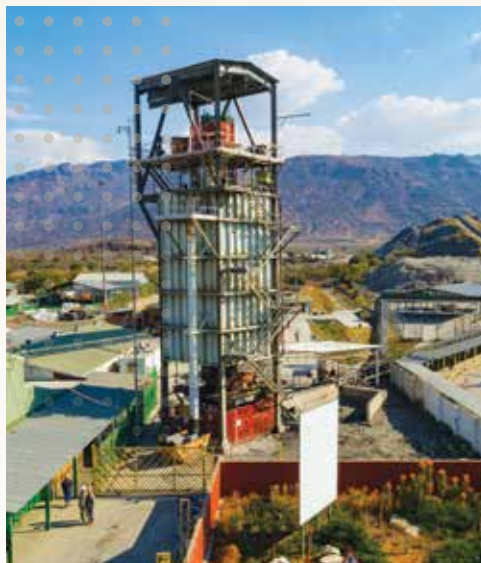




# MINERAL RESOURCES AND MINERAL RESERVES REPORT

>>>>>>>>>

# 2020



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## OUR 2020 SUITE OF REPORTS

## INTEGRATED ANNUAL REPORT

2020

### 2020 INTEGRATED ANNUAL REPORT

A holistic assessment of ARM's ability to create sustainable value, with relevant extracts from the annual financial statements and supplementary reports, particularly the sustainability report covering non-financial aspects with a material impact on our performance and our business.

## ANNUAL FINANCIAL STATEMENTS

2020

### 2020 ANNUAL FINANCIAL STATEMENTS

The audited annual financial statements have been prepared according to International Financial Reporting Standards (IFRS).

## SUSTAINABILITY REPORT

2020

### 2020 SUSTAINABILITY REPORT

Detailed information on our performance on key environmental and social matters.

## MINERAL RESOURCES AND MINERAL RESERVES REPORT

2020

### 2020 MINERAL RESOURCES AND MINERAL RESERVES REPORT

In line with JSE Listings Requirements, ARM prepares Mineral Resources and Mineral Reserves statements for all its assets as per SAMREC Code guidelines and definitions (2016).

## CORPORATE GOVERNANCE REPORT

2020

### 2020 CORPORATE GOVERNANCE REPORT

The corporate governance report includes detailed disclosure on the framework, processes and intended outcomes of ARM's governance structures and detailed disclosure on ARM's application of the principles of King IV™.

## 2020 KING IV™ APPLICATION REGISTER

2020

## NOTICE OF ANNUAL GENERAL MEETING

2020

### 2020 NOTICE OF AGM

### 2020 KING IV™ APPLICATION REGISTER

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## REFERENCES



2020 Integrated annual report



2020 Annual financial statements



2020 Sustainability report



2020 Mineral Resources and Mineral Reserves Report



2020 Corporate governance report



[www.arm.co.za](http://www.arm.co.za)

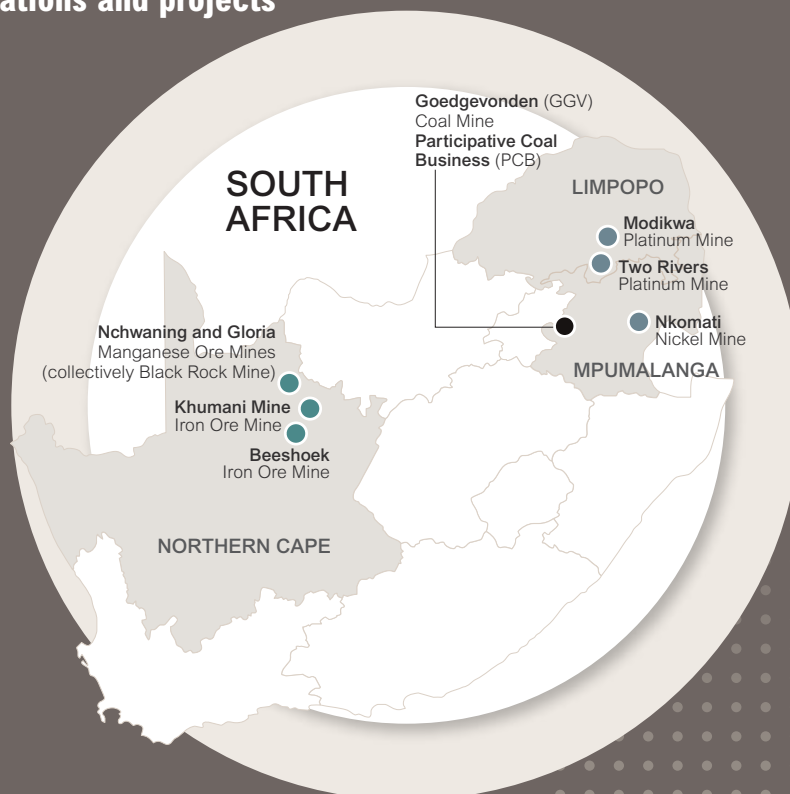
All monetary values in this report are in South African rand unless otherwise stated. Rounding may result in computational discrepancies on management and operational review tabulations.

# REPORT ON MINERAL RESOURCES AND MINERAL RESERVES AS AT 30 JUNE 2020

The report is issued annually to inform shareholders and potential investors of the mineral assets held by African Rainbow Minerals Limited (ARM). The report is a summary of competent persons' reports or technical reports on Mineral Resources and Mineral Reserves for ARM's mining operations and projects.



## Locality map of ARM operations and projects



Map not to scale



## ADDING VALUE

Extracting optimal value from the Mineral Resources and Mineral Reserves in our portfolio is fully aligned to ARM's purpose of delivering competitive returns and create sustainable value for all our shareholders through its strategic pillars:

Strategic pillar	How we add value
Operate our portfolio of assets safely, responsibly and efficiently	Manage life-of-mine Mineral Resources and Mineral Reserves for each operation efficiently, revising mine plans as required.
Allocate capital to value-creating investments	Undertake exploration activities on-mine and apply stringent criteria in allocating capital for the work, to ensure value creation in the areas we explore.
Focus on value-enhancing and integrated growth	Maintaining the appropriate balance between Mineral Reserves depletion and growth to ensure a sustainable company.

## INTRODUCTION

ARM's method of reporting Mineral Resources and Mineral Reserves complies with the South African Code for Reporting of Exploration Results, Mineral Resources and Mineral Reserves (SAMREC Code of 2016), the South African Code for reporting of Mineral Asset Valuation (SAMVAL Code, 2016) and Section 12.13 of the JSE Listings Requirements.



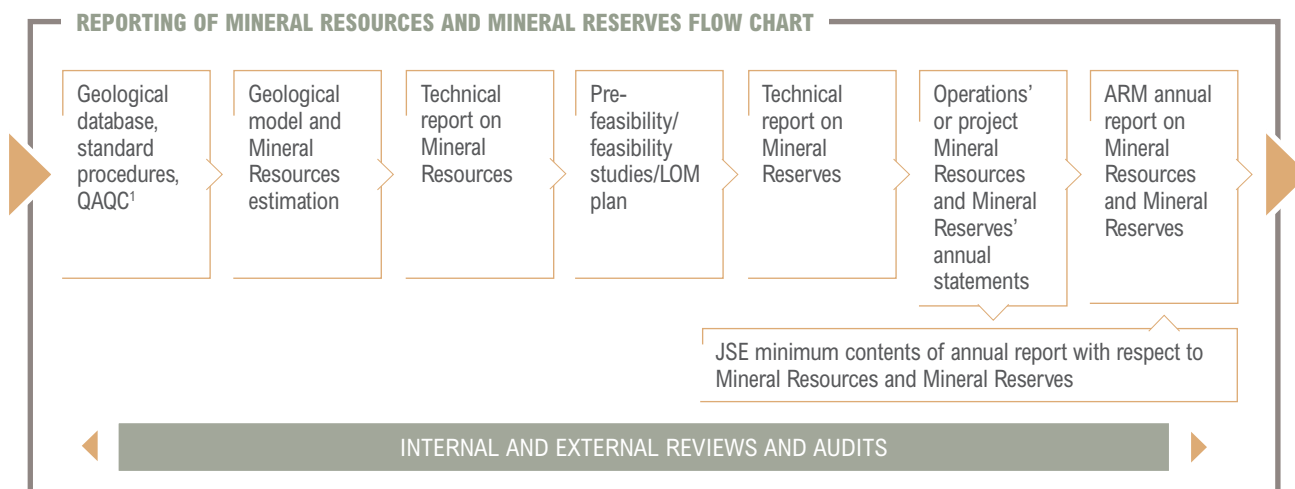
Historical ARM Mineral Resources and Mineral Reserves reports can be found at [www.arm.co.za](http://www.arm.co.za) under Investor Relations, financial results, integrated report.



An abridged version is included in the 2020 ARM integrated annual report, which can be found at [www.arm.co.za](http://www.arm.co.za).

The SAMREC Code of 2016 sets out minimum standards, recommendations and guidelines for Public Reporting of Exploration Results, Mineral Resources and Mineral Reserves in South Africa. It was launched and adopted by the Johannesburg Stock Exchange (JSE) in May 2016. The 2020 ARM Mineral Resources and Mineral Reserves Report is based on the SAMREC Code of 2016.

The reporting of Mineral Resources and Mineral Reserves is done annually according to the following flow chart:



<sup>1</sup> QAQC: Quality Assurance/Quality Control.

A set of guidelines have been formulated to assist competent persons in the estimation, classification and reporting of Mineral Resources and Mineral Reserves and are contained in a document entitled: "ARM Guidelines for Estimation, Classification and Reporting of Mineral Resources and Mineral Reserves".

As part of ARM's management process of Mineral Resources and Mineral Reserves, quarterly divisional forum meetings are conducted with the following objectives:

- Skills and technical knowledge transfer in the Mineral Resources and Mineral Reserves fields
- Ensuring that best practices through SAMREC compliant standard procedures are shared and applied
- Facilitate internal peer reviews and audits
- Advance professional development and registration of technical personnel.

The convention adopted in this report is that the Measured and Indicated Mineral Resources estimates are reported **inclusive** of that portion converted to Mineral Reserves. **Inferred Mineral**

**Resources** have not been included in feasibility studies or life-of-mine plans. Mineral Resources and Mineral Reserves estimates are quoted as at **30 June 2020** unless stated otherwise.

Underground Mineral Resources are in situ tonnages at the postulated mining width, after deductions for geological losses that have reasonable prospects for eventual economic extraction (**RPEEE**). Underground Mineral Reserves reflect tonnages that will be mined and processed while surface Mineral Reserves consist of stockpiles already mined and ready for processing. Both are quoted at the grade fed to the plant. Open-pit Mineral Resources are quoted as in situ tonnages that have reasonable prospects for eventual economic extraction and Mineral Reserves are tonnages falling within an economic pit-shell.

The classification into Measured, Indicated and Inferred Mineral Resources is done by consideration of geostatistical parameters, spacing of boreholes, geological structures and continuity of the mineralisation.

External consulting firms audit the Mineral Resources and Mineral Reserves of the ARM operations when substantial geological borehole data has been added to the previously established database or every three years whichever comes first.

The risk factors that could impact on the Mineral Resources and Mineral Reserves are reported in the Risk section of the 2020 integrated annual report.

The Mineral Resources and Mineral Reserves are reported on a **100% basis** and the attributable interest is noted in the footnotes of the tabulations. Maps, plans and reports supporting Mineral Resources and Mineral Reserves are available for inspection at ARM's registered office and at the relevant mines. ARM's Prospecting and Mining Rights details are provided in this report for each project and operation (refer to the relevant sections of the operations and projects). Rounding of figures may result in minor computational discrepancies on the Mineral Resources and Mineral Reserves tabulations.

In October of 2019, ARM agreed to dispose of and cede the JV interest in the Kalplats PGM prospect to Stella Platinum Proprietary Limited. The Mineral Resources for the Kalplats PGM prospect which were reported in 2019 ARM Mineral Resources and Mineral Reserves will no longer be reported by ARM.

## 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.

**A 'Measured Mineral Resource'** is 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.

**An 'Indicated Mineral Resource'** is 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.

**An 'Inferred Mineral Resource'** is 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.

### Mineral Reserves

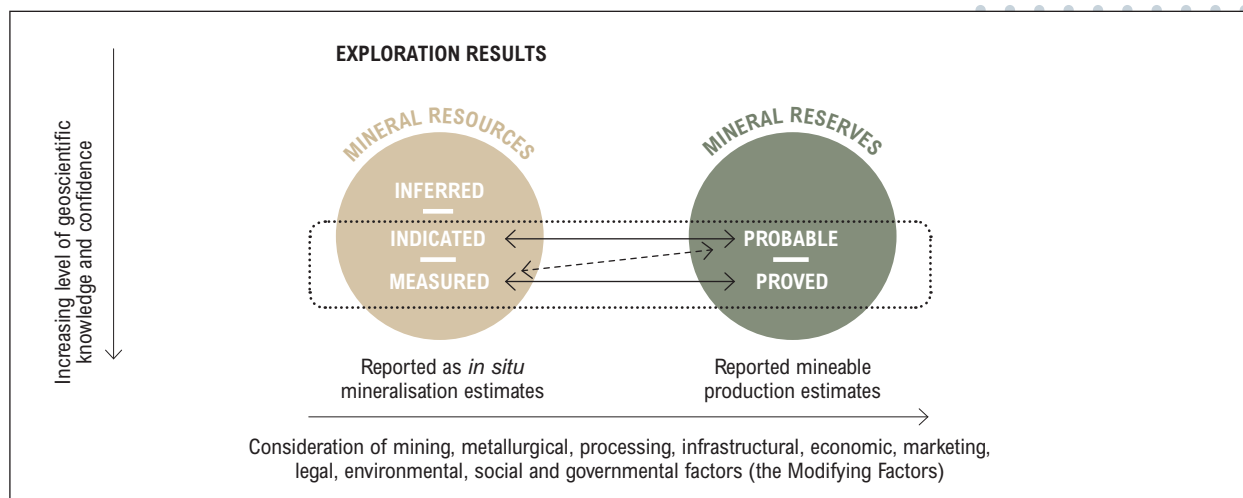
**A 'Mineral Reserve'** is the economically mineable part of a Measured and/or Indicated Mineral Resource. It includes diluting materials and allowances for losses, which may occur when the material is mined or extracted and is defined by studies at Pre-Feasibility or Feasibility level as appropriate 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.

