487.3	4.94	4.97	2,344	2,422	75.4	77.8
	Inferred	477.1	489.6	4.95	4.98	2,365	2,439	76.0	78.4
	Total	931.5	995.1	5.07	5.13	4,720	5,105	151.7	164.1
UG2 Reef	Measured	461.0	495.8	5.27	5.29	2,431	2,624	78.1	84.4
	Indicated	486.3	529.7	5.28	5.29	2,569	2,802	82.6	90.1
	Measured and Indicated	947.3	1,025.5	5.28	5.29	5,000	5,426	160.7	174.5
	Inferred in LOMP*	0.1	0.1	5.16	5.16	1	1	0.0	0.0
	Inferred ex LOMP*	466.5	498.5	5.53	5.52	2,578	2,751	82.9	88.5
	Inferred	466.7	498.7	5.53	5.52	2,579	2,752	83.0	88.5
	Total	1,414.0	1,524.2	5.36	5.37	7,579	8,178	243.6	263.0
Platreef**	Measured	236.6	255.5	1.99	2.09	471	534	15.1	17.2
	Measured stockpiles	4.4	4.8	3.20	3.19	14	15	0.4	0.5
	Indicated	1,371.1	1,069.4	2.17	2.30	2,975	2,460	95.7	79.1
	Measured and Indicated	1,612.1	1,329.7	2.15	2.26	3,460	3,009	111.2	96.7
	Inferred in LOMP*	2.5	1.6	4.77	4.51	12	7	0.4	0.2
	Inferred ex LOMP*	824.2	1,138.4	2.18	1.95	1,797	2,220	57.8	71.4
	Inferred	826.6	1,140.0	2.19	1.95	1,809	2,227	58.1	71.6
	Total	2,438.7	2,469.7	2.16	2.12	5,269	5,236	169.4	168.3
All reefs	Measured	890.1	964.2	4.38	4.44	3,899	4,282	125.3	137.7
	Indicated	2,123.7	1,896.7	3.26	3.60	6,916	6,819	222.3	219.2
	Measured and Indicated	3,013.8	2,860.8	3.59	3.88	10,815	11,101	347.6	356.9
	Inferred in LOMP*	5.2	4.0	6.30	6.28	34	25	1.1	0.8
	Inferred ex LOMP*	1,765.2	2,124.3	3.81	3.48	6,719	7,393	216.0	237.7
	Inferred	1,770.4	2,128.2	3.81	3.49	6,753	7,418	217.1	238.5
	Total	4,784.2	4,989.1	3.67	3.71	17,568	18,519	564.7	595.4
Zimbabwe									
Main Sulphide Zone	Measured	11.1	20.8	3.96	3.77	44	78	1.4	2.5
(MSZ)	Indicated	111.3	109.7	4.29	4.26	477	467	15.3	15.0
	Measured and Indicated	122.4	130.5	4.26	4.18	521	545	16.8	17.5
	Inferred in LOMP*	0.0	8.3	3.37	3.70	0	31	0.0	1.0
	Inferred ex LOMP*	47.4	37.7	4.23	4.37	200	165	6.4	5.3
	Inferred	47.4	46.0	4.23	4.25	200	196	6.4	6.3
	Total	169.7	176.5	4.25	4.20	721	741	23.2	23.8

\* Inferred in LOMP and Inferred ex LOMP
Inferred Mineral Resources within the Life-of-Mine Plan (LOMP) are described as 'Inferred (in LOMP)'. The portion of Inferred Resources with reasonable prospects for eventual economic extraction not considered in the LOMP are reported as 'Inferred (ex LOMP)'.

<sup>\*\*</sup> For the Platreef a cut-off grade of 1.0 4E g/t is used except for calc-silicate and oxidised material where a cut-off grade of 3.0 4E g/t is used.

as at 31 December 2018

#### MINERAL RESOURCES continued

#### By reef exclusive of Ore Reserves (4E) continued

The figures in the table below represent Amplats' attributable interests:

			Mineral Resources Grade Contained metal Million tonnes (Mt) 4E g/t 4E tonnes		Contained metal 4E Moz				
Reef	Classification	2018	2017	2018	2017	2018	2017	2018	2017
South Africa and Ziml	babwe	,		'					
All reefs	Measured	901.2	984.9	4.37	4.43	3,943	4,360	126.7	140.2
(including MSZ)	Indicated	2,234.9	2,006.4	3.31	3.63	7,393	7,286	237.7	234.3
	Measured and Indicated	3,136.1	2,991.3	3.61	3.89	11,336	11,646	364.4	374.5
	Inferred in LOMP*	5.2	12.3	6.29	4.54	34	56	1.1	1.8
	Inferred ex LOMP*	1,812.6	2,162.0	3.82	3.50	6,919	7,558	222.5	243.0
	Inferred	1,817.8	2,174.3	3.82	3.50	6,953	7,614	223.5	244.8
	Total	4,953.9	5,165.6	3.69	3.73	18,289	19,260	587.9	619.2
South Africa – tailings	5								
Tailings total	Measured	63.0	63.0	0.79	0.79	50	50	1.6	1.6
	Indicated	8.1	22.4	0.82	1.14	7	26	0.2	0.8
	Measured and Indicated	71.1	85.4	0.79	0.88	57	76	1.8	2.4
	Inferred	1.2	1.2	0.91	0.91	1	1	0.0	0.0
	Total	72.3	86.6	0.80	0.88	58	77	1.9	2.5

<sup>\*</sup> Inferred in LOMP and Inferred ex LOMP

Inferred Mineral Resources within the Life-of-Mine Plan (LOMP) are described as 'Inferred (in LOMP)'. The portion of Inferred Resources with reasonable prospects for eventual economic extraction not considered in the LOMP are reported as 'Inferred (ex LOMP)'.

<sup>\*\*</sup> For the Platreef a cut-off grade of 1.0 4E g/t is used except for calc-silicate and oxidised material where a cut-off grade of 3.0 4E g/t is used.

#### MINERAL RESOURCES EXCLUSIVE OF ORE RESERVE FOOTNOTES

#### General

Due to the uncertainty that may be attached to some Inferred Mineral Resources, it cannot be assumed that all or part of an Inferred Mineral Resource will necessarily be upgraded to an Indicated or Measured Resource after continued exploration.

Rounding of figures may result in computational discrepancies. Estimates of 0.0 represent numbers less than 0.05.

4E grade is the sum of platinum, palladium, rhodium and gold grades in grams per tonne (g/t). Tonnes are quoted as dry metric tonnes.

It should be noted that the Mineral Resources are quoted over the entire mining right and prospecting right areas, except for Mogalakwena Mine, where the Platreef Mineral Resources are only quoted down to potential future surface mining depth and for Merensky and UG2 Reefs at Tumela, Twickenham and Bokoni mines, where a virgin rock temperature of 75° C is currently considered to be the limit to mining given anticipated technology, metal prices and energy costs.

The Mineral Resource tabulations are quoted exclusive of Ore Reserves and after geological losses.

#### Disposal

During 2018, the disposal of the interest in Union Mine Mineral Resources to Siyanda Resources has been completed.

Amplats has sold its interest in the Bafokeng Rasimone Platinum Mine JV and the transaction has been submitted for approval to the South African Department of Mineral Resources in terms of section 11 of the Mineral and Petroleum Resources Development Act. The effective date of transfer of the Mining Right is expected in 2019 following the completion of the approval process. The Mineral Resources are therefore still reported.

#### Acquisition

Until September 2018 Amplats' interest in the Mototolo Mine was 50%. End of October 2018 Amplats acquired the Glencore share of 40% which resulted in an increase of Amplats' interest to 90%. The remaining 10% from minority shareholder(s) has subsequently been bought, resulting in a 100% ownership of Mototolo Mine by Amplats.

During 2018, Modikwa Platinum Mine acquired the Mining Right within the Doornbosch farm from Samancor Chrome.

#### **Cut-off grade**

Amplats takes cognisance of cut-off grades (derived from information on pay limits at the mining operations) and of 'reasonable prospects for eventual economic extraction' over a period of 30 to 50 years. The delineation of the Resources that meet the requirements of reasonable expectation of eventual economic extraction has been defined using the modifying factors as defined in the SAMREC Code. These include, but are not limited to, mineability, geological complexity, processability and economic factors relevant to Amplats. The overall minimum Resource grades, per reef, per operation are in most instances greater than the 'Cost 4' pay limit.

#### Resource Cut

The Mineral Resources are estimated over a variable 'Resource Cut', targeting a minimum width which takes cognisance of the mining method, potential economic viability and geotechnical aspects in the hanging wall or footwall of the reef.

#### **Mineral Resource reporting**

During 2018 Amplats commenced with the review of the application of the 'reasonable prospect for eventual economic extraction' (RPEEE) criteria to the Mineral Resources. As a result of this review a revised methodology of reporting Mineral Resources is being investigated and will be completed during 2019. Mineral Resource information such as tonnage, grade and content might change for the 2019 reporting should the reviewed methodology be implemented by Amplats.

as at 31 December 2018

#### MINERAL RESOURCES EXCLUSIVE OF ORE RESERVE FOOTNOTES continued

#### **South Africa**

The Mineral Resources exclusive of Ore Reserves 4E content decreased by 5.2% to 564.7 4E Moz (2017: 595.4 4E Moz) and the tonnage decreased by 4.1% to 4,784.2 Mt (2017: 4,989.1 Mt) as a result of the disposal of the interest in Union Mine to Siyanda and other factors:

- Union Mine Merensky and UG2 Reefs disposal:

  -33.4 4E Moz ⇒ -185.0 Mt
- Tumela Mine conversion of Mineral Resources to Ore Reserves (mainly UG2): -1.3 4E Moz ⇒ -6.8 Mt
- Mogalakwena Mine new information and model refinement at Sandsloot and Tweefontein:

   -1.0 4E Moz ⇒ -91.3 Mt

   Modikwa Mine conversion of Mineral Resources to Ore Reserves:

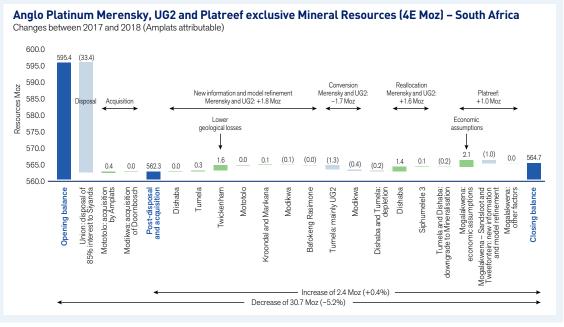
   -0.4 4E Moz ⇒ -2.1 Mt

The decrease is partly offset by the increase of exclusive Mineral Resources at:

■ Mogalakwena Mine – economic assumptions:
 +2.1 4E Moz ⇒ +61.6 Mt
 ■ Twickenham Mine – model refinement (lower geological losses):
 +1.6 4E Moz ⇒ +9.1 Mt
 ■ Dishaba Mine – reallocation of Ore Reserves to Mineral Resources:
 +1.4 4E Moz ⇒ +7.0 Mt
 ■ Mototolo Mine – acquisition (change in ownership from 50% to 100%):
 +0.4 4E Moz ⇒ +3.1 Mt

Excluding the sale of the interest in Union Mine to Siyanda, the total year-on-year Mineral Resources exclusive of Ore Reserves content increased by 0.4%.

For more information, refer to the waterfall chart below. The waterfall chart is based on the total of Measured, Indicated and Inferred Mineral Resources exclusive of Ore Reserves attributable to Amplats.



#### MINERAL RESOURCES EXCLUSIVE OF ORE RESERVE FOOTNOTES continued

#### By reef

#### **Merensky Reef**

The Merensky Mineral Resource 4E ounce content decreased by 7.6% to 151.7 4E Moz (2017: 164.1 4E Moz) and the tonnage decreased by 6.4% to 931.5 Mt (2017: 995.1 Mt) primarily as a result of the disposal of the interest in Union Mine to Siyanda:

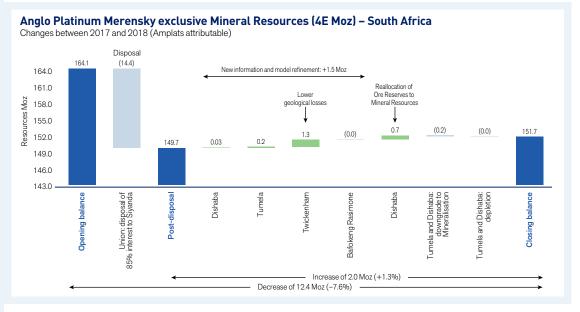
■ Union Mine – disposal:

-14.4 4E Moz ⇒ -74.0 Mt

The decrease is partly offset by the increase of Mineral Resources mainly as a result of model refinement and other factors:

- Twickenham Mine model refinement (lower geological losses): +1.3 4E Moz ⇒ +8.0 Mt
- Dishaba Mine reallocation of Ore Reserves to Mineral Resources: +0.7 4E Moz ⇒ +2.6 Mt
- Tumela Mine new information (mainly lower geological losses): +0.2 4E Moz ⇒ +0.8 Mt

Excluding the sale of Union Mine to Siyanda, the total year-on-year Merensky Mineral Resources exclusive of Ore Reserves content increased by 1.3% (see waterfall chart below).



as at 31 December 2018

#### MINERAL RESOURCES EXCLUSIVE OF ORE RESERVE FOOTNOTES continued

By reef continued

UG2 Reef

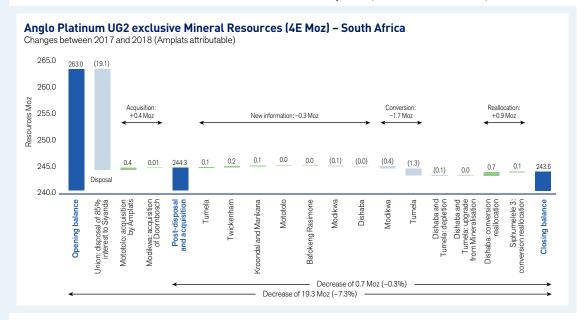
The UG2 exclusive Mineral Resource 4E ounce content decreased by 7.3% to 243.6 4E Moz (2017: 263.0 4E Moz) and the tonnage decreased by 7.2% to 1,414.0 Mt (2017: 1,524.2 Mt) primarily as a result of the disposal of the interest in Union Mine to Siyanda and other factors:

Union Mine – disposal:
 19.1 4E Moz ⇒ −111.0 Mt
 Turnela Mine – conversion of Mineral Resources to Ore Reserves:
 Modikwa Mine – conversion of Mineral Resources to Ore Reserves:
 -0.4 4E Moz ⇒ −2.1 Mt

This decrease is offset by the increase of Mineral Resources mainly at:

Dishaba Mine – reallocation of Ore Reserves to Mineral Resources: +0.7 4E Moz ⇒ +4.4 Mt
 Mototolo Mine – acquisition by Amplats: +0.4 4E Moz ⇒ +3.1 Mt
 Twickenham Mine – model refinement (lower geological losses): +0.2 4E Moz ⇒ +1.1 Mt

Excluding the sale of Union Mine to Siyanda and the acquisition of Mototolo Mine by Amplats the total year-on-year UG2 Mineral Resources exclusive of Ore Reserves content decreased by 0.3% (see waterfall chart below).



#### MINERAL RESOURCES EXCLUSIVE OF ORE RESERVE FOOTNOTES continued

## By reef continued Platreef Mogalakwena

A 1.0 4E g/t cut-off grade is used to define Platreef Mineral Resources (excluding oxidised and calc-silicate material for which a 3.0 4E g/t cut-off grade is applied).

The Mogalakwena Platreef exclusive Mineral Resource 4E ounce content increased slightly to 169.4 4E Moz (2017: 168.3 4E Moz) but the tonnage decreased slightly to 2,438.7 Mt (2017: 2,469.7 Mt) mainly due to economic assumptions which resulted in the reallocation of Ore Reserves to Mineral Resources:

■ Mogalakwena – economic assumptions:

+1.4 4E Moz ⇒ +56.6 Mt

■ Zwartfontein South – economic assumptions:

+0.6 4E Moz ⇒ +5.0 Mt

The resource statement includes stockpiled material from the open pit operation that consists of calc-silicate and oxidised material with a cut-off grade of greater than 3.0 4E g/t. This Measured Mineral Resource is included in the Resource statement (0.4 4E Moz  $\Rightarrow$  4.4 Mt).

#### Main Sulphide Zone (MSZ) – Unki

MSZ is the orebody mined at Unki Platinum Mine. As of 2010, an effective 100% interest in Southridge Limited (Unki Platinum Mine) is reported, subject to the finalisation of the indigenisation laws by the Zimbabwean government.

The Mineral Resource 4E ounce content decreased by 2.6% to 23.2 4E Moz (2017: 23.8 4E Moz) and the tonnage decreased by 3.8% to 169.7 Mt (2017: 176.5 Mt) due to conversion of Mineral Resources to Ore Reserves.

The current mining areas at Unki East and West are evaluated on a 180cm 'Resource Cut' width and the remaining area evaluated on a 120cm 'Resource Cut' width.

Oxidised material is excluded from public reporting.

#### **Tailings**

Operating tailings storage facilities are not reported as part of the Mineral Resources. At Amandelbult a dormant tailings storage facility has been evaluated and is separately reported as tailings Mineral Resources. Previously reported dormant tailings at Union Mine have been sold to Siyanda.

as at 31 December 2018

#### **MINERAL RESOURCES**

#### By mine/project exclusive of Ore Reserves (4E)

The figures in the table below represent Amplats' attributable interests:

		Mineral Re Million ton		Grad 4E g/		Contained 4E ton		Contained metal 4E Moz	
South Africa	Classification	2018	2017	2018	2017	2018	2017	2018	2017
Amandelbult Complex* (100%)	Measured	34.6	32.4	6.92	6.89	239	223	7.7	7.2
Merensky Reef	Indicated	57.9	57.6	7.02	6.98	407	402	13.1	12.9
	Measured and Indicated	92.5	90.0	6.98	6.95	646	625	20.8	20.1
	Inferred	58.3	58.3	6.84	6.86	399	400	12.8	12.9
	Total	150.8	148.3	6.93	6.91	1,045	1,025	33.6	33.0
UG2 Reef	Measured	130.1	130.1	5.38	5.42	700	705	22.5	22.7
	Indicated	69.7	71.7	5.60	5.61	390	402	12.5	12.9
	Measured and Indicated	199.8	201.8	5.45	5.49	1,090	1,107	35.0	35.6
	Inferred	55.9	55.9	5.73	5.73	320	320	10.3	10.3
	Total	255.7	257.6	5.51	5.54	1,410	1,427	45.3	45.9
Tailings	Measured	63.0	63.0	0.79	0.79	50	50	1.6	1.6
	Indicated	8.1	8.1	0.82	0.82	7	7	0.2	0.2
	Measured and Indicated	71.1	71.1	0.79	0.79	57	57	1.8	1.8
	Inferred	1.2	1.2	0.91	0.91	1	1	0.0	0.0
	Total	72.3	72.3	0.80	0.80	58	58	1.9	1.9
Tumela (100%)	Measured	25.3	25.4	6.85	6.83	173	174	5.6	5.6
Merensky Reef	Indicated	46.9	46.4	7.05	7.05	331	327	10.6	10.5
	Measured and Indicated	72.2	71.8	6.98	6.97	504	501	16.2	16.1
	Inferred	45.3	45.2	7.00	7.03	317	318	10.2	10.2
	Total	117.5	117.0	6.99	6.99	821	819	26.4	26.3
UG2 Reef	Measured	103.5	109.9	5.41	5.44	560	598	18.0	19.2
	Indicated	45.0	45.0	5.52	5.52	249	248	8.0	8.0
	Measured and Indicated	148.5	154.9	5.44	5.46	809	846	26.0	27.2
	Inferred	47.1	47.2	5.76	5.77	271	272	8.7	8.7
	Total	195.6	202.1	5.52	5.53	1,080	1,118	34.7	36.0
Dishaba (100%)	Measured	9.3	7.0	7.11	7.10	66	49	2.1	1.6
Merensky Reef	Indicated	11.0	11.2	6.90	6.69	76	75	2.4	2.4
	Measured and Indicated	20.3	18.2	7.00	6.85	142	124	4.6	4.0
	Inferred	13.0	13.1	6.30	6.29	83	82	2.6	2.6
	Total	33.3	31.3	6.72	6.61	225	206	7.2	6.6
UG2 Reef	Measured	26.6	20.1	5.25	5.31	140	107	4.5	3.4
	Indicated	24.6	26.7	5.74	5.75	141	154	4.5	4.9
	Measured and Indicated	51.3	46.9	5.49	5.56	281	261	9.0	8.4
	Inferred	8.8	8.7	5.54	5.54	49	48	1.6	1.6
	Total	60.1	55.6	5.49	5.56	330	309	10.6	9.9