**A 'Proved Mineral Reserve'** is the economically mineable part of a Measured Mineral Resource. A Proved Mineral Reserve implies a high degree of confidence in the Modifying Factors.

**A 'Probable Mineral Reserve'** is 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.

## RELATIONSHIP BETWEEN EXPLORATION RESULTS, MINERAL RESOURCES AND MINERAL RESERVES



## COMPETENCE

The lead competent person with overall responsibility for the compilation of the 2020 Mineral Resources and Mineral Reserves Report is Shepherd Kadzviti, an ARM employee. He confirms that the information in this report complies with the SAMREC Code of 2016 and that it may be published in the form and context in which it was intended.

Shepherd Kadzviti graduated with a BSc in geology and mathematics and an MSc in exploration geology from the University of Zimbabwe. He later completed a graduate diploma in mining engineering (GDE) at the University of the Witwatersrand. He worked at RioZim's Renco Gold Mine for 14 years in various capacities as geologist, technical services superintendent and mine manager. In 2005, he joined Anglo American Platinum at Union Mine as an evaluation geologist with responsibilities for geological database management and Mineral Resource estimation. After two years at the mine, he was transferred to the Anglo American Platinum corporate office where he was appointed resource geologist. He then joined ARM as Mineral Resources specialist in 2008, and was involved in the evaluation of various mineral deposits for the group. In 2012, he was

appointed group mineral resources manager for ARM. He is registered with the South African Council for Natural Scientific Professions (SACNASP) as a professional natural scientist (PrSciNat) in the field of practice of geological science, registration number 400164/05. SACNASP is based in the Management Enterprise Building, Mark Shuttleworth Street, Innovation Hub, Pretoria, 0087, South Africa. He has a total of 30 years' experience in various aspects of mining and exploration geology, database management and Mineral Resource estimation and as such is considered to be a competent person.

All competent persons at the ARM corporate office and the operations have sufficient relevant experience in the type of deposit and in the activity for which they have taken responsibility. The competent persons consent to the inclusion of the Exploration Results, Mineral Resources and Mineral Reserves information in this report, in the form and context in which it appears. Details of ARM's competent persons are available from the Company Secretary on written request. Details of ARM's competent persons are available from the Company Secretary on written request.

The following ARM corporate office competent persons were involved in compiling some aspects of the Mineral Resources and Mineral Reserves report or general review of the report. They are all employed by ARM.

ARM CORPORATE OFFICE				
Competent person	Professional organisation	Membership number	Qualifications	Relevant experience
S Kadzviti	SACNASP	400164/05	BSc, MSc Exploration Geology, GDE (Mining Engineering)	30 years
M Mabuza	SACNASP	400081/94	BSc, BSc Hons (Geology), MSc (Geology), GDE (Mining Engineering)	30 years
V Moyo	SACNASP	400305/11	BSc, BSc Hons (Geology), MSc (Project Management)	23 years
R Jooste	SACNASP	400163/05	BSc, BSc Hons (Geology), MEng (Mining Engineering)	19 years

### Shepherd Kadzviti PrSciNat

Group mineral resources manager

African Rainbow Minerals  
24 Impala Road, Chislehurst, Sandton, South Africa.  
8 October 2020

## SALIENT FEATURES FOR F2020

### ARM PLATINUM

#### Two Rivers Mine

Mineral Reserves for the UG2 reef decreased from 64.97 million tonnes at a grade of 3.50 g/t (6E) to 63.22 million tonnes at 3.56 g/t (6E) mainly due to mining depletion, which was partially off-set by an overall decrease in geological losses at the Main Decline.

#### Modikwa Mine

Mineral Reserves decreased from 47.16 million tonnes at 4.34 g/t (4E) to 45.73 million tonnes at 4.22 g/t (4E) mainly due to mining depletion.

#### Nkomati Mine

The Measured and Indicated Mineral Resources for Nkomati Mine decreased from 175.74 million tonnes at 0.35% Ni to 170.25 million tonnes at 0.35% Ni mainly due to mining production. The remaining Mineral Reserves in the open-pit area are 1.39 million tonnes at 0.37% Ni.

### ARM FERROUS

#### Black Rock Mine

Mineral Reserves for Nchwaning Seam 1 decreased from 68.76 million tonnes at 43.30% Mn to 60.57 million tonnes at 43.68% Mn due to production depletion and a decrease in the density based on a new density study that was undertaken. Nchwaning Seam 2 Mineral Reserves marginally decreased from 109.10 million tonnes at 42.73% Mn to 108.66 million tonnes at 42.77% Mn as the mining depletion was partially off-set by gains from a density increase and Mineral Resource modelling changes.

Mineral Reserves for Gloria Seam 1 decreased from 115.04 million tonnes at 37.41% Mn to 104.98 million tonnes at 37.27% Mn mainly due to a decrease in the density. Other factors that accounted for the change were mining depletion, model refinement and mine design changes.

#### Beeshoek Mine

Open-pit Mineral Reserves decreased from 29.84 million tonnes at 64.69% Fe to 26.18 million tonnes at 64.63% Fe mainly due to mining depletions in Village North, HF, BN and East pits.

#### Khumani Mine

Open-pit Mineral Reserves decreased from 433.44 million tonnes at 62.10% Fe to 424.58 million tonnes at 62.28% Fe primarily due to mining depletion and addition of Mineral Reserves as a result of the re-estimation of King and Mokaning areas.

Mineral Resources estimates were done during the year for the low-grade jig stockpile resulting in the declaration of a total of 17.18 million tonnes at 54.29% Fe of Indicated Mineral Resources and 1.78 million tonnes at 55.07% Fe of Inferred Mineral Resources.

### ARM COAL

#### Goedgevonden Coal Mine

Coal Reserves (ROM) decreased from 290 million tonnes to 280 million tonnes mainly due to mining depletion.

## F2020 MINERAL RESOURCES AND MINERAL RESERVES SUMMARY AS AT 30 JUNE 2020

### ARM Platinum operations

#### Platinum group elements



The tables below are summaries of ARM Mineral Resources and Mineral Reserves. The detailed information on Mineral Resources and Mineral Reserves is provided per operation from page 9 of this report.

* Mineral Resources and Mineral Reserves are reported on a 100% basis.	Mineral Resources								Mineral Reserves						
	Measured		Indicated		(Measured and Indicated)		Inferred		Proved		Probable		Total Reserves		
	Mt	Grade g/t	Mt	Grade g/t	Mt	Grade g/t	Mt	Grade g/t	Mt	Grade g/t	Mt	Grade g/t	Mt	Grade g/t	Moz
<b>Two Rivers Mine</b>															
2020 UG2 (grade reported as 6E)	14.35	5.65	83.75	5.73	98.10	5.72	80.30	5.33	4.63	3.41	58.59	3.57	63.22	3.56	7.23
2019 UG2 (grade reported as 6E)	13.99	5.58	84.20	5.71	98.19	5.69	79.03	5.40	5.39	3.57	59.58	3.49	64.97	3.50	7.31
2020 Merensky (grade reported as 6E)			75.73	3.42	75.73	3.42	61.39	4.32							
2019 Merensky (grade reported as 6E)			75.73	3.42	75.73	3.42	61.39	4.32							
<b>Modikwa Mine</b>															
2020 UG2 (grade reported as 4E)	85.80	5.94	102.20	5.91	188.00	5.92	77.50	6.22	13.43	4.45	32.30	4.12	45.73	4.22	6.21
2019 UG2 (grade reported as 4E)	86.30	5.94	102.50	5.92	188.80	5.93	77.30	6.24	15.68	4.49	31.48	4.27	47.16	4.34	6.58
2020 Merensky (grade reported as 4E)	20.70	3.15	53.88	2.90	74.58	2.97	139.33	2.84							
2019 Merensky (grade reported as 4E)	18.54	2.93	55.73	2.72	74.27	2.78	138.59	2.65							

6E = platinum + palladium + rhodium + iridium + ruthenium + gold.

4E = platinum + palladium + rhodium + gold.

The Mineral Resources are **inclusive** of those modified to produce Mineral Reserves.

\* Two Rivers Platinum Mine attributable interests (ARM 54%; Impala Platinum 46%).

\* Modikwa Platinum Mine attributable interests (ARM 41.5%; Modikwa communities 8.5%; Anglo American Platinum 50%).

### Nickel

* Mineral Resources and Mineral Reserves are reported on a 100% basis.	Mineral Resources								Mineral Reserves						
	Measured		Indicated		(Measured and Indicated)		Inferred		Proved		Probable		Total Reserves		
	Mt	Ni%	Mt	Ni%	Mt	Ni%	Mt	Ni%	Mt	Ni%	Mt	Ni%	Mt	Ni%	
<b>Nkomati Mine</b>															
2020 MMZ+PCMZ	75.61	0.32	94.64	0.37	170.25	0.35	46.35	0.40	1.39	0.37			1.39	0.37	
2019 MMZ+PCMZ	81.10	0.32	94.64	0.37	175.74	0.35	46.35	0.40	6.48	0.30	0.31	0.28	6.79	0.30	
2020 MMZ stockpiles									0.20	0.25			0.20	0.25	
2019 MMZ stockpiles									0.20	0.27			0.20	0.27	
2020 PCMZ stockpiles									0.36	0.20			0.36	0.20	
2019 PCMZ stockpiles									0.60	0.19			0.60	0.19	

The Mineral Resources are **inclusive** of those modified to produce Mineral Reserves.

MMZ – Main Mineralised Zone; PCMZ – Chromititic Peridotite Mineralised Zone.

Nkomati Mine MMZ Mineral Resources and Mineral Reserves also contain Cu, Co, and PGEs – details available on pages 29 to 30 of this report.

Nkomati Mine PCMZ Mineral Resources and Mineral Reserves also contain Cu, Co, PGEs and Cr<sub>2</sub>O<sub>3</sub> – details available on pages 29 to 30 of this report.

\* Nkomati Mine attributable interests (ARM 50%; Norilsk Nickel Africa (Pty) Ltd 50%).



## F2020 MINERAL RESOURCES AND MINERAL RESERVES SUMMARY continued

## Chrome

* Mineral Resources and Mineral Reserves are reported on a 100% basis.	Mineral Resources						Mineral Reserves					
	Measured		Indicated		(Measured and Indicated)		Proved		Probable		Total Reserves	
	Mt	Cr <sub>2</sub> O <sub>3</sub> %	Mt	Cr <sub>2</sub> O <sub>3</sub> %	Mt	Cr <sub>2</sub> O <sub>3</sub> %	Mt	Cr <sub>2</sub> O <sub>3</sub> %	Mt	Cr <sub>2</sub> O <sub>3</sub> %	Mt	Cr <sub>2</sub> O <sub>3</sub> %
<b>Nkomati Mine</b>												
<b>2020 Oxidised massive chromitite</b>	<b>0.13</b>	<b>27.16</b>	<b>0.05</b>	<b>23.28</b>	<b>0.18</b>	<b>26.08</b>						
2019 Oxidised massive chromitite	0.13	27.16	0.05	23.28	0.18	26.08						
<b>2020 Un-oxidised massive chromitite</b>	<b>0.12</b>	<b>25.14</b>	<b>0.21</b>	<b>24.42</b>	<b>0.33</b>	<b>24.68</b>						
2019 Un-oxidised massive chromitite	0.12	25.26	0.21	24.42	0.33	24.73	0.07	17.77			0.07	17.77
<b>2020 Chromite stockpiles</b>							<b>1.05</b>	<b>19.33</b>			<b>1.05</b>	<b>19.33</b>
2019 Chromite stockpiles							1.77	19.37			1.77	19.37

The Mineral Resources are **inclusive** of those modified to produce Mineral Reserves.

\* **Nkomati Mine attributable interests (ARM 50%; Norilsk Nickel Africa (Pty) Ltd 50%).**

## ARM Ferrous operations

## Manganese

* Mineral Resources and Mineral Reserves are reported on a 100% basis.	Mineral Resources								Mineral Reserves					
	Measured		Indicated		(Measured and Indicated)		Inferred		Proved		Probable		Total Reserves	
	Mt	Mn%	Mt	Mn%	Mt	Mn%	Mt	Mn%	Mt	Mn%	Mt	Mn%	Mt	Mn%
<b>Black Rock Mine (Nchwaning Mine)</b>														
<b>2020 Seam 1</b>	<b>84.88</b>	<b>44.71</b>	<b>41.12</b>	<b>39.87</b>	<b>126.00</b>	<b>43.13</b>			<b>37.51</b>	<b>44.29</b>	<b>23.06</b>	<b>42.68</b>	<b>60.57</b>	<b>43.68</b>
2019 Seam 1	82.11	44.65	49.05	40.48	131.16	43.09			38.65	44.16	30.11	42.20	68.76	43.30
<b>2020 Seam 2</b>	<b>106.29</b>	<b>42.83</b>	<b>68.47</b>	<b>42.28</b>	<b>174.76</b>	<b>42.61</b>			<b>72.72</b>	<b>42.69</b>	<b>35.94</b>	<b>42.92</b>	<b>108.66</b>	<b>42.77</b>
2019 Seam 2	104.25	42.83	68.54	42.08	172.79	42.53			73.09	42.70	36.01	42.80	109.10	42.73
<b>Black Rock Mine (Koppie area)</b>														
<b>2020 Seam 1</b>	<b>15.80</b>	<b>40.00</b>	<b>23.00</b>	<b>39.30</b>	<b>38.80</b>	<b>39.60</b>	<b>25.20</b>	<b>41.10</b>						
2019 Seam 1	9.03	40.30	34.57	40.70	43.60	40.60								
<b>2020 Seam 2</b>	<b>7.30</b>	<b>39.10</b>	<b>8.00</b>	<b>35.80</b>	<b>15.30</b>	<b>37.40</b>	<b>18.70</b>	<b>38.20</b>						
2019 Seam 2	8.23	37.40	18.58	39.20	26.81	38.60								
<b>Black Rock Mine (Gloria Mine)</b>														
<b>2020 Seam 1</b>	<b>69.39</b>	<b>37.29</b>	<b>80.08</b>	<b>37.56</b>	<b>149.47</b>	<b>37.43</b>	<b>30.19</b>	<b>36.91</b>	<b>44.61</b>	<b>37.20</b>	<b>60.37</b>	<b>37.32</b>	<b>104.98</b>	<b>37.27</b>
2019 Seam 1	64.01	37.49	92.93	37.65	156.94	37.58	31.87	37.29	41.84	37.40	73.20	37.42	115.04	37.41
<b>2020 Seam 2</b>			<b>32.06</b>	<b>28.41</b>	<b>32.06</b>	<b>28.41</b>	<b>122.92</b>	<b>30.03</b>						
2019 Seam 2			34.81	28.41	34.81	28.41	133.46	30.03						

The Mineral Resources are **inclusive** of those modified to produce Mineral Reserves.