#### MINERAL RESOURCES continued

By mine/project exclusive of Ore Reserves (4E) continued

		Mineral Ro Million tor		Gra 4E ç		Contained 4E ton		Contained 4E M	
South Africa	Classification	2018	2017	2018	2017	2018	2017	2018	2017
Mogalakwena** (100%)	Measured	236.6	255.5	1.99	2.09	471	534	15.1	17.2
Platreef	Indicated	1,371.1	1,069.4	2.17	2.30	2,975	2,460	95.7	79.1
	Measured and Indicated	1,607.8	1,324.9	2.14	2.26	3,446	2,994	110.8	96.2
	Inferred	826.6	1,140.0	2.19	1.95	1,809	2,227	58.1	71.6
	Total	2,434.4	2,464.9	2.16	2.12	5,255	5,221	168.9	167.8
Platreef primary ore stockpiles	Measured Indicated	4.4	4.8	3.20	3.19	14	15	0.4	0.5
	Measured and Indicated	4.4	4.8	3.20	3.19	14	15	0.4	0.5
	Inferred								
	Total	4.4	4.8	3.20	3.19	14	15	0.4	0.5
Twickenham (100%)	Measured	48.4	47.5	4.75	4.75	230	225	7.4	7.2
Merensky Reef	Indicated	87.3	85.7	4.97	4.96	434	425	14.0	13.7
,	Measured and Indicated	135.7	133.1	4.89	4.89	664	650	21.3	20.9
	Inferred	165.7	160.3	5.26	5.26	872	843	28.0	27.1
	Total	301.4	293.4	5.09	5.09	1,536	1,493	49.4	48.0
UG2 Reef	Measured	54.6	55.2	6.29	6.29	344	347	11.1	11.2
OUZ NCCI	Indicated	145.4	146.1	6.05	6.05	879	884	28.3	28.4
	Measured and Indicated	200.0	201.3	6.12	6.12	1,223	1,231	39.3	39.6
	Inferred	148.2	145.8	5.88	5.88	871	857	28.0	27.6
	Total	348.2	347.1	6.02	6.02	2,094	2,088	67.3	67.1
Union (from 85% [2017] to 0% [2018])	Measured		23.0		6.38		147		4.7
Merensky Reef	Indicated		33.3		5.98		199		6.4
·	Measured and Indicated		56.3		6.14		346		11.1
	Inferred		17.7		5.76		102		3.3
	Total		74.0		6.05		448		14.4
UG2 Reef	Measured		40.1		5.10		205		6.6
00211001	Indicated		37.0		5.51		204		6.6
	Measured and Indicated		77.1		5.30		409		13.1
	Inferred		33.9		5.44		185		5.9
	Total		111.0		5.34		594		19.1
Tailings	Measured								
J	Indicated		14.3		1.32		19		0.6
	Measured and Indicated		14.3		1.32		19		0.6
	Inferred								
	Total		14.3		1.32		19		0.6
Bafokeng Rasimone (33%)	Measured	9.1	9.0	7.88	7.86	71	71	2.3	2.3
Merensky Reef	Indicated	10.4	10.4	7.05	7.05	74	74	2.4	2.4
	Measured and Indicated	19.5	19.5	7.44	7.43	145	145	4.7	4.6
	Inferred	8.5	8.8	7.76	7.59	66	67	2.1	2.1
	Total	28.0	28.3	7.53	7.48	211	212	6.8	6.8

as at 31 December 2018

#### MINERAL RESOURCES continued

By mine/project exclusive of Ore Reserves (4E) continued

		Mineral Re Million ton		Grad 4E g/		Contained 4E ton			Contained metal 4E Moz	
South Africa	Classification	2018	2017	2018	2017	2018	2017	2018	2017	
Bafokeng Rasimone (33%)	Measured	18.9	18.7	5.05	5.07	95	95	3.1	3.0	
UG2 Reef	Indicated	21.4	21.6	4.98	4.97	107	107	3.4	3.4	
	Measured and Indicated	40.3	40.3	5.01	5.02	202	202	6.5	6.5	
	Inferred	9.8	9.8	5.00	5.00	49	49	1.6	1.6	
	Total	50.1	50.1	5.01	5.01	251	251	8.1	8.1	
Bokoni (49%)	Measured	45.5	45.5	4.82	4.82	219	219	7.0	7.0	
Merensky Reef	Indicated	23.4	23.4	4.85	4.85	114	114	3.7	3.7	
	Measured and Indicated	68.9	68.9	4.83	4.83	333	333	10.7	10.7	
	Inferred	100.8	100.8	5.02	5.02	506	506	16.3	16.3	
	Total	169.7	169.7	4.94	4.94	839	839	27.0	27.0	
UG2 Reef	Measured	97.3	97.3	6.43	6.43	626	626	20.1	20.1	
	Indicated	45.2	45.2	6.57	6.57	297	297	9.6	9.6	
	Measured and Indicated	142.5	142.5	6.47	6.47	923	923	29.7	29.7	
	Inferred	85.6	85.6	6.71	6.71	574	574	18.5	18.5	
	Total	228.1	228.1	6.56	6.56	1,497	1,497	48.1	48.1	
Kroondal (50%)	Measured	0.6	0.5	3.05	2.92	2	1	0.1	0.0	
UG2 Reef	Indicated	0.3	0.5	3.40	3.23	1	1	0.0	0.0	
	Measured and Indicated	0.8	0.9	3.16	3.07	3	2	0.1	0.1	
	Inferred									
	Total	0.8	0.9	3.16	3.07	3	2	0.1	0.1	
Marikana (50%)	Measured	13.6	12.1	3.29	3.20	45	39	1.4	1.2	
UG2 Reef	Indicated	4.7	6.0	3.75	3.52	18	21	0.6	0.7	
	Measured and Indicated	18.3	18.0	3.41	3.31	63	60	2.0	1.9	
	Inferred	2.5	2.7	2.95	2.96	7	8	0.2	0.3	
	Total	20.8	20.8	3.35	3.26	70	68	2.2	2.2	
Modikwa (50%)	Measured	9.3	9.3	2.93	2.93	27	27	0.9	0.9	
Merensky Reef	Indicated	27.9	27.9	2.72	2.72	76	76	2.4	2.4	
	Measured and Indicated	37.1	37.1	2.77	2.77	103	103	3.3	3.3	
	Inferred	69.3	69.3	2.65	2.65	184	184	5.9	5.9	
	Total	106.4	106.4	2.69	2.69	287	287	9.2	9.2	
UG2 Reef	Measured	23.3	24.9	5.90	5.92	138	147	4.4	4.7	
	Indicated	44.6	45.5	5.90	5.92	263	269	8.5	8.7	
	Measured and Indicated	67.9	70.4	5.90	5.92	401	416	12.9	13.4	
	Inferred	38.6	38.9	6.24	6.21	241	242	7.8	7.8	
	Total	106.5	109.3	6.02	6.02	642	658	20.6	21.2	
Mototolo (from 50% [2017] to 100% [2018])	Measured Indicated	6.3	2.9	3.91	3.81	25	11	0.8	0.4	
UG2 Reef	Measured and Indicated	6.3	2.9	3.91	3.81	25	11	0.8	0.4	
	Inferred	510	2.0	0.01	0.01		4.1		0.1	
	Total	6.3	2.9	3.91	3.81	25	11	0.8	0.4	
	iotai	0.3	2.3	3.31	J.01	20	11	U.O	0.4	

		Mineral Resources Grade Million tonnes (Mt) 4E g/t		Contained metal 4E tonnes			Contained metal 4E Moz		
South Africa	Classification	2018	2017	2018	2017	2018	2017	2018	2017
Siphumelele 3 (100%)	Measured	4.9	2.7	3.04	2.64	15	7	0.5	0.2
UG2 Reef	Indicated		1.2		2.69		3		0.1
	Measured and Indicated	4.9	3.9	3.04	2.66	15	10	0.5	0.3
	Inferred								
	Total	4.9	3.9	3.04	2.66	15	10	0.5	0.3
Der Brochen (100%)	Measured	41.4	41.4	4.75	4.75	197	197	6.3	6.3
Merensky Reef	Indicated	59.2	59.2	4.51	4.51	267	267	8.6	8.6
	Measured and Indicated	100.6	100.6	4.61	4.61	464	464	14.9	14.9
	Inferred	74.4	74.4	4.53	4.53	337	337	10.8	10.8
	Total	175.0	175.0	4.58	4.58	801	801	25.7	25.7
UG2 Reef	Measured	111.3	111.3	3.96	3.96	441	441	14.2	14.2
	Indicated	155.1	155.1	3.96	3.96	614	614	19.8	19.8
	Measured and Indicated	266.5	266.5	3.96	3.96	1,055	1,055	33.9	33.9
	Inferred	126.1	126.1	4.10	4.10	517	517	16.6	16.6
	Total	392.6	392.6	4.00	4.00	1,572	1,572	50.6	50.6

#### MINERAL RESOURCES EXCLUSIVE OF ORE RESERVES FOOTNOTES BY MINE/PROJECT

#### General

- \* For reconciliation purposes the Mineral Resources from the individual mines Tumela and Dishaba have been tabulated to enable a comparison with the previously reported Amandelbult Complex.
- with the previously reported Amandelbult Complex.

  \*\* For the Platreef a cut-off grade of 1.0 4E g/t is used except for calc-silicate and oxidised material where a cut-off grade of 3.0 4E g/t is used.

Rounding of figures may result in computational discrepancies. Estimates of 0.0 represent figures less than 0.05. 4E grade is the sum of platinum, palladium, rhodium and gold grades in grams per tonne (g/t). Tonnes are quoted as dry metric tonnes.

The Mineral Resources are quoted exclusive of Ore Reserves and geological losses.

#### Tumela

The Merensky and UG2 Reefs are estimated over a variable 'Resource Cut' width, targeting a minimum width of 120cm.

The Merensky Mineral Resource 4E ounce content increased slightly to 26.44E Moz (2017: 26.34E Moz) and the tonnage increased slightly to 117.5 Mt (2017: 117.0 Mt) mainly due to lower geological losses.

The UG2 Mineral Resource 4E ounce content decreased by 3.4% to 34.74E Moz (2017:36.04E Moz) and the tonnage decreased by 3.2% to 195.6 Mt (2017:202.1 Mt) mainly due to the conversion of Mineral Resources to Ore Reserves:

■ Conversion:

-1.3 4E Moz ⇒ -6.8 Mt

New information (mainly lower geological losses):

+0.1 4E Moz ⇒ +0.8 Mt

#### Dishaba

The Merensky and UG2 Reefs are estimated over a variable 'Resource Cut' width, targeting a minimum width of 120cm. The Merensky Mineral Resource 4E ounce content increased by 8.4% to 7.2 4E Moz (2017: 6.6 4E Moz) and the tonnage increased by 6.6% to 33.3 Mt (2017: 31.3 Mt) mainly due to reallocation of Ore Reserves to Mineral Resources as a result of a revised mine plan.

The UG2 Mineral Resource 4E ounce content increased by 6.9% to 10.6 4E Moz (2017: 4E 9.9 Moz) and the tonnage increased by 8.1% to 60.1 Mt (2017: 55.6 Mt) mainly due to reallocation of Ore Reserves to Mineral Resources as a result of a revised mine plan.

#### Twickenham

The Merensky and UG2 Reefs are estimated over a variable 'Resource Cut' width, targeting a minimum width of 105cm and 95cm respectively.

The Merensky Mineral Resource 4E ounce content increased marginally to 49.4 4E Moz (2017: 48.0 4E Moz) and the tonnage increased marginally to 301.4 Mt (2017: 293.4 Mt) due to lower geological losses.

The UG2 Mineral Resource 4E ounce content increased marginally to 67.3 4E Moz (2017: 67.1 4E Moz) and the tonnage increased marginally to 348.2 Mt (2017: 347.1 Mt) due to lower geological losses.

as at 31 December 2018

#### MINERAL RESOURCES EXCLUSIVE OF ORE RESERVES FOOTNOTES BY MINE/PROJECT continued

Union

Due to the sale of Union Mine to Siyanda, Amplats' attributable interest decreased from 85% to 0%.

**Bafokeng** Rasimone

The figures quoted are as at end of December 2018 and reflect the attributable interest only. Reserve figures are provided by Bafokeng Rasimone, which is managed by Royal Bafokeng Platinum.

The Merensky Mineral Resource 4E ounce content is unchanged at 6.8 4E Moz and the tonnage decreased slightly to 28.0 Mt (2017: 28.3 Mt).

The UG2 Mineral Resource 4E ounce content is unchanged at 8.1 4E Moz and the tonnage is unchanged at 50.1 Mt.

Amplats' attributable interest is 49%. The figures quoted are as at end of December 2018 and reflect the attributable interest **Bokoni** only. Figures are provided by Atlatsa. The mine is still on care and maintenance.

The Merensky and UG2 Mineral Resources are unchanged.

Amplats' attributable interest is 50%. The figures quoted are as at end of December 2018 and reflect the attributable interest Kroondal

only. UG2 Reef figures are provided by Kroondal, which is managed by Sibanye-Stillwater.

The UG2 Mineral Resource 4E ounce content is unchanged at 0.1 4E Moz and the tonnage decreased to 0.8 Mt

(2017: 0.9 Mt).

Marikana Amplats' attributable interest is 50%. The figures quoted are as at end of December 2018 and reflect the attributable interest

only. UG2 Reef figures are provided by Marikana, which is managed by Sibanye-Stillwater.

The UG2 Mineral Resources are unchanged.

Modikwa Amplats' attributable interest is 50%. The figures quoted are as at end of December 2018 and reflect the attributable

interest only.

The Merensky Mineral Resource is unchanged.

The UG2 Mineral Resource 4E ounce content decreased marginally to 20.6 4E Moz (2017: 21.2 4E Moz) and the tonnage decreased marginally to 106.5 Mt (2017: 109.3 Mt) mainly due to conversion of Mineral Resources to Ore Reserves:

■ Conversion: -0.4 4E Moz ⇒ -2.1 Mt

■ Model refinement (higher geological losses): -0.1 4E Moz ⇒ -0.6 Mt

Mototolo Due to the acquisition of Amplats end of October 2018, the attributable interest increased from 50% to 100%. The figures quoted for 2017 reflect the 50% attributable interest, the figures quoted as at end of December 2018 reflect 100%.

UG2 Reef figures are provided by Mototolo management.

The UG2 Mineral Resource 4E ounce content doubled to 0.8 4E Moz (2017: 0.4 4E Moz) and the tonnage doubled to 6.3 Mt (2017: 2.9 Mt) as a result of the acquisition of Mototolo by Amplats and lower geological losses.

**Siphumelele** 

The Siphumelele 3 shaft is mined on a royalty basis from Kroondal Mine (Sibanye-Stillwater). UG2 Reef figures are provided 3 shaft by Sibanye-Stillwater.

The UG2 Mineral Resource 4E ounce content increased by 45% to 0.5 4E Moz (2017: 0.3 4E Moz) and the tonnage

increased by 26% to 4.9 Mt (2017: 3.9 Mt) mainly due to new information and conversion.

The Merensky Reef Mineral Resources are estimated over a 'Resource Cut' width of 90cm and the UG2 Reef Mineral **Der Brochen** Resources are estimated over a variable 'Resource Cut' width targeting a minimum width of 180cm.

The Merensky and UG2 Mineral Resources are unchanged.

It is likely that Mototolo Resources will be accounted for under a combined Der Brochen-Mototolo entity in the next

reporting cycle.

### MINERAL RESOURCES

#### By reef inclusive of Ore Reserves (4E)

		Mineral R Million tor		Grade 4E g/		Containe 4E to		Containe 4E M	
Reef	Classification	2018	2017	2018	2017	2018	2017	2018	2017
South Africa		'	'		<u> </u>				
Merensky Reef	Measured	208.5	233.2	5.42	5.53	1,129	1,287	36.3	41.4
	Indicated	277.7	309.1	5.21	5.30	1,448	1,638	46.6	52.6
	Measured and Indicated	486.2	542.3	5.30	5.39	2,577	2,925	82.8	94.1
	Inferred	477.1	489.6	4.95	4.98	2,364	2,439	76.0	78.4
	Total	963.3	1,031.9	5.13	5.20	4,941	5,364	158.8	172.5
UG2 Reef	Measured	656.3	708.0	5.17	5.22	3,392	3,698	109.1	118.9
	Indicated	506.1	562.7	5.29	5.25	2,679	2,956	86.1	95.0
	Measured and Indicated	1,162.3	1,270.8	5.22	5.24	6,071	6,654	195.2	213.9
	Inferred	466.7	498.7	5.53	5.52	2,579	2,752	83.0	88.5
	Total	1,629.0	1,769.5	5.31	5.32	8,650	9,406	278.2	302.4
Platreef*	Measured	999.4	1,033.8	2.82	2.83	2,820	2,923	90.7	94.0
	Measured stockpiles	68.3	58.8	1.90	1.79	130	105	4.2	3.4
	Indicated	1,789.2	1,555.7	2.44	2.53	4,363	3,943	140.3	126.8
	Measured and Indicated	2,856.9	2,648.3	2.56	2.63	7,313	6,971	235.1	224.1
	Inferred	826.6	1,140.0	2.19	1.95	1,808	2,227	58.1	71.6
	Total	3,683.5	3,788.3	2.48	2.43	9,121	9,198	293.3	295.7
All reefs	Measured	1,932.4	2,033.7	3.87	3.94	7,471	8,013	240.2	257.7
	Indicated	2,573.0	2,427.6	3.30	3.52	8,490	8,537	273.0	274.4
	Measured and Indicated	4,505.4	4,461.3	3.54	3.71	15,961	16,550	513.2	532.1
	Inferred	1,770.4	2,128.2	3.81	3.49	6,751	7,418	217.1	238.5
	Total	6,275.8	6,589.6	3.62	3.64	22,712	23,968	730.3	770.6
Zimbabwe									
Main Sulphide Zone (MSZ)	Measured	38.7	36.0	3.99	3.97	154	143	5.0	4.6
	Indicated	138.9	144.7	4.21	4.22	585	611	18.8	19.6
	Measured and Indicated	177.6	180.7	4.16	4.17	739	754	23.8	24.2
	Inferred	47.4	46.0	4.23	4.25	200	196	6.4	6.3
	Total	224.9	226.7	4.18	4.19	939	950	30.2	30.5
South Africa and Zimbab	we								
All reefs (including MSZ)	Measured	1,971.1	2,069.8	3.87	3.94	7,625	8,156	245.2	262.3
	Indicated	2,711.9	2,572.3	3.35	3.56	9,075	9,148	291.8	294.1
	Measured and Indicated	4,683.0	4,642.1	3.57	3.73	16,700	17,304	536.9	556.3
	Inferred	1,817.8	2,174.3	3.82	3.50	6,951	7,614	223.5	244.8
	Total	6,500.7	6,816.3	3.64	3.66	23,651	24,918	760.5	801.1
South Africa – tailings									
Tailings	Measured	63.0	63.0	0.79	0.79	50	50	1.6	1.6
	Indicated	8.1	23.0	0.82	1.14	7	27	0.2	0.8
	Measured and Indicated	71.1	86.0	0.79	0.88	57	77	1.8	2.4
	Inferred	1.2	1.2	0.91	0.91	1	1	0.0	0.0
	Total	72.3	87.3	0.80	0.89	58	78	1.9	2.5

as at 31 December 2018

#### MINERAL RESOURCES INCLUSIVE OF ORE RESERVES FOOTNOTES

#### General

\*For the Platreef a cut-off grade of 1.0 4E g/t is applied except for calc-silicate and oxidised material where a cut-off grade of 3.0 4E g/t is applied.