\* **Black Rock Manganese Mine attributable interests (ARM 50%; Assore 50%).**

## F2020 MINERAL RESOURCES AND MINERAL RESERVES SUMMARY continued

## Iron ore

* Mineral Resources and Mineral Reserves are reported on a 100% basis.	Mineral Resources								Mineral Reserves					
	Measured		Indicated		(Measured and Indicated)		Inferred		Proved		Probable		Total Reserves	
	Mt	Fe%	Mt	Fe%	Mt	Fe%	Mt	Fe%	Mt	Fe%	Mt	Fe%	Mt	Fe%
<b>Beeshoek Mine</b>														
<b>2020 All pits</b>	<b>86.71</b>	<b>64.06</b>	<b>5.11</b>	<b>63.44</b>	<b>91.82</b>	<b>64.02</b>	<b>5.35</b>	<b>62.58</b>	<b>26.05</b>	<b>64.64</b>	<b>0.13</b>	<b>63.35</b>	<b>26.18</b>	<b>64.63</b>
2019 All pits	90.56	64.11	5.11	63.44	95.67	64.07	5.35	62.58	29.71	64.70	0.13	63.35	29.84	64.69
<b>2020 Stockpiles</b>											<b>1.22</b>	<b>60.02</b>	<b>1.22</b>	<b>60.02</b>
2019 Stockpiles											0.77	58.52	0.77	58.52
<b>2020 Low-grade stockpiles</b>	<b>2.41</b>	<b>56.46</b>	<b>12.64</b>	<b>53.22</b>	<b>15.05</b>	<b>53.74</b>					<b>11.97</b>	<b>53.22</b>	<b>11.97</b>	<b>53.22</b>
2019 Low-grade stockpiles	2.41	56.46	12.64	53.22	15.05	53.74			2.29	56.46	11.97	53.22	14.26	53.74
<b>Khumani Mine</b>														
<b>2020 Bruce and King/Mokaning</b>	<b>449.08</b>	<b>62.88</b>	<b>132.76</b>	<b>63.12</b>	<b>581.84</b>	<b>62.93</b>	<b>35.18</b>	<b>61.87</b>	<b>341.01</b>	<b>62.20</b>	<b>83.57</b>	<b>62.58</b>	<b>424.58</b>	<b>62.28</b>
2019 Bruce and King/Mokaning	418.99	63.01	137.30	63.22	556.29	63.06	36.10	61.13	340.19	61.97	93.25	62.58	433.44	62.10
<b>2020 Stockpiles</b>											<b>6.31</b>	<b>55.52</b>	<b>6.31</b>	<b>55.52</b>
2019 Stockpiles											6.04	55.08	6.04	55.08
<b>2020 Low-grade stockpiles</b>			<b>17.18</b>	<b>54.29</b>	<b>17.18</b>	<b>54.29</b>	<b>1.78</b>	<b>55.07</b>						

The Mineral Resources are **inclusive** of those modified to produce Mineral Reserves.

\* Iron ore operations attributable interests (ARM 50%; Assore 50%).

## ARM Coal operations

## Coal

* Coal Resources and Coal Reserves are reported on a 100% basis.	Coal Resources								Coal Reserves (ROM)						Coal Reserves (Saleable)					
	Measured		Indicated		(Measured and Indicated)		Inferred		Proved		Probable		Total Reserves		Proved		Probable		Total Reserves	
	Mt	CV (MJ/kg)	Mt	CV (MJ/kg)	Mt	CV (MJ/kg)	Mt	CV (MJ/kg)	Mt	CV (MJ/kg)	Mt	CV (MJ/kg)	Mt	CV (MJ/kg)	Mt	CV (MJ/kg)	Mt	CV (MJ/kg)	Mt	CV (MJ/kg)
Goedgevonden Coal Mine																				
2020 (Coal Resources reported as MTIS**)	490	19.82	7	18.28	497	19.80	1	16.72	280	19.57			280	19.57	172	^			172	^
2019 (Coal Resources reported as MTIS**)	510	19.82	7	18.28	517	19.80	1	16.72	280	19.64	10	19.64	290	19.64	173	^^	5	^^	178	^^

The Coal Resources are **inclusive** of those modified to produce Coal Reserves.

\*\* Mineable Tonnes In Situ (MTIS) Coal Resources are now reported as per SAMREC Code of 2016 requirements.

^ 2020 [HG Export (73 Mt; CV 6 000 Kcal/kg)] and [LG Export (99 Mt; CV 21.50 MJ/kg)].

^^ 2019 [HG Export (79 Mt; CV 6 000 Kcal/kg)] and [LG Export (99 Mt; CV 21.50 MJ/kg)].

\* Goedgevonden Coal Mine attributable interests (ARM 26%; Glencore Operations 74%).

# ARM PLATINUM



## TWO RIVERS PLATINUM MINE

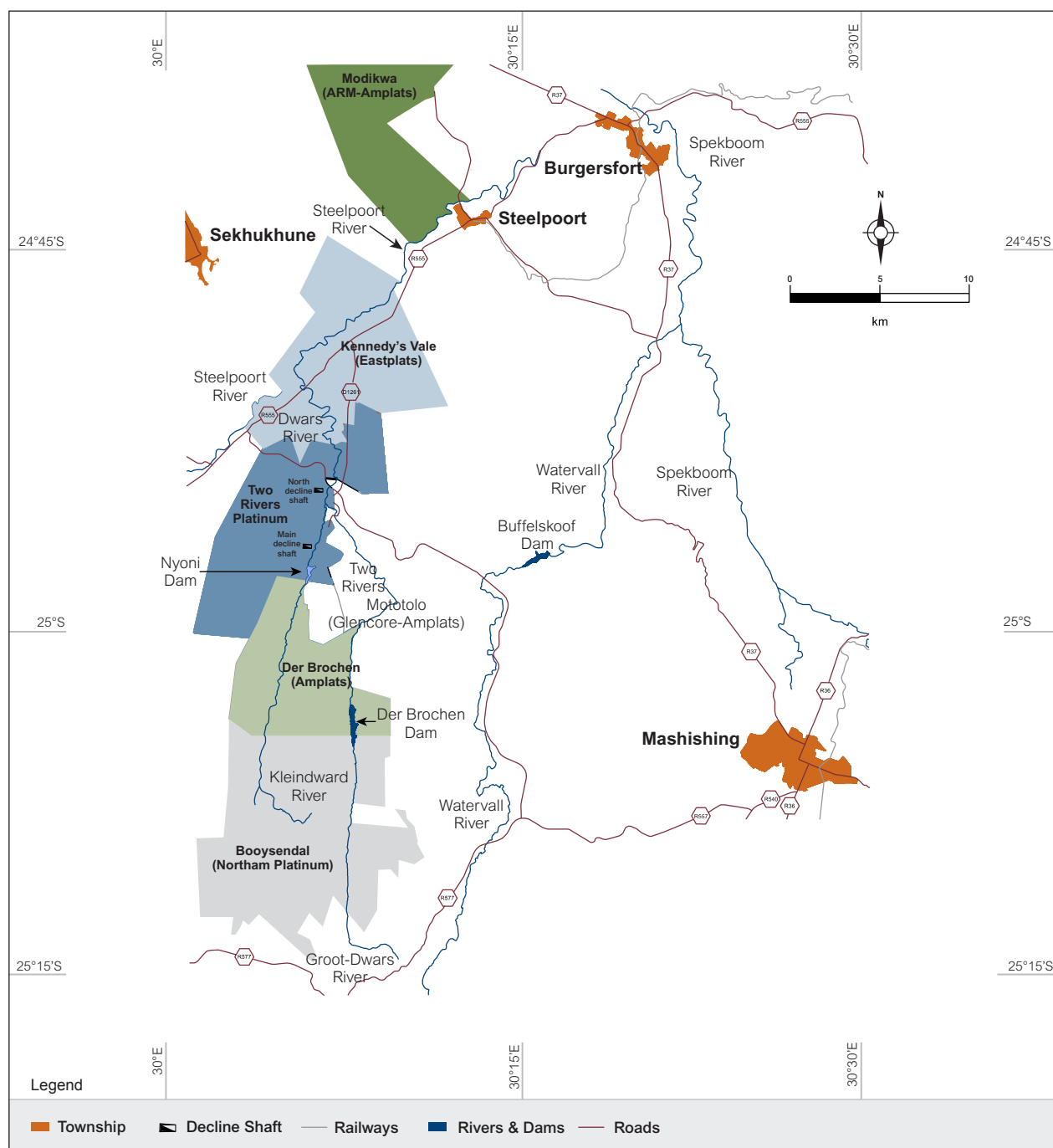
ARM's attributable beneficial interest in Two Rivers Platinum Mine (TRP) operation is 54%. The other 46% is held by Impala Platinum.

### LOCALITY

Two Rivers Platinum Mine is located on the southern sector of the Eastern Limb of the Bushveld Complex. The mine is located on the farm Dwarsrivier 372KT and extends to portions of the farms Kalkfontein 367KT and Tweefontein 360KT and the farm Buffelshoek 368KT. At longitude 30°07'E and latitude 24°59'S, the mine is approximately 30 kilometres from Steelpoort and 60 kilometres from Lydenburg, Mpumalanga Province, South Africa. Two Rivers Platinum Mine is neighboured by Mototolo Platinum Mine and Dwarsrivier, Tweefontein and Thorncleft chromite mines.

## ARM PLATINUM continued

## LOCALITY MAP OF TWO RIVERS PLATINUM MINE



## HISTORY

Exploration, development and production history in the area dates from the early 1920s. During 1929, Lydenburg Platinum Areas Limited started mining activity, but no records are available.

Following the acquisition by Gold Fields Mining and Development Limited, exploration started again in 1987 and was mainly directed at the Merensky Reef. Assmang Limited acquired the

Dwarsrivier farm in September 1998, primarily to exploit the LG6 chromitite.

During 2001, Anglovaal acquired the PGE rights on the farm from Assmang and targeted the UG2 Reef. In June 2005, after the 2004 ARM/Anglovaal merger, and following a full feasibility study and a period of trial underground mining, the ARM/Impala Joint Venture announced the approval of a 220 000 ounce-per-year PGM mine. As a result, an underground mine was established.



## ARM PLATINUM continued

**COMPETENCE**

The following competent persons were involved in the estimation of Mineral Resources and Mineral Reserves for the Two Rivers Platinum Mine. They are employed by Two Rivers Mine.

Competent person	Professional organisation	Membership number	Qualifications	Relevant experience
J Coetzee (Mineral Resources)	SACNASP	114086	BSc (Geology), BSc Hons (Geology)	17 years
JZ Khumalo (Geology)	SACNASP	400256/05	BSc (Geology), BSc Hons (Geology), GDE (Mining Engineering)	21 years
TJ Horak (Mineral Reserves)	IMSSA	1113	NHD (Mine Surveying), GDE (Mining Engineering)	21 years

**MINING AUTHORISATION**

Legal entitlement	Minerals covered by Mining Right	Comment	Period of Mining Right (years)	Known impediments on legal entitlement
Mining Right LP 178 MR (as amended)	Platinum, palladium, rhodium, ruthenium, osmium, iridium, silver, gold and ores.	On 8 November 2017, the amended TRP Mining Right, incorporating the Remaining Extent of Kalkfontein (previously Tamboti) into the TRP Mining Right, was executed. The prospecting area previously covered by LP 2125 PR was also incorporated into the TRP Mining Right.	25 years: 20 March 2013 to 19 March 2038	None

**GEOLOGY**

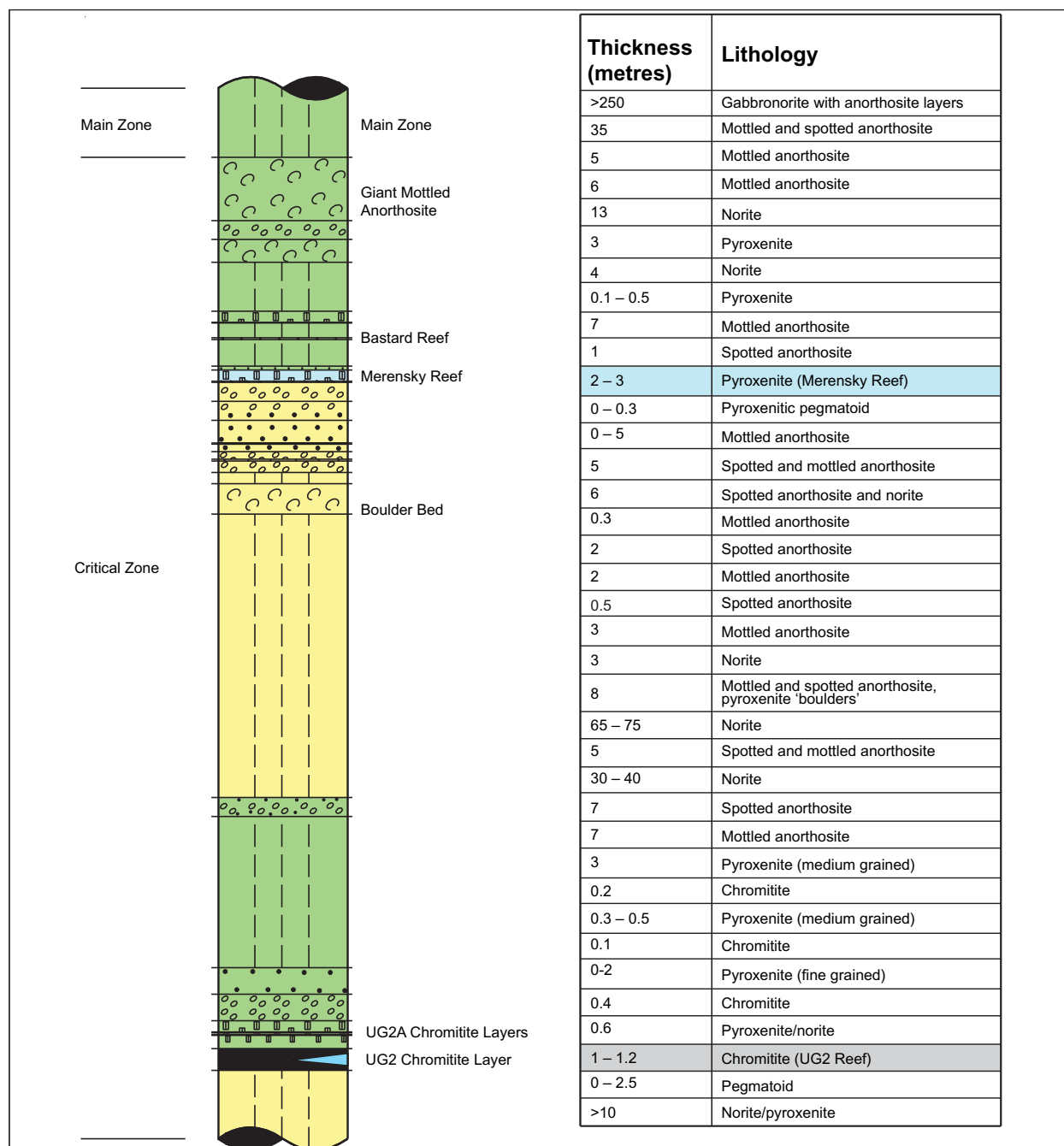
The geological succession at Two Rivers Platinum Mine is broadly similar to other areas of the Eastern Limb of the Bushveld Complex. An exception is the presence of the Steelpoortpark granite in the south-western part of the project, which is unique to this area. At Two Rivers, both the Merensky and UG2 Reefs are present, but only the UG2 is currently exploited. The middling between the Merensky Reef and the UG2 Reef is approximately 140 metres to 160 metres, but reduces significantly in the northern part of the Two Rivers Platinum Mine, to about 70 metres.

The UG2 Reef outcrops in the Klein Dwarsrivier valley on the Dwarsrivier farm, with a north-south strike length of 7.5 kilometres, dipping to the west at between 7° to 10°. The elevated topography results in the UG2 occurring at a depth of approximately 935 metres towards the western boundary.

The UG2 is bottom loaded with peak PGM values occurring in the basal 10 centimetre portion. The following reef facies have been defined for the UG2 at Two Rivers Platinum Mine:

- UG2 Normal Reef facies which is characterised by a 100 to 120 centimetre-thick chromitite overlain by up to three chromitite 'leaders' collectively termed the UG2A chromitites
- UG2 Split Reef facies in the southern, west-central and north-eastern parts which is characterised by a chromitite seam that is separated by a layer of a fine- to medium-grained internal pyroxenite unit
- The UG2 Multiple Split Reef facies which is represented by multiple splitting of the UG2 chromitite by internal pyroxenite. It occurs mainly in the southern section of the mine on the Dwarsrivier farm as well as the east-central section of the Buffelshoek farm.

## ARM PLATINUM continued

**STRATIGRAPHIC COLUMN OF THE UPPER CRITICAL ZONE FROM THE MERENSKY HANGING WALL THROUGH TO THE UG2 FOOTWALL AT TWO RIVERS PLATINUM MINE**

The Merensky Reef consists mainly of orthopyroxene with lesser amounts of plagioclase and clinopyroxene. Thin chromitite layers, usually 1 to 4 millimetres thick, occur near the upper and lower contacts of the reef. The Merensky Reef has variable thickness but generally reduces in thickness from the Dwarsrivier farm towards Kalkfontein and Buffelshoek farms. The regional north-northeast to south-southwest trending Kalkfontein fault, with a vertical displacement of up to 1 000 metres down-thrown to the west, defines the limits of the eastern structural domain for both the UG2 and Merensky Reefs.

The ground beyond this fault remains an exploration target where both reefs are at depths in excess of 1 000 metres. Both reefs are affected by the granite intrusion in the southern portion of the Buffelshoek farm where both reefs are absent.

## EXPLORATION ACTIVITIES

Four surface boreholes were drilled on Dwarsrivier 372 KT farm (south area) during the year that further assisted with understanding the UG2 split reef complexities for this area. This borehole information was used for the 2020 Mineral Resource model update. One additional geotechnical borehole was drilled

## ARM PLATINUM continued

to assist the rock engineering and ventilation departments with critical information pertaining to the ground conditions where a new surface fan will be placed. The borehole was drilled in the South 4 area of the main decline area. Ninety-four new underground sample intersections were also used to update the 2020 UG2 geological wireframe and block model. The underground sample information was used in the estimation process.

The total costs including assaying was R3.53 million for surface drilling of 1264.64 metres. The amount also included costs of underground sampling assays, geological services and road construction. A total of 10 339.04 metres were drilled underground for R6.66 million including assaying.

The four surface boreholes drilled were planned to achieve a 150m by 150m grid and intersected both UG2 and Merensky reefs.

Plans for F2021 are to continue drilling in the south area of Dwarsrivier 372 KT in the split reef area as well as delineation drilling for the St. George's fault. Routine underground drilling is also planned. The cost of drilling will amount to R3.48 million and R7.12 million for surface and underground drilling respectively.

## MINING METHODS AND INFRASTRUCTURE

TRP mining operation consists of two UG2 Decline shaft systems, the Main Decline and the North Decline, located approximately 2.5 kilometres apart on strike. Both shafts were designed for mechanised bord and pillar mining. The mine has a concentrator plant on site where initial processing is done. Concentrate is transported by road to Impala Platinum's plants for further processing.

## MINERAL RESOURCES

The UG2 geological and grade block model was updated in 2020 using the following data: four new boreholes drilled in Dwarsrivier 372 KT farm in the split reef area, underground boreholes and underground sampling data.

The surface boreholes at TRP have an average grid spacing of 500 metres over the whole property and 250 metre grid spacing in some areas. The borehole spacing is 100 metres on strike and 50 metres on dip in the north-eastern portion of Dwarsrivier farm. Current drilling in the south area of Dwarsrivier 372 KT is planned to achieve a 150m by 150m drilling grid.

The borehole core drilled by TRP is cut by diamond saw and the half-core sampled at 20 centimetre intervals. Samples for both Merensky and UG2 Reefs are crushed and split and submitted for assaying. All samples from recent drilling at TRP were assayed at Genalysis Laboratory Services (Pty) Ltd (Genalysis) using Ni-sulphide collection fire-assay with an ICP-MS finish to determine Pt, Pd, Rh, Ru, Ir and Au values. Base metals (Ni, Cu and Co) were assayed by aqua regia digestion/OES finish.

Duplicate samples and check analyses are carried out. Densities are determined at the laboratory by pycnometer. The earlier Gold Fields and Assmang samples were assayed by Pb-collector fire-assay with gravimetric finish. In order to combine the data, some of the original core samples were re-assayed by means of Ni-sulphide collection fire-assay and a regression equation was derived, to re-cast the original Pb-collection data as Ni-sulphide assay 'equivalents'. Samples

from other drilling campaigns by Implats and Kamení used the Genalysis Laboratory as well.

In 2020, the UG2 Reef geological modelling was undertaken in Datamine Strat 3D. The software is suitable for stratified deposits and allows for the modelling of faults. The model produced shows consistency in the fault displacements. Ordinary Kriging interpolation within Datamine Studio RM was used to estimate the grade of each 50 x 50 x 1 metre block generated within the UG2 Reef geological models. Variables estimated were Pt, Pd, Rh, Au, Ru, and Ir, Cu and Ni. The internal pyroxenite and the leader chromitites were also modelled and estimated. Sub-cell splitting of blocks was allowed to follow the geological boundaries accurately. Density was estimated by Ordinary Kriging in the resource model. Additional models of the UG2 leaders and the footwall of the UG2 chromitite were created for use in the Mineral Reserve model as mining dilution.

The Merensky Reef model was not updated in 2020, therefore the Mineral Resource statement is based on the 2019 model. In 2019, Strat 3D was utilised in creating the geological model. Ordinary Kriging interpolation within Datamine Studio RM was used to estimate the grade of each 50 x 50 x 1 metre block generated within the Merensky Reef geological models. Variables estimated were Pt, Pd, Rh, Au, Ru, and Ir, Cu and Ni. Three models for the Top Mineralised zone, Middle Mineralised zone and the Bottom Mineralised zone were produced. An additional model was produced for the footwall unit.

The UG2 and Merensky Mineral Resource classification is based on the consideration of both geological and geostatistical parameters. The geological continuity of the reef is assessed by considering minor and major faulting and other structural disturbances on the reefs and the consistency in thickness and grade. Geostatistical parameters such as Kriging variance, Kriging efficiency, regression slope, number of samples used in estimation and search volume are also considered in the Mineral Resource classification. Geological losses of 21% to 25% (UG2 Reef) and 30% (Merensky Reef) were applied to account for potholes, faults, dykes and iron-rich replacement pegmatoids.

The Mineral Resources declared have reasonable and realistic prospects for eventual economic extraction having considered the following:

- Location, quality, grade and geological continuity which are known and are supported by drilling information which includes sampling
- UG2 and Merensky reef mineralisation with a minimum thickness of 1m and a grade of not less than 1.8 g/t (6E) is considered a Mineral Resource that can be reported from experience on the platinum mines. If the thickness of reef is less than 1 metre then the accumulation value should not be less than 180 cmg/t
- A depth constraint has also been applied as mineralisation at depth of greater than 1 000m will be at temperatures that are likely to be too high for safe mining, so all the Mineral Resources at this depth have been excluded
- Mining and processing methods are well established at the operation and are currently used to exploit the orebody
- All other considerations such as legal, infrastructural, environmental, marketing, social and economic factors are covered as part of the mining plan for the operation

## ARM PLATINUM continued

## TWO RIVERS PLATINUM MINE: UG2 REEF MINERAL RESOURCES ESTIMATES AS AT 30 JUNE 2020

* Mineral Resources are reported on a 100% basis.	Mineral Resources								
	Mt	Pt g/t	Pd g/t	Rh g/t	Au g/t	4E g/t	6E g/t	Pt Moz	6E Moz
Measured	14.35	2.64	1.50	0.48	0.04	4.66	5.65	1.22	2.61
Indicated	83.75	2.59	1.65	0.48	0.04	4.77	5.73	6.98	15.44
<b>Total Measured and Indicated 2020</b>	<b>98.10</b>	<b>2.60</b>	<b>1.63</b>	<b>0.48</b>	<b>0.04</b>	<b>4.75</b>	<b>5.72</b>	<b>8.20</b>	<b>18.05</b>
Total Measured and Indicated 2019	98.19	2.58	1.64	0.48	0.04	4.74	5.69	8.14	17.98
<b>Inferred 2020</b>	<b>80.30</b>	<b>2.34</b>	<b>1.65</b>	<b>0.43</b>	<b>0.04</b>	<b>4.47</b>	<b>5.33</b>	<b>6.04</b>	<b>13.77</b>
Inferred 2019	79.03	2.37	1.66	0.44	0.04	4.51	5.40	6.01	13.72

4E = platinum + palladium + rhodium + gold; 6E = platinum + palladium + rhodium + iridium + ruthenium + gold.

The Measured and Indicated Mineral Resources are inclusive of those modified to produce Mineral Reserves.

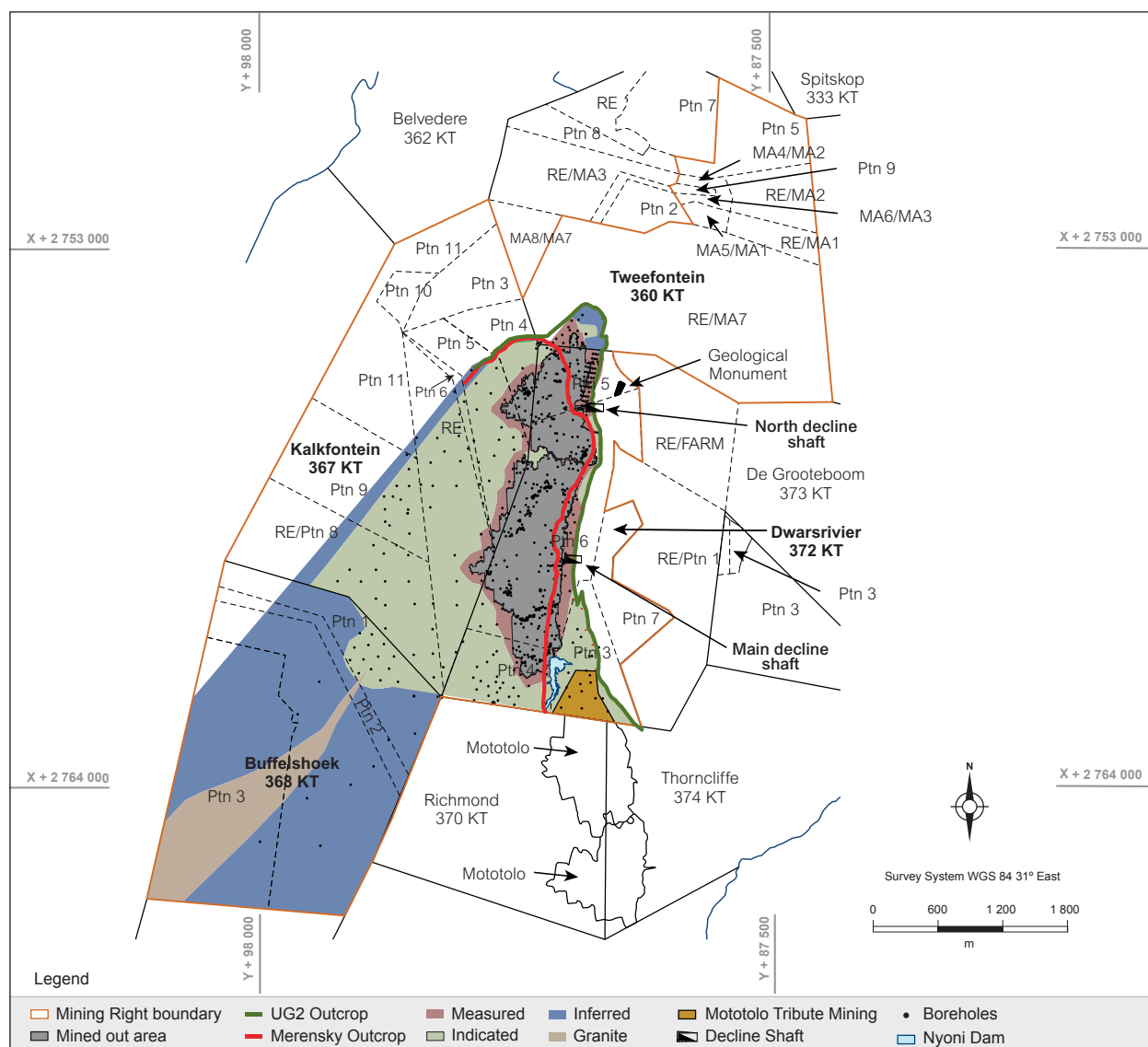
Totals are rounded off.