Rounding of figures may result in computational discrepancies. Estimates of 0.0 represent numbers less than 0.05.

4E grade is the sum of platinum, palladium, rhodium and gold grades in grams per tonne (g/t). Tonnes are quoted as dry metric tonnes.

The Mineral Resource tabulations are quoted inclusive of Ore Reserves and exclusive of geological losses.

#### **South Africa**

The Mineral Resources inclusive of Ore Reserves 4E content decreased by 5.2% to 730.3 4E Moz (2017: 770.6 4E Moz) and the tonnage decreased by 4.8% to 6,275.8 Mt (2017: 6,589.6 Mt) mainly as a result of the disposal of Union Mine to Siyanda Resources Proprietary Limited, depletion, new information and model refinement at Mogalakwena's Sandsloot, Tweefontein North and Tweefontein Hill areas:

Union Mine Merensky and UG2 Reefs – disposal:
 -39.2 4E Moz ⇒ -217.9 Mt
 Merensky and UG2 Reefs – mainly depletion:
 -1.8 4E Moz ⇒ -11.2 Mt
 Mogalakwena Mine – depletion and stockpile movements:
 -1.1 4E Moz ⇒ -9.4 Mt
 Mogalakwena Mine – model refinement and new information Sandsloot,

Tweefontein North and Tweefontein Hill:

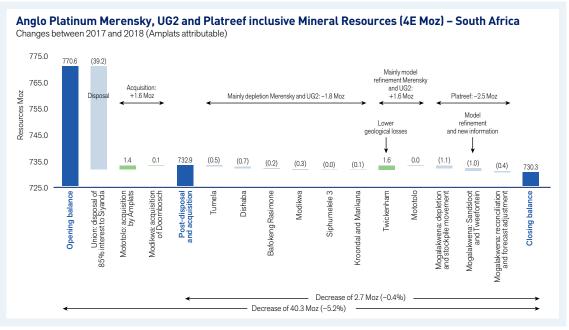
-1.0 4E Moz 

-91.3 Mt

These decreases are partly offset by the increase in Mineral Resources primarily from Twickenham Mine and due to the acquisition of the remaining 50% of Mototolo Mine by Amplats:

Twickenham Mine – model refinement (lower geological losses):
 +1.6 4E Moz ⇒ +9.1 Mt
 Mototolo Mine – acquisition:
 +1.4 4E Moz ⇒ +10.6 Mt

Excluding the sale of the interest in Union Mine to Siyanda and the acquisition of Mototolo by Amplats the total year-on-year Mineral Resources inclusive of Ore Reserves content decreased by 0.4% (see waterfall chart below).



The definitions for the waterfall charts are on page 49.

#### **Zimbabwe**

The Main Sulphide Zone (MSZ) is the orebody mined at Unki Platinum Mine. As of 2010, an effective 100% interest in Southridge Limited (Unki Platinum Mine) is reported, subject to the finalisation of the indigenisation laws by the Zimbabwean government.

The Mineral Resource inclusive of Ore Reserves 4E ounce content decreased marginally to 30.2 4E Moz (2017: 30.5 4E Moz) and the tonnage decreased marginally to 224.9 Mt (2017: 226.7 Mt) mainly due to depletion.

#### MINERAL RESOURCES INCLUSIVE OF ORE RESERVES

#### By mine/project inclusive of Ore Reserves (4E)

		Mineral Re Million ton		Grad 4E g/		Containe 4E to		Contained 4E M	
South Africa	Classification	2018	2017	2018	2017	2018	2017	2018	2017
Amandelbuit Complex* (100%)	Measured	39.4	40.5	6.87	6.87	271	278	8.7	8.9
Merensky Reef	Indicated	63.3	62.6	6.95	6.98	440	437	14.2	14.0
	Measured and Indicated	102.8	103.1	6.92	6.93	711	715	22.9	23.0
	Inferred	58.3	58.3	6.84	6.86	399	400	12.8	12.9
	Total	161.1	161.4	6.89	6.91	1,110	1,115	35.7	35.8
UG2 Reef	Measured	243.2	247.8	5.37	5.38	1,305	1,334	42.0	42.9
	Indicated	80.0	80.1	5.57	5.59	447	448	14.3	14.4
	Measured and Indicated	323.2	327.9	5.42	5.44	1,752	1,782	56.3	57.3
	Inferred	55.9	55.9	5.73	5.74	320	320	10.3	10.3
	Total	379.2	383.7	5.46	5.48	2,072	2,102	66.6	67.6
Tailings	Measured	63.0	63.0	0.79	0.79	50	50	1.6	1.6
	Indicated	8.1	8.1	0.82	0.82	7	7	0.2	0.2
	Measured and Indicated	71.1	71.1	0.79	0.79	57	57	1.8	1.8
	Inferred	1.2	1.2	0.91	0.91	1	1	0.0	0.0
	Total	72.3	72.3	0.80	0.80	58	58	1.9	1.9
Tumela (100%)	Measured	25.4	25.5	6.85	6.83	174	174	5.6	5.6
Merensky Reef	Indicated	46.9	46.4	7.05	7.05	331	327	10.6	10.5
	Measured and Indicated	72.3	71.9	6.98	6.97	505	501	16.2	16.1
	Inferred	45.3	45.2	7.00	7.03	317	318	10.2	10.2
	Total	117.6	117.1	6.99	6.99	822	819	26.4	26.3
UG2 Reef	Measured	154.5	157.6	5.39	5.40	833	851	26.8	27.3
	Indicated	45.2	45.1	5.52	5.52	250	249	8.0	8.0
	Measured and Indicated	199.7	202.7	5.42	5.42	1,083	1,100	34.8	35.3
	Inferred	47.1	47.2	5.76	5.77	271	272	8.7	8.8
	Total	246.8	249.8	5.49	5.49	1,354	1,372	43.5	44.1
Dishaba (100%)	Measured	14.1	15.0	6.91	6.93	97	104	3.1	3.3
Merensky Reef	Indicated	16.4	16.2	6.67	6.77	109	110	3.5	3.5
	Measured and Indicated	30.5	31.2	6.78	6.85	206	214	6.6	6.9
	Inferred	13.0	13.1	6.30	6.28	82	82	2.6	2.6
	Total	43.5	44.3	6.64	6.68	288	296	9.3	9.5
UG2 Reef	Measured	88.7	90.2	5.32	5.36	472	483	15.2	15.5
	Indicated	34.8	35.0	5.65	5.69	197	199	6.3	6.4
	Measured and Indicated	123.5	125.2	5.41	5.45	669	682	21.5	21.9
	Inferred	8.8	8.7	5.54	5.54	49	48	1.6	1.6
	Total	132.3	133.9	5.42	5.46	718	730	23.1	23.5

as at 31 December 2018

#### MINERAL RESOURCES INCLUSIVE OF ORE RESERVES continued

By mine/project inclusive of Ore Reserves (4E) continued

The figures in the table below repre		Mineral Ro Million tor	esources	Grad 4E g/		Contained metal 4E tonnes		Contained metal 4E Moz	
South Africa	Classification	2018	2017	2018	2017	2018	2017	2018	2017
Mogalakwena (100%)**	Measured	999.4	1,033.8	2.82	2.83	2,820	2,923	90.7	94.0
Platreef	Indicated	1,789.2	1,555.7	2.44	2.53	4,363	3,943	140.3	126.8
	Measured and Indicated	2,788.6	2,589.5	2.58	2.65	7,183	6,866	231.0	220.8
	Inferred	826.6	1,140.0	2.19	1.95	1,808	2,227	58.1	71.6
	Total	3,615.2	3,729.5	2.49	2.44	8,991	9,093	289.1	292.4
Platreef primary ore stockpiles	Measured Indicated	68.3	58.8	1.90	1.79	130	105	4.2	3.4
	Measured and Indicated	68.3	58.8	1.90	1.79	130	105	4.2	3.4
	Inferred								
	Total	68.3	58.8	1.90	1.79	130	105	4.2	3.4
Twickenham (100%)	Measured	48.4	47.5	4.75	4.75	230	225	7.4	7.2
Merensky Reef	Indicated	87.3	85.7	4.97	4.96	434	425	14.0	13.7
	Measured and Indicated	135.7	133.1	4.89	4.89	664	650	21.3	20.9
	Inferred	165.7	160.3	5.26	5.26	872	843	28.0	27.1
	Total	301.4	293.4	5.09	5.09	1,536	1,493	49.4	48.0
UG2 Reef	Measured	54.6	55.2	6.29	6.29	344	347	11.1	11.2
	Indicated	145.4	146.1	6.05	6.05	879	884	28.3	28.4
	Measured and Indicated	200.0	201.3	6.12	6.12	1,223	1,231	39.3	39.6
	Inferred	148.2	145.8	5.88	5.88	871	857	28.0	27.6
	Total	348.2	347.1	6.02	6.02	2,094	2,088	67.3	67.1
Union (from 85% [2017] to 0% [2018])	Measured		24.1		6.36		153		4.9
Merensky Reef	Indicated		33.7		6.00		202		6.5
	Measured and Indicated		57.8		6.15		355		11.4
	Inferred		17.7		5.76		102		3.3
	Total		75.5		6.06		457		14.7
UG2 Reef	Measured		67.7		5.23		354		11.4
	Indicated		40.7		5.49		224		7.2
	Measured and Indicated		108.4		5.33		578		18.6
	Inferred		33.9		5.44		185		5.9
	Total		142.4		5.35		763		24.5
Tailings	Measured								_
	Indicated		14.9		1.32		20		0.6
	Measured and Indicated		14.9		1.32		20		0.6
	Inferred								
	Total		14.9		1.32		20		0.6