**Key assumptions for Mineral Resources:**

Geological loss factor applied: 21%–25%.

\* Two Rivers Platinum Mine attributable interests (ARM 54%; Impala Platinum 46%).

## TWO RIVERS PLATINUM MINE UG2 REEF MINERAL RESOURCES CLASSIFICATION



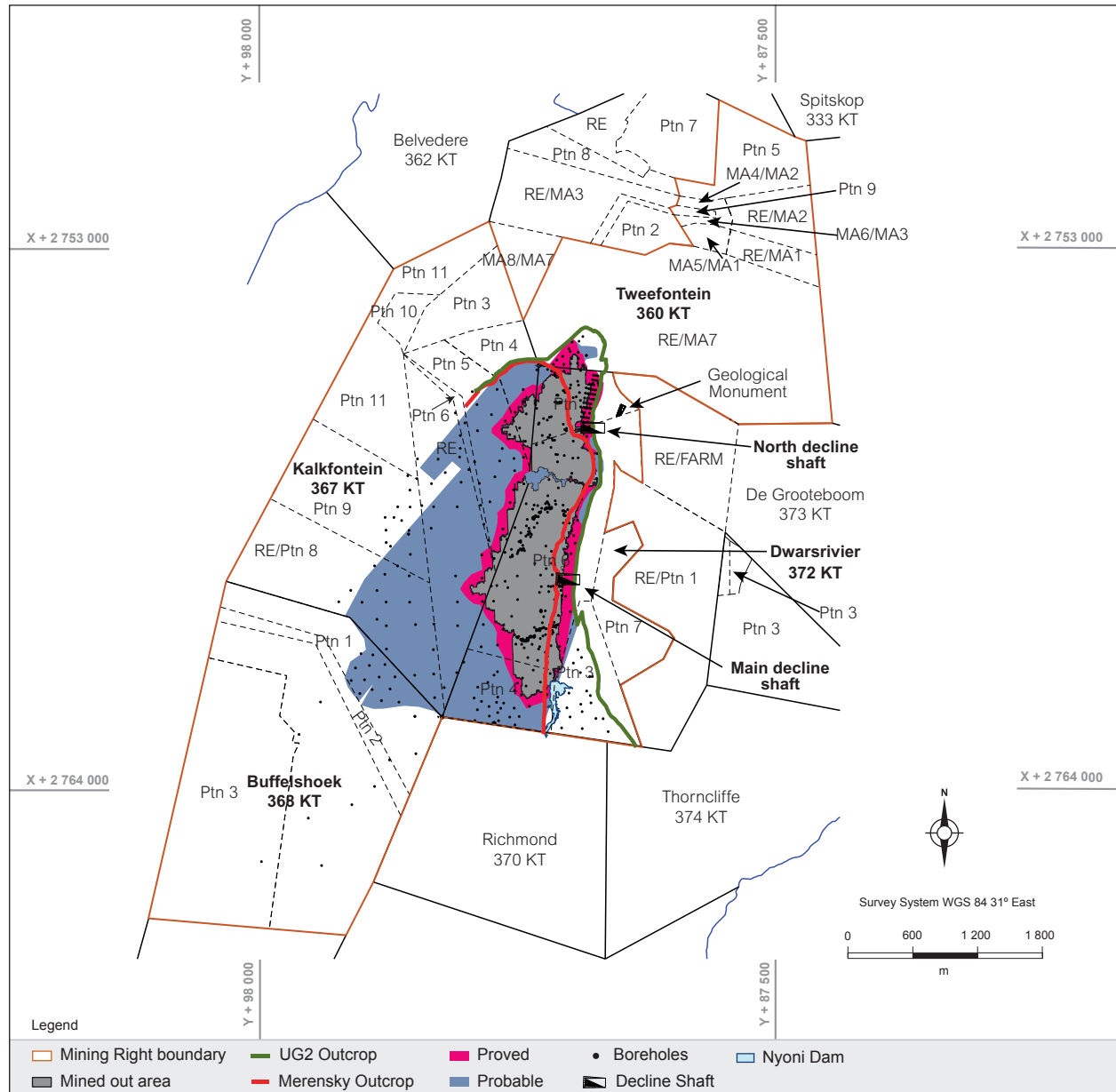


## ARM PLATINUM continued

### MINERAL RESERVES

The Mineral Resources to Mineral Reserves conversion for the UG2 was done using the Datamine Studio 5D Mine Planner software package. Conversion of the UG2 Mineral Resources was done for the Measured and Indicated Mineral Resources in Dwarsrivier farm, Kalkfontein farm portions 4 to 6 and Tweefontein. The modifying factors used for the conversion of Mineral Resources to Mineral Reserves took into account the mining method, mining extraction factor, mining losses, mining dilution, mine call factor and commodity prices among other financial parameters. Details of some of the key parameters are provided as footnotes on the Mineral Reserves tabulations.

### TWO RIVERS PLATINUM MINE UG2 REEF MINERAL RESERVES CLASSIFICATION



## ARM PLATINUM continued

## TWO RIVERS PLATINUM MINE: UG2 REEF MINERAL RESERVES ESTIMATES AS AT 30 JUNE 2020

* Mineral Reserves are reported on a 100% basis.	Mineral Reserves								
	Mt	Pt g/t	Pd g/t	Rh g/t	Au g/t	4E g/t	6E g/t	Pt Moz	6E Moz
Proved	4.63	1.57	0.90	0.29	0.03	2.79	3.41	0.23	0.51
Probable	58.59	1.63	0.99	0.30	0.03	2.95	3.57	3.07	6.72
<b>Total Reserves 2020</b>	<b>63.22</b>	<b>1.63</b>	<b>0.98</b>	<b>0.30</b>	<b>0.03</b>	<b>2.94</b>	<b>3.56</b>	<b>3.30</b>	<b>7.23</b>
Total Reserves 2019	64.97	1.60	0.97	0.30	0.03	2.89	3.50	3.35	7.31

4E = platinum + palladium + rhodium + gold; 6E = platinum + palladium + rhodium + iridium + ruthenium + gold.

Totals are rounded off.

Modifying factors for the conversion of Mineral Resources to Mineral Reserves include:

Mining loss factor: Main Decline 3%; North Decline 11%.

Plant recovery: 81% (6E) depending on plant feed grade.

Shaft call factor: 95%–99%.

Mining dilution: on average 16 to 20cm on hangingwall and 35cm on footwall.

Minimum mining height: 1.95 metres; maximum mining height 3.20 metres.

Prices (US\$/oz): Pt: 973; Pd: 1 896; Rh: 4 873; Ru: 216; Ir: 1 359; Au: 1 529.

Prices (US\$/tonne): Cu: 6 272; Cr<sub>2</sub>O<sub>3</sub>: 150.

Exchange rate (R/US\$): 16.61.

Life-of-mine: >22 years.

\* Two Rivers Platinum Mine attributable interests (ARM 54%; Impala Platinum 46%).

## TWO RIVERS PLATINUM MINE: MERENSKY REEF MINERAL RESOURCES ESTIMATES AS AT 30 JUNE 2020

* Mineral Resources are reported on a 100% basis.	Mineral Resources								
	Mt	Pt g/t	Pd g/t	Rh g/t	Au g/t	4E g/t	6E g/t	Pt Moz	6E Moz
<b>Indicated 2020</b>	<b>75.73</b>	<b>1.87</b>	<b>0.95</b>	<b>0.11</b>	<b>0.20</b>	<b>3.13</b>	<b>3.42</b>	<b>4.55</b>	<b>8.32</b>
Indicated 2019	75.73	1.87	0.95	0.11	0.20	3.13	3.42	4.55	8.32
<b>Inferred 2020</b>	<b>61.39</b>	<b>2.28</b>	<b>1.31</b>	<b>0.14</b>	<b>0.25</b>	<b>3.98</b>	<b>4.32</b>	<b>4.50</b>	<b>8.53</b>
Inferred 2019	61.39	2.28	1.31	0.14	0.25	3.98	4.32	4.50	8.53

4E = platinum + palladium + rhodium + gold; 6E = platinum + palladium + rhodium + iridium + ruthenium + gold.

The Measured and Indicated Mineral Resources are inclusive of those modified to produce Mineral Reserves.

Totals are rounded off.

Key assumptions for Mineral Resources:

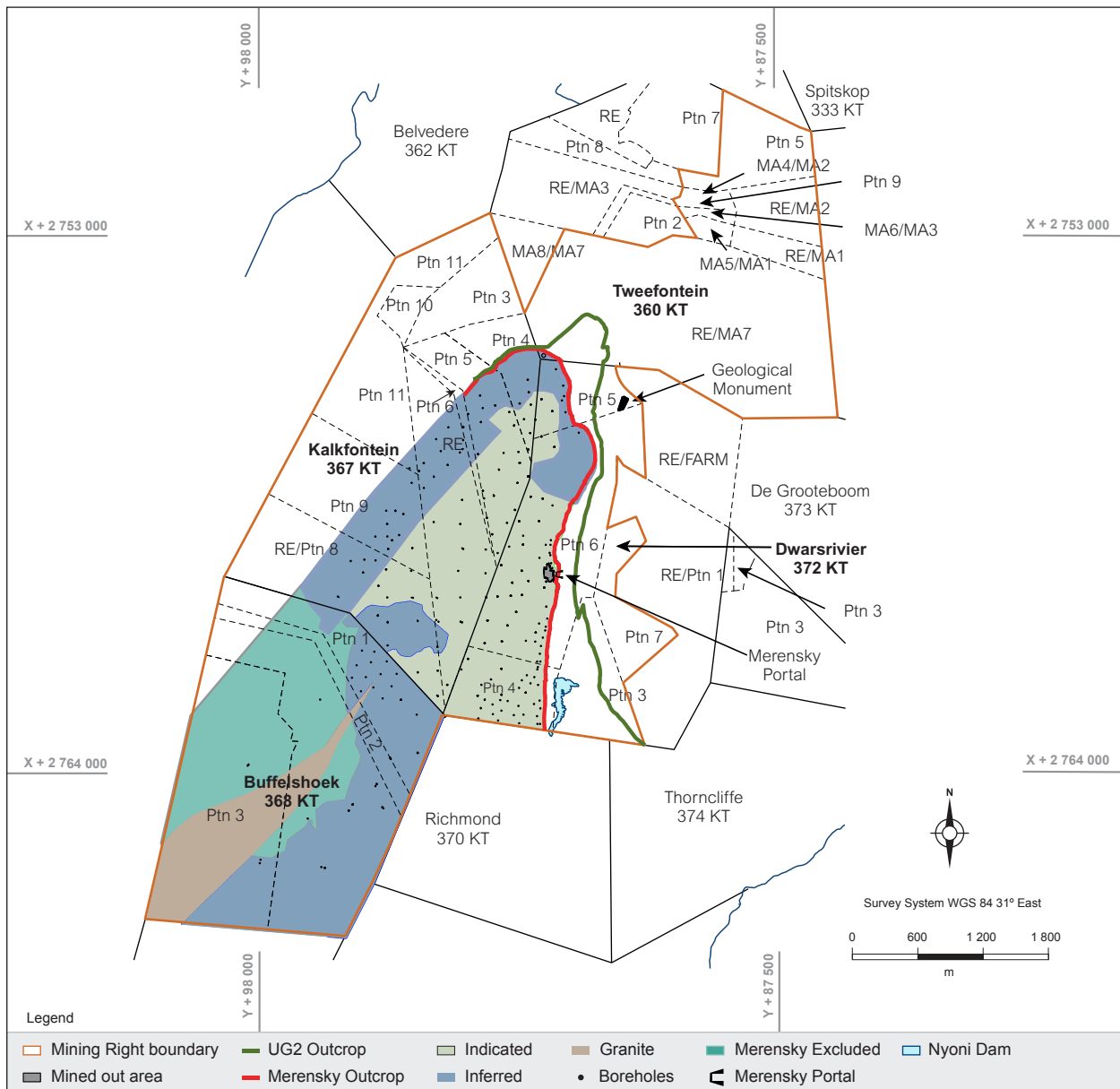
Geological loss factor applied: 30%.

\* Two Rivers Platinum Mine attributable interests (ARM 54%; Impala Platinum 46%).



## ARM PLATINUM continued

## TWO RIVERS PLATINUM MINE MERENSKY REEF MINERAL RESOURCES CLASSIFICATION



## Year-on-year change

The UG2 Reef Measured and Indicated Mineral Resources decrease from 98.19 million tonnes at 5.69 g/t (6E) to 98.10 million tonnes at 5.72 g/t (6E) mainly by mining depletion was minimised by an overall decrease in geological losses, the latter resulting in a gain in Mineral Resources. Inferred Mineral Resources at 80.30 million tonnes with a grade of 5.33 g/t (6E) was almost the same as last year which was at 79.03 million tonnes at 5.40 g/t (6E).

Mineral Reserves for the UG2 Reef decreased from 64.97 million tonnes at a grade of 3.50 g/t (6E) to 63.22 million tonnes at 3.56 g/t (6E) mainly due to mining depletion, which was partially offset by an overall decrease in geological losses and an increase in the hanging-wall dilution at the Main Decline.

The Indicated and Inferred Mineral Resources for the Merensky Reef remained unchanged as the model was not updated during the year.