#### MINERAL RESOURCES INCLUSIVE OF ORE RESERVES continued

#### By mine/project inclusive of Ore Reserves (4E) continued

		Mineral Re Million ton		Grad 4E g/		Containe 4E to		Containe 4E M	
South Africa	Classification	2018	2017	2018	2017	2018	2017	2018	2017
Bafokeng Rasimone (33%)	Measured	24.5	25.0	7.55	7.55	185	188	6.0	6.1
Merensky Reef	Indicated	16.6	16.6	7.07	7.02	117	117	3.8	3.7
	Measured and Indicated	41.1	41.6	7.36	7.34	302	305	9.7	9.8
	Inferred	8.5	8.8	7.76	7.59	66	67	2.1	2.2
	Total	49.6	50.4	7.43	7.38	368	372	11.9	12.0
UG2 Reef	Measured	31.2	31.3	5.20	5.22	162	163	5.2	5.2
	Indicated	24.1	24.6	4.99	4.97	120	122	3.9	3.9
	Measured and Indicated	55.4	55.8	5.11	5.11	282	285	9.1	9.2
	Inferred	9.8	9.8	5.00	5.00	49	49	1.6	1.6
	Total	65.2	65.7	5.09	5.09	331	334	10.7	10.8
Bokoni (49%)	Measured	45.5	45.5	4.82	4.82	219	219	7.0	7.0
Merensky Reef	Indicated	23.4	23.4	4.85	4.85	114	114	3.7	3.7
	Measured and Indicated	68.9	68.9	4.83	4.83	333	333	10.7	10.7
	Inferred	100.8	100.8	5.02	5.02	506	506	16.3	16.3
	Total	169.7	169.7	4.94	4.94	839	839	27.0	27.0
UG2 Reef	Measured	97.3	97.3	6.43	6.43	626	626	20.1	20.1
	Indicated	45.2	45.2	6.57	6.57	297	297	9.6	9.6
	Measured and Indicated	142.5	142.5	6.47	6.47	923	923	29.7	29.7
	Inferred	85.6	85.6	6.71	6.71	574	574	18.5	18.5
	Total	228.1	228.1	6.56	6.56	1,497	1 497	48.1	48.1
Kroondal (50%)	Measured	10.0	9.0	3.09	3.00	31	27	1.0	0.9
UG2 Reef	Indicated	0.3	3.4	3.40	3.12	1	11	0.0	0.3
	Measured and Indicated	10.3	12.4	3.10	3.03	32	38	1.0	1.2
	Inferred								
	Total	10.3	12.4	3.10	3.03	32	38	1.0	1.2
Marikana (50%)	Measured	13.6	12.1	3.29	3.20	45	39	1.4	1.2
UG2 Reef	Indicated	4.7	6.0	3.75	3.52	18	21	0.6	0.7
	Measured and Indicated	18.3	18.0	3.41	3.31	63	60	2.0	1.9
	Inferred	2.5	2.7	2.95	2.96	7	8	0.2	0.3
	Total	20.8	20.8	3.35	3.26	70	68	2.2	2.2
Modikwa (50%)	Measured	9.3	9.3	2.93	2.93	27	27	0.9	0.9
Merensky Reef	Indicated	27.9	27.9	2.72	2.72	76	76	2.4	2.4
	Manager and Indicated	37.1	37.1	2.77	2.77	103	103	3.3	3.3
	Measured and Indicated	0711	0111						
	Inferred	69.3	69.3	2.65	2.65	184	184	5.9	5.9

as at 31 December 2018

#### MINERAL RESOURCES INCLUSIVE OF ORE RESERVES continued

#### By mine/project inclusive of Ore Reserves (4E) continued

The figures in the table below represent Amplats' attributable interests:

		Mineral Ro Million tor			ade g/t	Containe 4E tor		Contained 4E M	
South Africa	Classification	2018	2017	2018	2017	2018	2017	2018	2017
Modikwa (50%)	Measured	43.4	43.5	5.94	5.96	258	259	8.3	8.3
UG2 Reef	Indicated	51.2	51.6	5.92	5.93	303	306	9.8	9.8
	Measured and Indicated	94.7	95.2	5.93	5.94	561	565	18.1	18.2
	Inferred	38.6	38.9	6.24	6.21	241	242	7.8	7.8
	Total	133.3	134.1	6.02	6.02	802	807	25.8	26.0
Mototolo (from 50% [2017] to 100% [2018])	Measured Indicated	21.2	10.5	4.19	4.21	89	44	2.9	1.4
UG2 Reef	Measured and Indicated	21.2	10.5	4.19	4.21	89	44	2.9	1.4
	Inferred								
	Total	21.2	10.5	4.19	4.21	89	44	2.9	1.4
Siphumelele 3 (100%) UG2 Reef	Measured Indicated	30.2	22.3 9.9	3.02	2.88 2.87	91	64 29	2.9	2.1 0.9
	Measured and Indicated	30.2	32.2	3.02	2.88	91	93	2.9	3.0
	Inferred								
	Total	30.2	32.2	3.02	2.88	91	93	2.9	3.0
Der Brochen (100%)	Measured	41.4	41.4	4.75	4.75	197	197	6.3	6.3
Merensky Reef	Indicated	59.2	59.2	4.51	4.51	267	267	8.6	8.6
	Measured and Indicated	100.6	100.6	4.61	4.61	464	464	14.9	14.9
	Inferred	74.4	74.4	4.53	4.53	337	337	10.8	10.8
	Total	175.0	175.0	4.58	4.58	801	801	25.7	25.7
UG2 Reef	Measured	111.3	111.3	3.96	3.96	441	441	14.2	14.2
	Indicated	155.1	155.1	3.96	3.96	614	614	19.8	19.8
	Measured and Indicated	266.5	266.5	3.96	3.96	1,055	1,055	33.9	33.9
	Inferred	126.1	126.1	4.10	4.10	517	517	16.6	16.6
	Total	392.6	392.6	4.00	4.00	1,572	1,572	50.6	50.6

#### MINERAL RESOURCES INCLUSIVE OF ORE RESERVES FOOTNOTES

General

<sup>\*</sup> For reconciliation purposes the Mineral Resources from the individual mines Tumela and Dishaba have been tabulated to enable a comparison with the previously reported Amandelbult Complex.

<sup>\*\*</sup> For the Platreef a cut-off grade of 1.0 4E g/t is applied except for calc-silicate and oxidised material where a cut-off grade of 3.0 4E g/t is applied.

#### **MINERAL RESOURCE CLASSIFICATION MAPS Amandelbult Merensky Reef** Shaft Roodedam Langpan 371 KQ 368 KQ Merensky Outcrop UG2 Outcrop DISHAB Mining Right Boundary Merensky Mined Out Area Grootkuil 376 KQ Transition Zone Zwartkop 369 KQ Indicated Schildpadne 385 KQ Middeldrift Mineralisation: Virgin Rock Temperature > 75° C Vlakpoort 388 KQ Mineralisation: Structural Complex or not Economically Extractable Areas Vrugbaar 381 KQ Vlaknek 392 KQ Zondereinde 384 KQ Witvley 423 KQ Kopje Alleen 422 KQ Oskuil 390 KQ Kameelhoek 408 KQ Kaalvlakte 416 KQ Vlakplaats 427 KQ