## HISTORICAL PRODUCTION AT TWO RIVERS PLATINUM MINE (UG2 REEF)

Financial year	ROM		Milled	
	Mt	Grade g/t (6E)	Mt	Grade g/t (6E)
2015/2016	3.37		3.51	
2016/2017	3.38	3.80	3.50	3.90
2017/2018	3.45	3.57	3.46	3.63
2018/2019	3.32	3.58	3.40	3.52
2019/2020	2.94	3.52	3.02	3.45



Additional information regarding production figures can be found in the ARM Platinum section of the 2020 ARM integrated annual report which can be found at [www.arm.co.za](http://www.arm.co.za).

## ARM PLATINUM continued



## MODIKWA PLATINUM MINE

ARM's attributable beneficial interest in Modikwa's operations is 41.5%; 8.5% is held by the Modikwa communities and 50% is held by Rustenburg Platinum Mines.

### LOCALITY

Modikwa Platinum Mine is situated approximately 15 kilometres north of Burgersfort and 15 kilometres north-west of Steelpoort, along the border between the Mpumalanga and Limpopo Provinces in South Africa. Located at longitude 30°10'E and latitude 24°40'S, the site is accessed via the R37 road between Polokwane and Burgersfort. The topography of the area is defined by a low-lying broad valley which strikes due north-south and is underlain by rock units of the upper critical zone of the Bushveld Complex.



Refer to page 1 for the locality map showing the Modikwa Platinum Mine.

### HISTORY

Exploration in the area started in the mid-1920s with the discovery of the Merensky Reef. During the late 1980s, drilling was undertaken on the UG2 and Merensky Reefs. In the late 1990s, a feasibility study was completed for the exploitation of the UG2 Reef. During 2001, a 50:50 JV agreement was signed between Rustenburg Platinum Mines and ARM Mining Consortium Limited. ARM's effective stake in Modikwa is 41.5%, through its 83% ownership of the ARM Mining Consortium. The other 8.5% is held by the Mampudima and Matimatjatji community companies through their 17% shareholding in the ARM Mining Consortium.

### COMPETENCE

The following competent persons were involved in the estimation of Mineral Resources and Mineral Reserves for the Modikwa Platinum Mine. They are employed by Anglo American Platinum (I Colquhoun) and Modikwa Mine (J de Kock).

Competent person	Professional organisation	Membership number	Qualifications	Relevant experience
I Colquhoun (Mineral Resources)	SACNASP	400097/00	BSc (Geology), BSc Hons (Mineral Economics)	37 years
J de Kock (Mineral Reserves)	SAIMM	705068	Government Survey Certificate of Competency	38 years



ARM PLATINUM continued

Mining authorisation

Legal entitlement	Minerals covered by Mining Right	Comment	Period of Mining Right (years)	Known impediments on legal entitlement
Mining Right LP 129 MR (as amended)	Platinum group metals together with metals and minerals found in association therewith.	The acquisition in respect of a portion of the farm Doornbosch 294 KT was completed in 2019.	30 years: 13 November 2013 to 12 November 2043	None

GEOLOGY

The Bushveld layered sequence around Modikwa strikes north-northwest to south-southeast and dips to the southwest at 10° to 12°, with local variations in the dip resulting in gradients of nearly 20°. There are several instances where some gentle ‘rolling’ of the reef horizons have been recorded, and normally steeper dips are noted nearer the outcrop (as opposed to at depth).

The outcrop positions of the Merensky Reef and the UG2 normally occur within the areas of low relief, and much of the outcrop is masked by extensive development of black turf, as well as, in places, transported sediments. On the farms Maandagshoek 254 KT, Onverwacht 292 KT and Winterveld 293 KT; however, the UG2 (and occasionally the Merensky Reef) outcrops in a

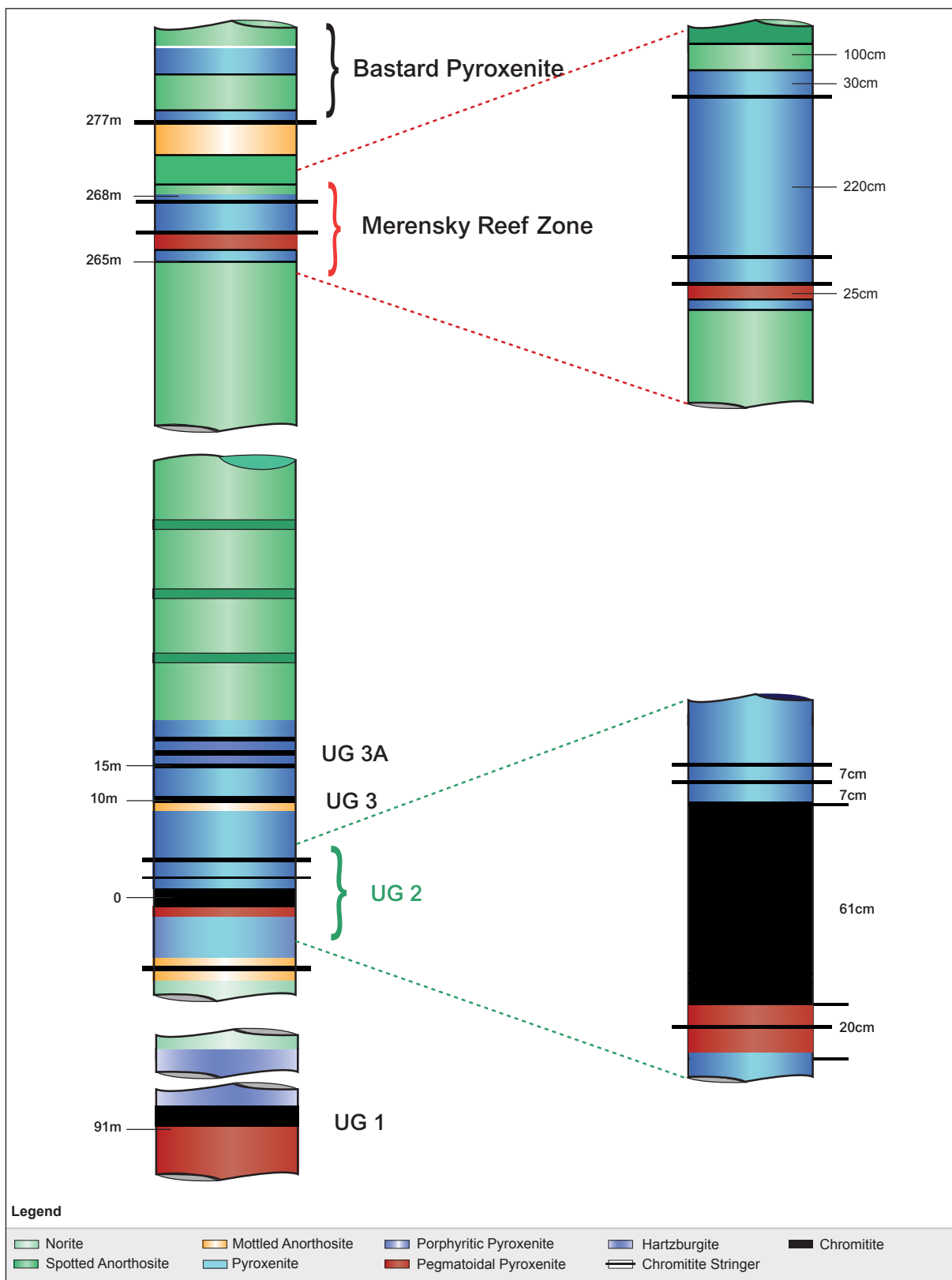
series of elongated hills. Although frequently covered with scree material, much of this outcrop has been marked by a series of trenches and pits, many of which date from early pioneer prospecting.

Both the UG2 and Merensky Reefs are present at Modikwa. The UG2 occurs as a chromitite layer with an average thickness of approximately 60 centimetres. Three leader chromitites occur above the main seam. Gentle undulations of the UG2 with amplitudes of less than 2 metres are developed across the mine area. Potholes are randomly distributed within the North Shaft area but are less abundant in the South Shaft area. The Onverwacht Hill area in the southern portion of the mine is characterised by the presence of several large ultramafic pegmatoid intrusions that disrupt, and locally replace, the UG2.



## ARM PLATINUM continued

## GENERALISED GEOLOGICAL SUCCESSION AT MODIKWA PLATINUM MINE



## ARM PLATINUM continued

### EXPLORATION ACTIVITIES

A total of 23 underground boreholes were drilled in the 2019/2020 year at the North and South shafts at a cost of R3.67 million to update the following: UG2 reef, dyke and reef pothole positions. Borehole radar was also utilised to explore for reef and define geological structures ahead mining stopes and development.

It is planned that the following work will be undertaken in 2021:

- 8 450 metres will be drilled underground for a total of R4.59 million including borehole radar
- Initial 3D Seismic survey will be done at cost of R32.27 million
- Drilling of 5 surface boreholes which will cost R3.56 million will be undertaken in the northern part of the mine

### MINING METHODS AND INFRASTRUCTURE

Mining consists of mechanised development and conventional stoping. The UG2 is accessed via two primary declines from the surface, and South 2 shaft. Run-of-mine tonnage is processed at the Modikwa concentrator and the PGE-rich concentrate is transported to Anglo Platinum's Polokwane smelter and refining facilities.

### MINERAL RESOURCES

The Mineral Resource modelling and estimation for Modikwa Platinum Mine is done by the Anglo American Platinum resource modelling team. The Mineral Resource classification is based on data constraints, information risk assessments, geological, geostatistical considerations and review by the competent person's team. The UG2 and Merensky Reef Mineral Resource is based on surface diamond drillholes (mother drillholes and deflections) and underground sample sections. The logs and assay values are kept in separate electronic databases and are combined for estimation purposes after rigorous data validation. Both the UG2 and Merensky models were updated during the year.

Samples are submitted to Anglo Research Laboratories (AR) and Mintek Laboratories (primary laboratories) and to Genalysis (check laboratory) for analysis. The UG2 Mineral Resource cut is divided into three units comprising the UG2 reef and dilution cuts in the hanging wall and footwall to make up the mining cut. Estimation of the three sub-units in the mining cut is carried out separately and independently. Two-dimensional block models with block sizes of 125 x 125 metres, 250 x 250 metres and 500 x 500 metres, depending

on the drillhole/sample section spacing, are created. The Pt, Pd, Rh, Au, Cu and Ni grades, reef width and density are interpolated using Ordinary Kriging. Mineral Resources are reported after deduction of geological losses. The geological losses account for losses due to pegmatoidal intrusions, faults, dykes and potholes.

Mineral Resource classification for both UG2 and Merensky reefs is based on geostatistical parameters (search volume, number of samples used in estimation, Kriging efficiency, Kriging variance and regression slope), geological structure information (aeromagnetic data, seismics, facies, structural model, reef facies, mining history and geological loss information) and QAQC assessment. These parameters are allocated weightings to get the final Mineral Resource classification score.

The following factors were considered to determine reasonable prospects of eventual economic extraction of the Mineral Resources that are reported:

- Legal – Modikwa Mine has permits and licences to mine and also adheres to regulatory requirements
- Geology – all data used for Mineral Resource models is validated and no Mineral Resources are declared below the 75° C isotherm, below which mining is currently not feasible. Geological losses are applied based on an annual assessment of mined-out areas
- Mining method – mining is conventional and has been used in the past and at adjacent mines to economically exploit the orebody
- Metallurgical – material mined is currently processed on and off-mine
- Other factors such as marketing, environmental and social, infrastructure, economic are adequately covered in the mine plan

### MINERAL RESERVES

Part of the Measured and Indicated Mineral Resources are converted to Mineral Reserves by applying appropriate mining, metallurgical and economic factors, ie 'modifying factors', details of which are below the Mineral Reserves table. A minimum mining cut of 102 centimetres is used to determine the amount of footwall waste that is included in the mining cut. Where the hanging wall and the main seam thickness are greater than 102 centimetres, an additional 5 centimetres of footwall waste is included. The basal contact of the UG2 layer is typically high-grade and it is important that this contact is not left in the footwall during mining.

## ARM PLATINUM continued

**MODIKWA PLATINUM MINE: UG2 MINERAL RESOURCES AND MINERAL RESERVES ESTIMATES AS AT 30 JUNE 2020**

* Mineral Resources and Mineral Reserves are reported on a 100% basis.	Mineral Resources				Mineral Reserves		
	Mt	4E g/t	4E Moz		Mt	4E g/t	4E Moz
Measured	85.80	5.94	16.39	Proved	13.43	4.45	1.92
Indicated	102.20	5.91	19.42	Probable	32.30	4.12	4.28
<b>Total Measured and Indicated 2020</b>	<b>188.00</b>	<b>5.92</b>	<b>35.80</b>	<b>Total Reserves 2020</b>	<b>45.73</b>	<b>4.22</b>	<b>6.21</b>
Total Measured and Indicated 2019	188.80	5.93	35.99	Total Reserves 2019	47.16	4.34	6.58
<b>Inferred 2020</b>	<b>77.50</b>	<b>6.22</b>	<b>15.50</b>				
Inferred 2019	77.30	6.24	15.51				

4E = platinum + palladium + rhodium + gold.

The Measured and Indicated Mineral Resources are inclusive of those modified to produce Mineral Reserves.  
Totals are rounded off.

**Key assumptions for Mineral Resources:**

Geological loss factor applied: 10.91%–38.78%.

Grade and thickness cut-off: No grade cut-off applied but grades are >4.09 g/t (4E) and 1.02 metres.

**Modifying factors for the conversion of Mineral Resources to Mineral Reserves include:**

'Unknown' geological loss factor applied: 4%–9%.

Mining loss factor: 1.2%.

Mining dilution: 36%.

Plant recovery: 88% (4E).

Mine call factor: 95%.

Mineral Reserve cut-off grade: 3.7 g/t (4E).