De Deur 419 KQ

> Einde 420 KQ

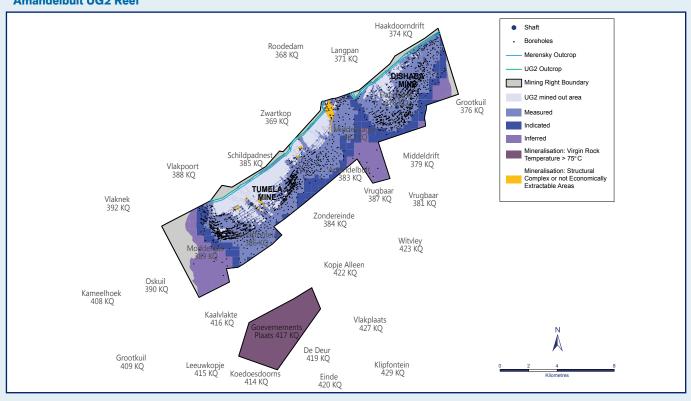
Klipfontein 429 KQ



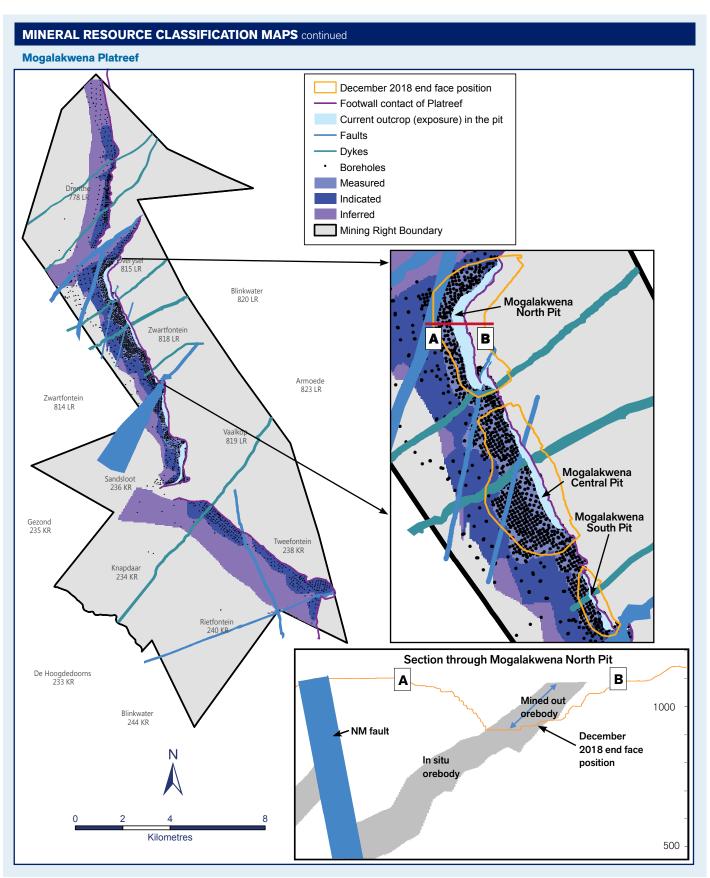
Grootkuil

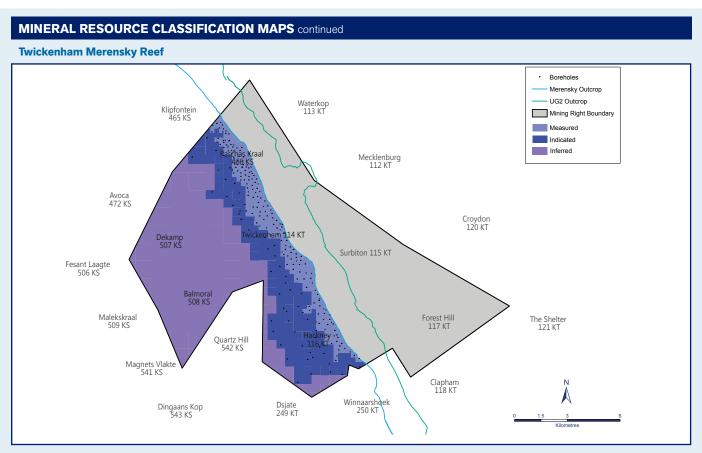
Leeuwkopje 415 KQ

Koedoesdoorns 414 KQ

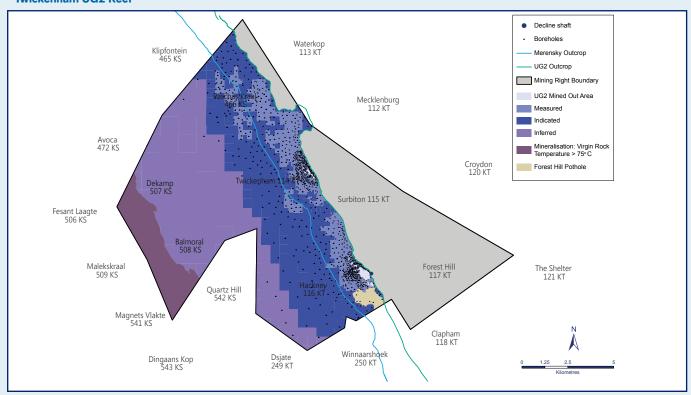


as at 31 December 2018

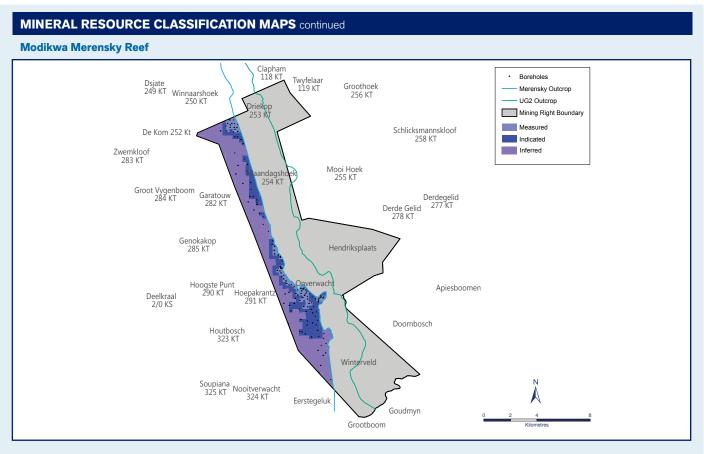


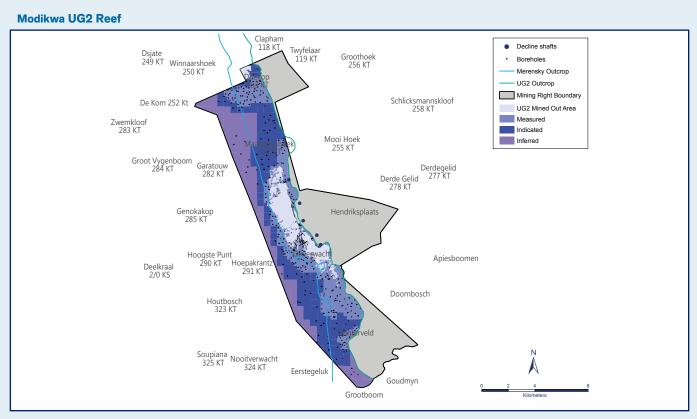


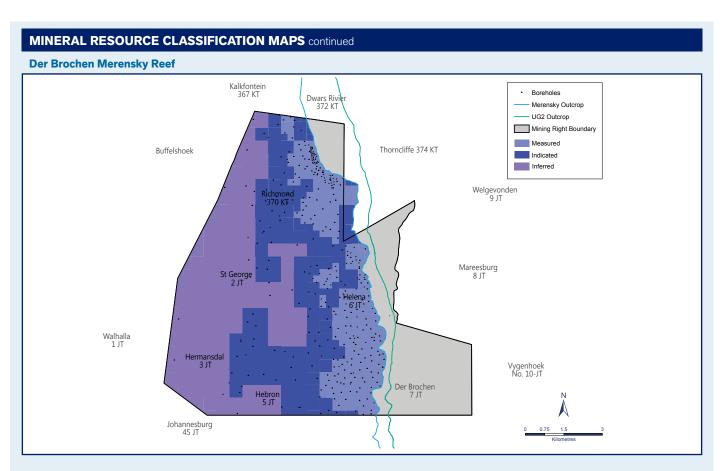




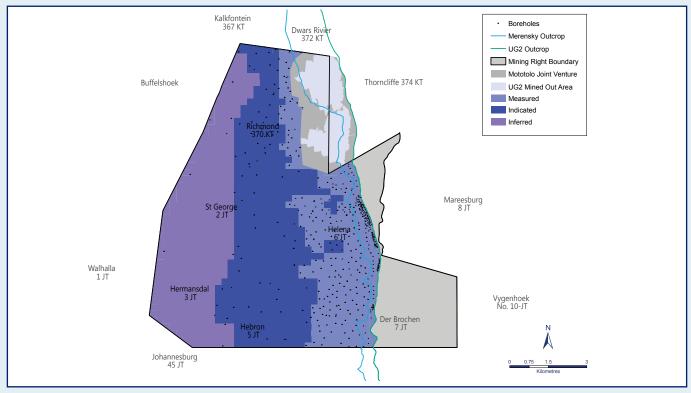
as at 31 December 2018



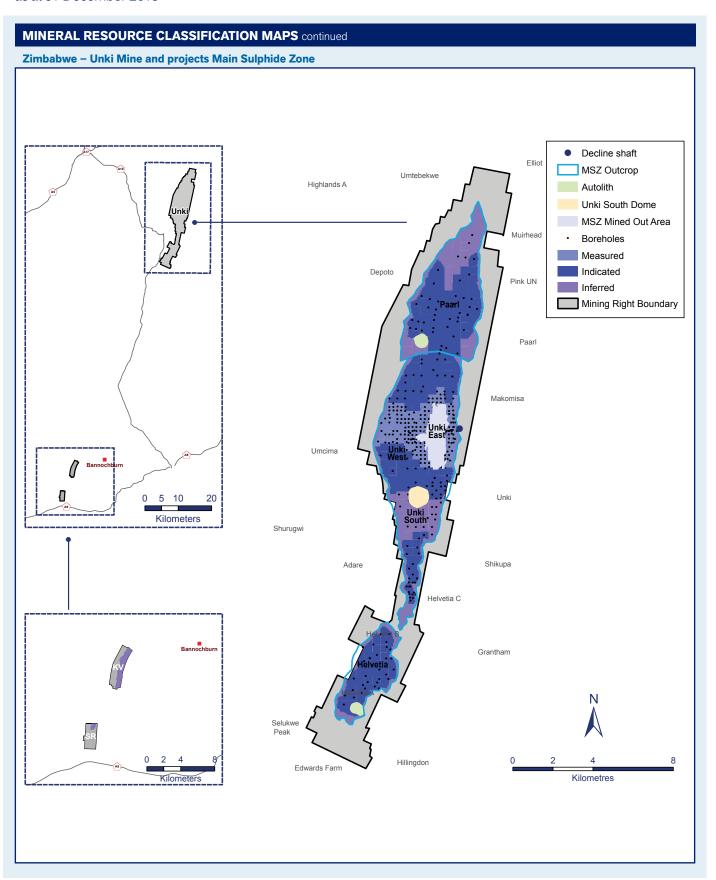








as at 31 December 2018



#### **MINERAL RESOURCES**

#### **Prill and base metal estimates**

The prill percentage (%) distribution (platinum, palladium, rhodium and gold), the base metal grades (copper and nickel) and chrome are based on the modelled and evaluated information and are quoted over the 'Resource Cut' and based on the Mineral Resources inclusive of Ore Reserves.

	Prill % distribution				Base meta	l grades	Chrome*
	Pt %	Pd %	Rh %	Au %	Cu %	Ni %	Cr <sub>2</sub> O <sub>3</sub> %
Merensky Reef – West Bushveld							
Tumela Mine	61.9	29.5	5.1	3.6	0.08	0.24	
Dishaba Mine	62.8	28.8	4.5	3.9	0.08	0.21	
Bafokeng Rasimone Platinum Mine	64.7	26.7	4.3	4.2	0.11	0.23	
Merensky Reef – East Bushveld							
Twickenham Platinum Mine	58.8	31.1	3.1	7.0	0.09	0.24	
Modikwa Platinum Mine	60.3	30.2	3.1	6.4	0.05	0.14	
Bokoni Platinum Mine	61.5	28.8	3.6	6.1	0.08	0.20	
Der Brochen	59.1	30.4	2.6	7.9	0.12	0.26	
UG2 Reef – West Bushveld							
Tumela Mine	58.7	29.2	11.4	0.7	0.01	0.12	31.9
Dishaba Mine	60.2	27.7	11.4	0.7	0.01	0.13	31.6
Bafokeng Rasimone Platinum Mine	59.2	29.3	11.0	0.6	0.01	0.11	
UG2 Reef - East Bushveld							
Twickenham Platinum Mine	42.4	47.9	8.1	1.6	0.03	0.15	24.6
Modikwa Platinum Mine	43.7	46.0	8.9	1.4	0.03	0.13	
Bokoni Platinum Mine	41.1	49.0	8.1	1.9	0.05	0.17	
Der Brochen	54.1	35.7	9.0	1.2	0.01	0.10	
Platreef							
Mogalakwena Mine	42.2	48.2	3.1	6.5	0.10	0.19	
MSZ – Zimbabwe							
Unki Platinum Mine	48.5	39.8	4.1	7.5	0.14	0.22	

<sup>\*</sup>Only Tumela, Dishaba mines and Twickenham Platinum Mine project have evaluated the chromite content within the UG2 Reef.

Rounding of figures may result in computational discrepancies. 4E grade is the sum of platinum, palladium, rhodium and gold grades.