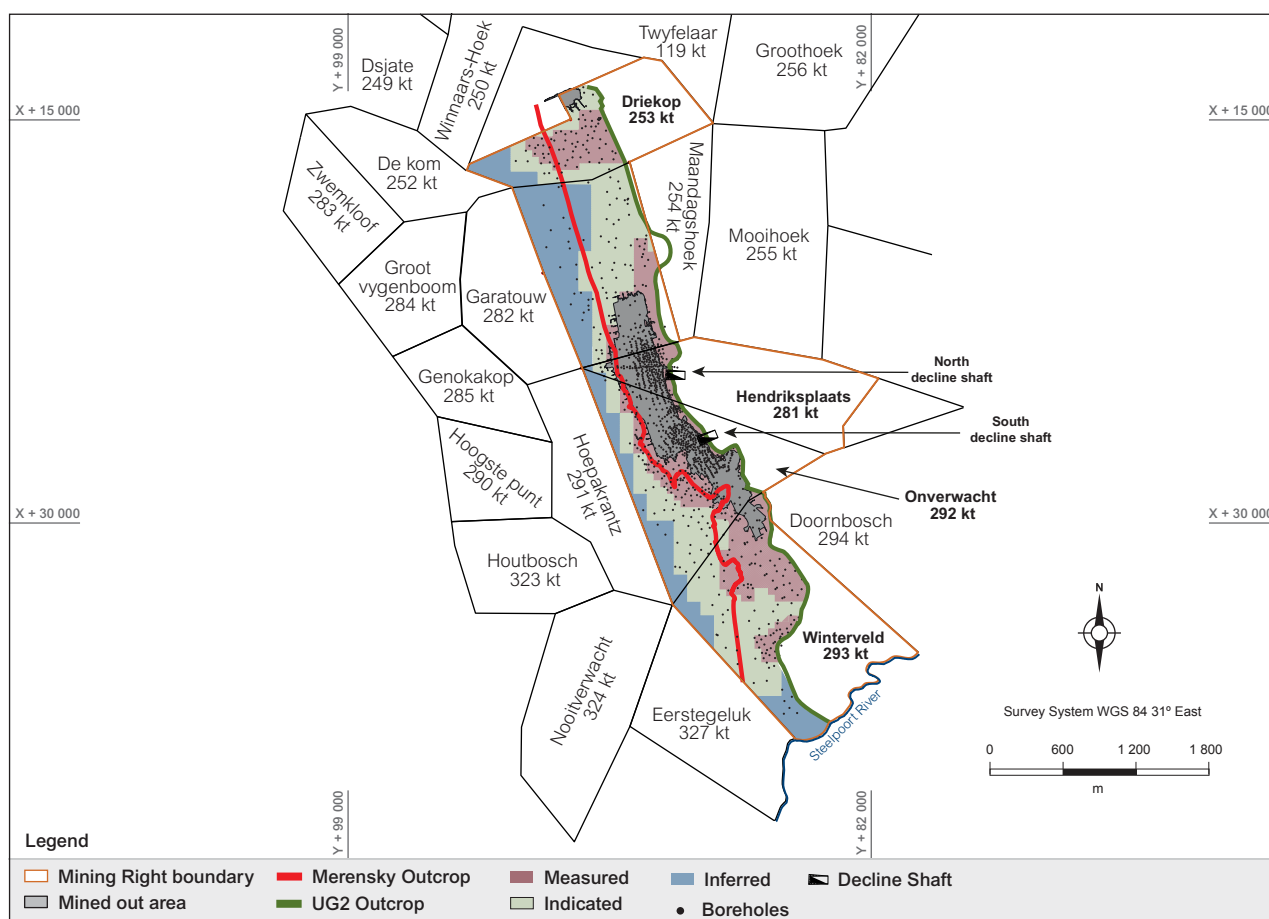
Price ranges (US\$/oz): **Pt**: 810–920; **Pd**: 1 150–1 900; **Rh**: 2 450–3 650; **Ru**: 220–260; **Ir**: 1 150–1 250; **Au**: 1 310–1 390.

Prices (US\$/tonne): **Cu**: 5 291–7 275; **Ni**: 13 007–14 110.

Exchange rate (R/US\$): 13.85–14.30.

Life-of-mine: >22 years.

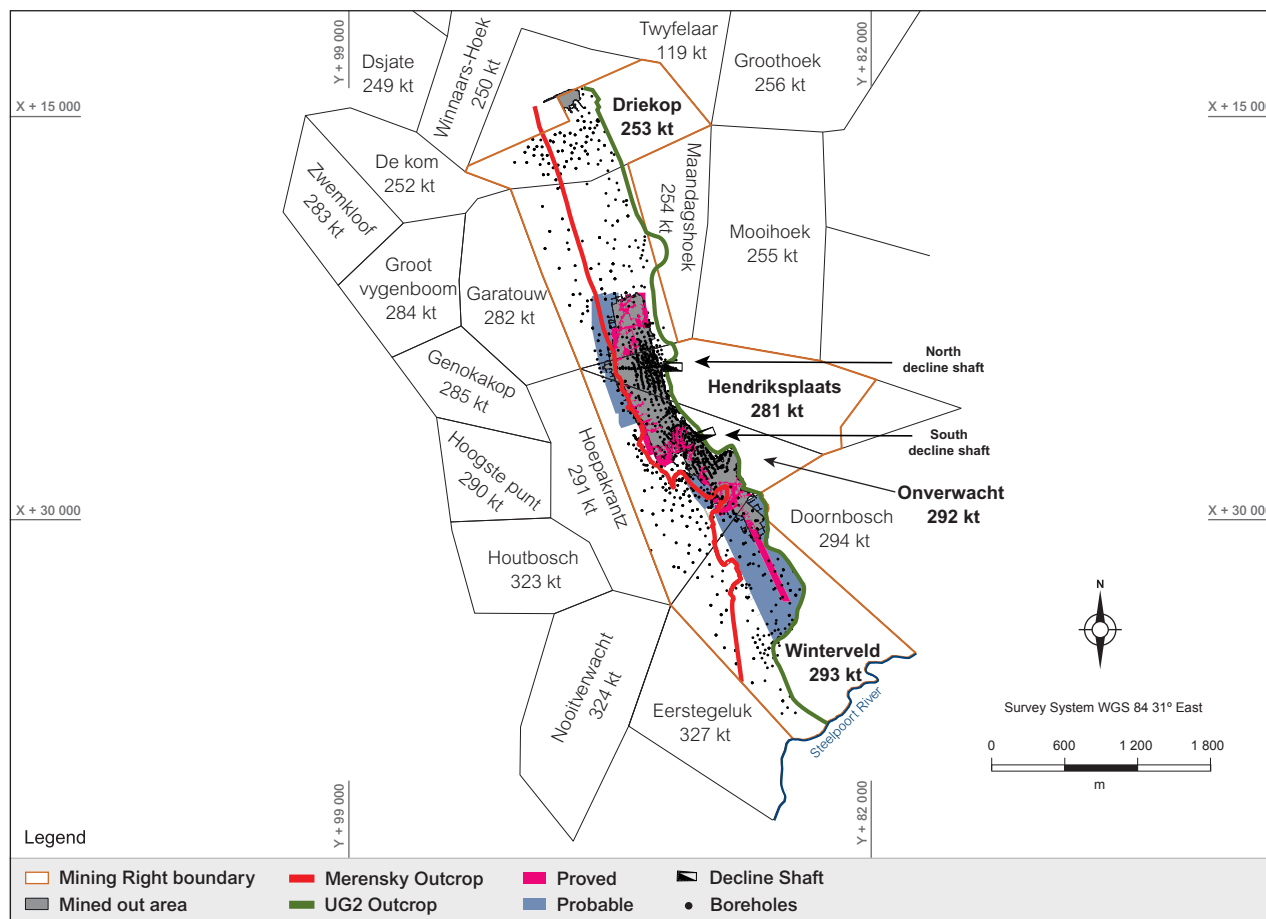
\* **Modikwa Platinum Mine attributable interests (ARM 41.5%; Modikwa communities 8.5%, Anglo American Platinum 50%).**

**MODIKWA PLATINUM MINE UG2 MINERAL RESOURCES CLASSIFICATION**



## ARM PLATINUM continued

## MODIKWA PLATINUM MINE UG2 MINERAL RESERVES CLASSIFICATION



## MODIKWA PLATINUM MINE: MERENSKY REEF MINERAL RESOURCES ESTIMATES AS AT 30 JUNE 2020

	Mineral Resources		
	Mt	4E g/t	4E Moz
* Mineral Resources are reported on a 100% basis.			
Measured	20.70	3.15	2.10
Indicated	53.88	2.90	5.02
<b>Total Measured and Indicated 2020</b>	<b>74.58</b>	<b>2.97</b>	<b>7.12</b>
Total Measured and Indicated 2019	74.27	2.78	6.63
<b>Inferred 2020</b>	<b>139.33</b>	<b>2.84</b>	<b>12.72</b>
Inferred 2019	138.59	2.65	11.83

4E = platinum + palladium + rhodium + gold.

Totals are rounded off.

**Key assumptions for Mineral Resources:**

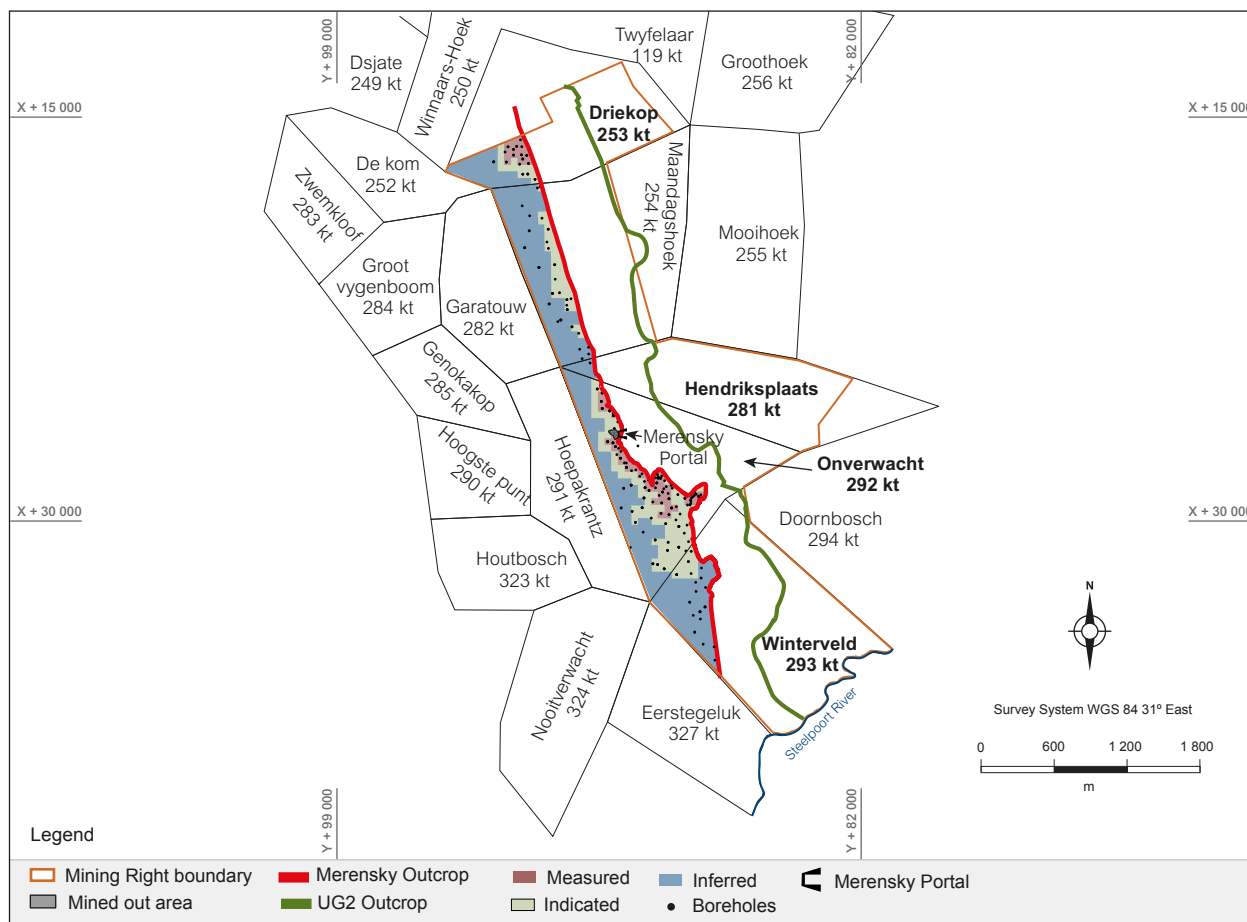
Geological loss factor applied: 10.91%–38.78%.

Grade and thickness cut-off: No cut-off grade applied but grades are >1.52 g/t (4E) and 1.02 metres.

\* Modikwa Platinum Mine attributable interests (ARM 41.5%; Modikwa communities 8.5%; Anglo American Platinum 50%).

## ARM PLATINUM continued

## MODIKWA PLATINUM MINE MERENSKY MINERAL RESOURCES CLASSIFICATION



## Year-on-year change

There was a net marginal decrease in Measured and Indicated Mineral Resources from 188.80 million tonnes at 5.93 g/t (4E) to 188 million tonnes at 5.92 g/t (4E) mainly due to production depletion, which was offset by additional tonnage from remodelling and re-evaluation.

Mineral Reserves decreased from 47.16 million tonnes at 4.34 g/t (4E) to 45.73 million tonnes at 4.22 g/t (4E) mainly due to mining depletion, mining design changes and adjustment of some modifying factors.

## HISTORICAL PRODUCTION AT MODIKWA PLATINUM MINE (UG2 REEF)

Financial year	ROM		Milled	
	Mt	Grade g/t (4E)	Mt	Grade g/t (4E)
2015/2016	2.08		2.05	
2016/2017	2.05	4.96	2.01	4.60
2017/2018	2.06	5.26	2.43	4.22
2018/2019	2.06	4.17	2.29	4.18
2019/2020	1.91	4.24	1.94	4.09



Additional information regarding production figures can be found in the ARM Platinum section of the 2020 ARM integrated annual report which can be found at [www.arm.co.za](http://www.arm.co.za).

## ARM PLATINUM continued

## NKOMATI NICKEL-COPPER- COBALT-PGM- CHROMITE MINE

ARM's attributable beneficial interest at Nkomati Mine is 50%. The other 50% is held by Norilsk Nickel Africa (Pty) Ltd.