#### **By project 3E Mineral Resources**

The figures in the table below represent Amplats' attributable interests:

		Mineral Resources Grade Million tonnes (Mt) 3E g/t		Containe 3E to	ed metal onnes	7 7 7 7	ed metal Moz		
South Africa	Classification	2018	2017	2018	2017	2018	2017	2018	2017
Sheba's Ridge (35%)	Measured		28.0		0.88		25		0.8
Mineralised Pyroxenite	Indicated		34.0		0.85		29		0.9
	Measured and Indicated		62.0		0.87		54		1.7
	Inferred		149.9		0.96		144		4.6
	Total		211.9		0.94		198		6.4

<sup>\*</sup> Not included in regional Mineral Resources.

Rounding of figures may result in computational discrepancies. Figures not included in the global Mineral Resource summary.

3E grade reported: sum of platinum, palladium and gold grades in grams per tonne (g/t).

Mineral Resources are reported after the deduction of geological losses.

as at 31 December 2018

#### **MINERAL RESOURCES** continued

#### By project 3E Mineral Resources continued

#### Sheba's Ridge

The figures quoted for 2017 are for the attributable interest. A cut-off grade of 0.5 3E g/t was applied. Uncertainty surrounding Mineral Rights paired with a review of the reasonable prospects for eventual economic extraction criteria, led to a downgrade of Mineral Resources to Mineralisation.

#### **MINERALISATION**

#### General

In addition to the evaluated and reported Ore Reserves and Mineral Resources, Amplats holds various Mineralisation that are not publicly reported.

Different types of Mineralisation exist, either stockpiled material on surface or still in-situ underground. This material requires studies to determine the potential economic value (reasonable and realistic prospects for eventual economic extraction).

#### **Surface material**

Surface material is subdivided into tailings storage facilities, stockpiles or rock dumps.

#### Tailings storage facilities

Tailings Mineral Resources, where evaluated, are already reported in the relevant Mineral Resource statement. Tailings Mineralisation: operating (active) tailings facilities for current mining operations are not evaluated and therefore are not reported as part of the Mineral Resources. They contain residual amounts of PGE and base metals and are registered internally in Amplats' asset books. Currently significant Mineralisation are available at the following operations:

Amandelbult, Mogalakwena and Bafokeng Rasimone mines; in the East Bushveld at Modikwa, Mototolo and Bokoni mines and in Zimbabwe at Unki Mine.

#### **Stockpiles**

Stockpiles are mined ore being held for future treatment. Currently, only Mogalakwena reports Ore Reserve and Mineral Resource stockpiles. These Ore Reserves and Mineral Resources are already reported in the relevant Ore Reserve and Mineral Resource statement.

#### Rock dumps

Rock dumps are not evaluated and are currently not reported under the Ore Reserve and Mineral Resource statement.

Evaluation of low-grade rock dumps not contracted to external companies is ongoing. They contain various amounts of PGE and base metals and are recorded internally. Currently, Mineralisation have been identified at Amandelbult mines. However, minor rock dumps also exist on other operations.

### Underground in-situ material

It must be noted that the Mineral Resources are quoted over the entire mining right and prospecting right areas except for:

- Mogalakwena Mine, where the Mineral Resources are only quoted down to potential future surface mining depths
- Twickenham, Tumela and Bokoni mines, where a virgin rock temperature of 75° C is currently considered to be the limit to mining given present technology, metal prices and energy costs. Areas higher than 75° C are currently classified as Mineralisation.

#### **DEFINITIONS FOR WATERFALL CHARTS**

**Opening balance** As at 31 December 2017.

**Production** The amount of material (expressed in terms of tonnage and content as applicable) removed by mining from the

scheduled Ore Reserves, ie the areas actually mined during the reporting period which are removed from the

reserve model(s).

**Depletion** Mineral Resources: the amount of material (expressed in terms of tonnage and content as applicable) removed by

mining from the Mineral Resources, ie the areas actually mined during the reporting period which are removed

from the resource model(s).

**Conversion** Conversion is the process of upgrading Mineral Resources to Ore Reserves based on a change in confidence

levels and/or modifying factors or due to a revised extraction strategy.

Conversion is the process of 'upgrading' material from Mineralisation to Mineral Resources.

**Reallocation** Reallocation is the process of downgrading of Ore Reserves to Mineral Resources or Mineral Resources to

Mineralisation based on a change in confidence levels and/or modifying factors or due to a revised extraction

strategy.

**Economic assumptions** The effect of economic assumptions based on the current or future price of a commodity and associated exchange

rate estimates which have a direct impact on the Mineral Resources or Ore Reserves.

**Reconciliation**Changes which cannot be allocated to a defined category or an adjustment necessary to mitigate inaccurate production/depletion estimates of the previous year.

**New information**The effect of additional resource definition information, which initiates an update to the geological models (facies,

structural, grade and geotechnical) and results in an updated Resource model.

**Model refinement**No additional resource definition drilling has been undertaken but the interpretation (geometry/ore-waste

contacts) of the orebody has been refined or internal mine/lease boundaries changed, eg based on mapping information obtained during mining or a different structural model being applied. Changes to in-situ tonnages as a result of new geological losses being applied or a change to the definition of the boundary of the Mineral

Resources due to an updated 'economically mineable cut' being applied.

Mineralisation A concentration (or occurrence) of material of possible economic interest, in or on the earth's crust, for which

quantity and quality cannot be estimated with sufficient confidence to be defined as a Mineral Resource.

Mineralisation is not classified as a Mineral Resource or Mineral Reserve and can only be reported under exploration results. The data and information relating to it must be sufficient to allow a considered and balanced

judgement of its significance.

**Disposal** Reduction in Mineral Resources and Ore Reserves due to disposals of assets.

Acquisition Additional Mineral Resources and Ore Reserves due to acquisitions of assets or increased direct ownership in

JV agreements/associate companies.

Closing balance As at 31 December 2018.

**4E Moz** 4E million troy ounces.

### **COMPETENT PERSONS LIST**

ORE RESERVES	RVES NAME		YEARS
Corporate			
Ore Reserves	Andrew Smith	ECSA	15
Mine			
Tumela Mine, Dishaba Mine	Vinodh Sewpersad	SACNASP	27
Mogalakwena Mine	Marlon van Heerden	SAIMM	11
Modikwa Platinum Mine	Jurie de Kock	SAIMM	17
Kroondal Mine, Rustenburg-Siphumelele 3 shaft	Brian Smith	SAGC	16
Mototolo Platinum Mine	Frederik Fensham	SACNASP	25
Bafokeng Rasimone Platinum Mine	Robby Ramphore	SAIMM	22
	Clive Ackhurst	ECSA	18
Unki Mine	Clever Dick	SAIMM	15

MINERAL RESOURCES	NAME	RPO	YEARS
Corporate			
Mineral Resources	Gernot Langwieder	SACNASP	22
Mine			
Tumela Mine, Dishaba Mine, Twickenham Mine, Modikwa Mine, Unki Mine	lain Colquhoun	SACNASP	21
Mogalakwena Mine	Kavita Mohanlal	SACNASP	15
Kroondal Mine, Marikana Mine, Rustenburg-Siphumelele 3 shaft	Leonard Changara	SACNASP	19
Mototolo Platinum Mine	Frederik Fensham	SACNASP	25
Bafokeng Rasimone Platinum Mine	Prinushka Padiachy	SACNASP	9
Bokoni Platinum Mine	Vinodh Sewpersad	SACNASP	27
Projects			
Der Brochen	lain Colquhoun	SACNASP	21
Tailings dams			
Amandelbult	Kavita Mohanlal	SACNASP	15





### **ADMINISTRATION**

#### **DIRECTORS**

#### **Executive directors**

C Griffith (chief executive officer)

I Botha (finance director)

#### Independent non-executive directors

MV Moosa (independent non-executive chairman)

RMW Dunne (British)

NP Mageza

NT Moholi

D Naidoo

JM Vice

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

M Cutifani (Australian)

S Pearce (Australian)

AM O'Neill (British)

AH Sangqu

#### **Alternate directors**

PG Whitcutt (alternate director to R Médori)

#### **COMPANY SECRETARY**

Elizna Viljoen

elizna.viljoen@angloamerican.com

Telephone +27 (0) 11 638 3425

Facsimile +27 (0) 11 373 5111

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Anglo Operations Proprietary Limited

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Facsimile +27 (0) 11 373 5111

+27 (0) 11 834 2379

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a division of FirstRand Bank Limited

#### **REGISTRARS**

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Rosebank

2196

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Marshalltown, 2107

Telephone +27 (0) 11 370 5000

Facsimile +27 (0) 11 688 5200

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Woodmead

Sandton, 2196

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#### **LEAD COMPETENT PERSON**

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Telephone +27 (0) 11 373 6334

#### FRAUD LINE - SPEAKUP

Anonymous whistleblower facility 0800 230 570 (South Africa) angloplat@anglospeakup.com

#### **HR-RELATED QUERIES**

**Job opportunities:** www.angloamericanplatinum.com/careers/job-opportunities

Bursaries: bursaries@angloplat.com

Career information: www.angloamericanplatinum.com/

careers/working-at-anglo-american-platinum

# **DISCLAIMER** Certain elements made in this annual report constitute forward looking statements. Forward looking statements are typically identified by the use of forward looking terminology such as 'believes', 'expects', 'may', 'will', 'could', 'should', 'intends', 'estimates', 'plans', 'assumes', or 'anticipates' or the negative thereof or other variations thereon or comparable terminology, or by discussions of, eg future plans, present or future events, or strategy that involve risks and uncertainties. Such forward looking statements are subject to a number of risks and uncertainties, many of which are beyond the Company's control and all of which are based on the Company's current beliefs and expectations about future events. Such statements are based on current expectations and, by their current nature, are subject to a number of risks and uncertainties that could cause actual results and performance to differ materially from any expected future results or performance, expressed or implied, by the forward looking statement. No assurance can be given that such future results will be achieved; actual events or results may differ materially as a result of risks and uncertainties facing the Company and its subsidiaries.

Bastion



#### **Anglo American Platinum Limited**

Incorporated in the Republic of South Africa Date of incorporation: 13 July 1946 Registration number: 1946/022452/06 JSE code: AMS – ISIN: ZAE000013181

#### www.angloamericanplatinum.com

A member of the Anglo American plc group

#### www.angloamerican.com

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