### LOCALITY

Nkomati Nickel Mine is located approximately 300 kilometres east of Johannesburg in the Mpumalanga Province of South Africa. Situated at latitude 25°40'S and longitude 30°30'E, the mine is accessed via the national N4 highway between Johannesburg and Machadodorp, the R341 provincial road and the R351 tarred road.



Refer to page 1 for the locality map showing the Nkomati Mine.



### HISTORY

Nickel, copper, cobalt, PGM and chromite mineralisation is hosted by the Uitkomst Complex, a layered mafic-ultramafic, Bushveld satellite intrusion. The Uitkomst Complex outcrops on the farms Slaaihoek 540JT and Nkomati 770JT. In 1929, the Mineral Rights on Slaaihoek were purchased by ETC, an Anglovaal subsidiary, to mine gold at the old Mamre and Slaaihoek mines. In the early 1970s, an Anglo American/ INCO Joint Venture began exploring Uitkomst for nickel. In 1990, AngloAmerican (AAC) completed a feasibility study on an open-pit operation exploiting the large disseminated sulphide resource on Uitkomst, with negative results.

Exploration on Slaaihoek by Anglovaal began in 1989, and in 1991, the massive sulphide body (MSB) was discovered by surface drilling. In 1995, the Nkomati JV between Anglovaal and AAC was formed. In January 1997, underground production started on the MSB. In 2004, Anglovaal acquired AAC's interest and in 2005, following the merger of Anglovaal and ARM, a 50:50 JV was formed between ARM and LionOre, then a global nickel producer and owner of the Activox technology. In February 2006, Nkomati approved the Phase 1 expansion project to exploit the Main Mineralised Zone (MMZ), one of the disseminated sulphide orebodies, by underground and open-pit mining at a rate of 100 000 tonnes per month of ore to maintain annual nickel production

at approximately 5 000 tonnes in concentrate, after output from the MSB started declining. The project was completed in 2007. In the same year, Norilsk Nickel acquired LionOre, together with its 50% share in Nkomati. The MSB orebody is now mined out.

The Phase 2a expansion project, increasing MMZ ore production to 375 000 tonnes per month with the construction of a new plant, was commissioned during 2010. The Phase 2b expansion, involving the upgrading of the 100 000 tonnes per month MMZ plant to a 250 000 tonnes per month Chromititic Peridotite Mineralised Zone (PCMZ) plant, was completed during F2011. The PCMZ, which is being mined only in the open-pit, is a disseminated chromite-rich sulphide body within the Chromititic Peridotite (PCR) Unit (overlying the MMZ), which has to be treated separately to liberate the chromite fines.

Nkomati has also been producing lumpy chromite, chips and fines from the Oxidised Massive Chromitite since 2006, a layer which overlies the PCMZ orebody. A chrome washing plant to treat the fines stockpile was commissioned in 2008. In addition, the Oxidised PCR, which is the highly weathered PCR Unit immediately below the Oxidised Massive Chromitite, is being stockpiled for future processing for its chromite content.

## ARM PLATINUM continued

**COMPETENCE**

The following competent persons were involved in the estimation of Mineral Resources and Mineral Reserves for the Nkomati Mine. They are employed by Nkomati Mine.

Competent person	Professional organisation	Membership number	Qualifications	Relevant experience
N Strydom (Mineral Resources)	SACNASP	400148/04	NHD (Economic Geology), MBA	21 years
T Mogano (Mineral Reserves)	SAIMM	708776	Certificates in Advanced Mine Survey and Advanced Mine Valuation	10 years

**MINING AUTHORISATION**

Legal entitlement	Minerals covered by Mining Right	Comment	Period of Mining Right (years)	Known impediments on legal entitlement
Mining Rights MP 146 MR and MP 147 MR	Nickel, copper, cobalt, platinum, palladium, rhodium, iridium, ruthenium, osmium, gold, silver and other contained minerals and metals.	None	25 years: 6 June 2012 to 5 June 2037	None

**GEOLOGY**

Sulphide and chromite mineralisation occurs within the Uitkomst Complex, a Bushveld-age, layered, mafic-ultramafic intrusion, which concordantly intrudes dolomite/chert of the Malmani Subgroup and shales/quartzites of the Timeball Hill Formation. The Uitkomst Complex, which lies unconformably on an Archaean basement, is a north-west/south-east tubular shaped body which outcrops in the Slaaihoek Valley for approximately 9 kilometres before dipping at 4° below an escarpment where it has been drilled down-dip for another 4 kilometres and is still open-ended to the north west.

From the base to top, the stratigraphy of the Uitkomst Complex comprises the Basal Gabbro Unit (up to 15 metres thick), the Lower Pyroxenite Unit (average 35 metres), the Chromititic Peridotite Unit (30 to 60 metres), the Massive Chromitite Unit (up to 10 metres), the Peridotite Unit (330 metres), the Upper Pyroxenite Unit (65 metres), the Gabbro-norite Unit (250 metres), and the Upper Gabbro Unit

(50 metres). The complex and surrounding sediments are intruded by numerous diabase sills up to 30 metres in thickness.

Apart from the now mined-out Massive Sulphide Body (MSB), situated at and below the base of the Uitkomst Complex, there are three main economic sulphide mineralised zones:

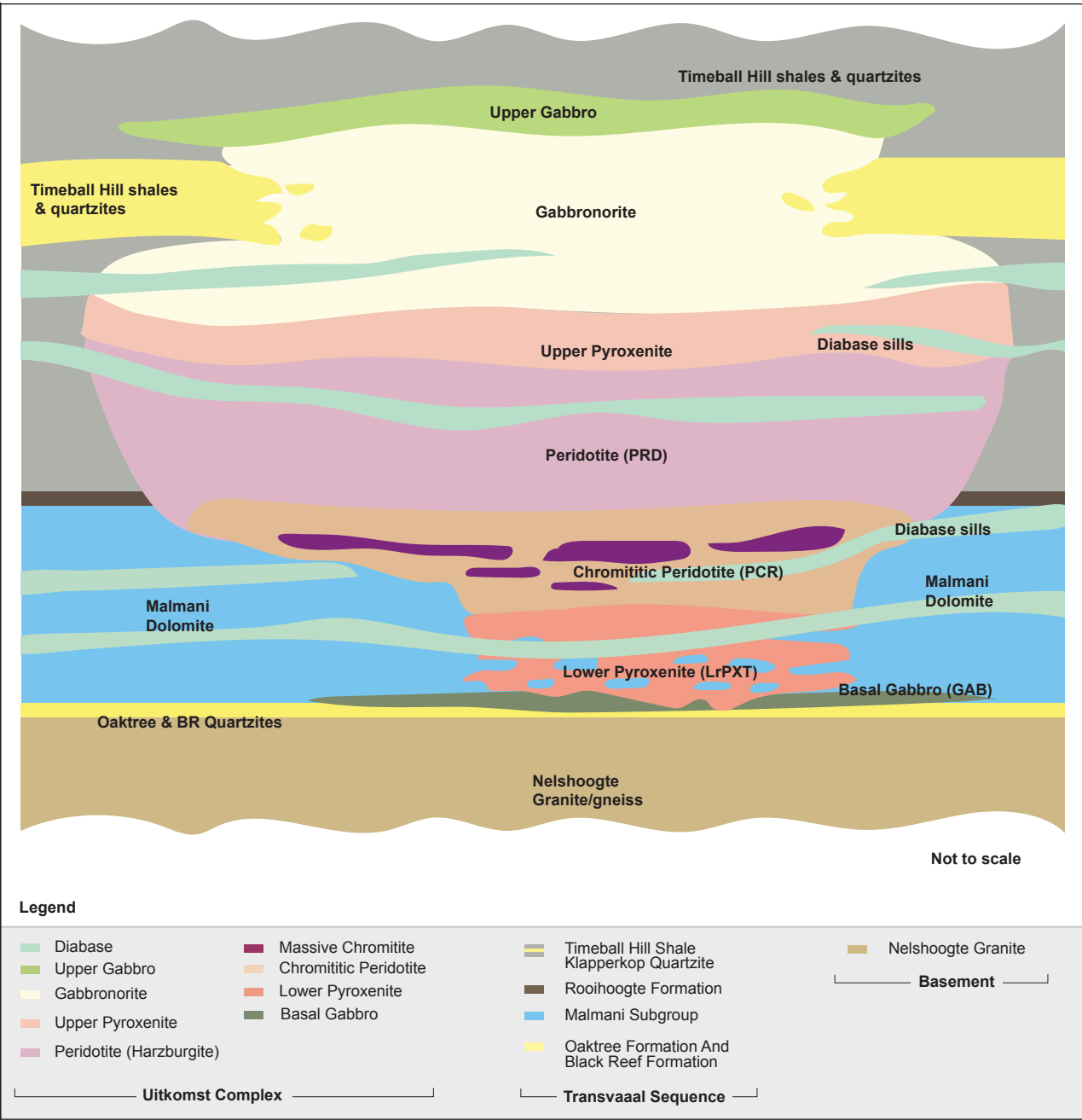
- The Basal Mineralised Zone (BMZ) within the Basal Gabbro
- The Main Mineralised Zone (MMZ) occurring within the Lower Pyroxenite Unit
- The Chromititic Peridotite Mineralised Zone (PCMZ) which occurs with the Chromititic Peridotite (PCR)

In addition, the Peridotite Unit contains the Peridotite Mineralised Zone (PRDMZ) which is a low-grade disseminated sulphide mineralisation zone not yet included in the mine's resource base. The dominant sulphide minerals are pyrrhotite, pentlandite and chalcopyrite. Cobalt is mostly in solid solution in the pentlandite, and the platinum group metals (PGMs) occur as separate minerals, with merenskyite being dominant. The current mined chromite is contained within the Massive Chromitite Unit (MCHR) in the open-pit area.



ARM PLATINUM continued

IDEALISED GEOLOGICAL SECTION OF UITKOMST COMPLEX



EXPLORATION ACTIVITIES

There was no exploration drilling conducted during this financial year. A total of 520 Reverse Circulation (RC) boreholes were drilled between 1 July 2019 and 30 June 2020 for the purposes of in-fill drilling and grade control in Open Pit 3. Total metres drilled were 37 777 metres at a cost of R15.5 million. There are no plans to resume exploration drilling in 2021.

MINING METHODS AND INFRASTRUCTURE

Mining operations comprise open-pit mining operation which feeds two concentrators (MMZ and PCMZ) producing concentrate containing PGMs, nickel, copper and cobalt. Previously, MMZ was also mined by underground mechanised mining methods but this operation is now on care and maintenance. Final products are transported to various third parties for toll smelting and refining. Chrome products from Oxidised Massive Chromitite and the PCMZ, produced from the chrome washing plant and the PCMZ plant, are sold to local and export markets.



## ARM PLATINUM continued

**MINERAL RESOURCES**

There has been numerous diamond, percussion and RC drilling campaigns since 1972. Consequently, various sampling and assaying protocols as well as varying standards of QA/QC have been used. Core sizes are mainly NQ and TNW. Before 1990 (Anglo American boreholes), half core samples over widths ranging from 1 metre to 5 metres were taken. Samples were assayed at the Anglo American Research Laboratory (AARL) for total nickel, copper and cobalt using Atomic Absorption (AA) and for 'sulphide' nickel using a peroxide leach/AA finish. Composite samples were assayed for platinum and palladium by Pb-collection fire-assay/ICP, S by combustion, and a range of major elements by fusion and density using the Archimedes bath method. Between 1990 and 1997 (Anglovaal boreholes), assays were carried out at the Anglovaal Research Laboratory (AVRL), with internal standard checks. Nickel analyses were also carried out by the partial digestion methods. Comparisons between AARL and AVRL were undertaken to ensure that the data was compatible.

In 2003, a 50 metre-spaced drilling programme was carried out in the shallow open-pit area. Samples from this drilling were analysed at AVRL for nickel, copper and cobalt using an aqua regia partial extraction/AA finish. Platinum, palladium, rhodium and gold were analysed by Pb-collection fire-assay/AA finish. Analyses also included  $\text{Cr}_2\text{O}_3$ ,  $\text{MgO}$ ,  $\text{FeO}$  and S. Density was also determined by gas pycnometer. Duplicates and internal standards were used and a suite of referee samples were analysed at the Genalysis Laboratory in Perth. Comparisons indicated good correlations between laboratories. In 2005, it was decided to resample many of the Anglo American drillholes to improve the sample density for PGEs in the open-pit area. Drill core was resampled (quarter core) at 1 metre intervals. Assays were carried out by the SGS Laboratory in Johannesburg for Pt, Pd and Au by Pb-collection fire-assay/AA finish and for Ni, Cu and Co by aqua regia leach/AA finish. Blanks, duplicates and standards were included for quality control.

In 2007/2008, a 50 metre in-fill diamond drilling programme (116 holes – 18 000 metres) was completed in the shallower part of Pit 3. In the Pit 2 area, another 44 holes (3 450 metres) were added to the database. Half-core samples from the Pit 3 drilling were analysed at Genalysis Laboratory Services in Perth for Ni, Cu and Co by aqua regia partial digestion/ICP finish; for Pt, Pd and Au by Pb-collection fire-assay/ICP finish; high chrome samples for  $\text{Cr}_2\text{O}_3$  by fusion/ICP and density by gas pycnometer. AMIS standards, duplicates and blank samples were used for internal QA/QC. Half-core samples from the Pit 2 drilling were analysed at Nkomati Mine's laboratory for Ni, Cu and Co by aqua regia partial digestion/AA finish.

The underground MMZ and PCMZ Mineral Resources are based on surface and underground diamond drilling as well as RC holes. Underground holes are spaced 10 to 20 metres apart and the drill core is sampled at 1 metre intervals. The Nkomati Mine laboratory analysed samples for Ni, Cu and Co using aqua regia leach/ICP finish, while the PGE assays are carried out by SGS and Mintek Laboratories in Johannesburg. Both laboratories use blanks, standards and check assays for quality control.

Geological wireframe models are generated from the entire borehole database (boreholes and RC holes) in Datamine

Studio 3. All data is used for the variography. Grade estimation is by Ordinary Kriging. In addition to the estimation of Ni, Pt, Pd, Rh, Au, Co and Cu, density is also estimated for each model cell. Block sizes for the resource model are at 50 x 50 x 2.5 metres for poorly informed areas, 25 x 25 x 2.5 metres for moderately informed areas and 12.5 x 12.5 x 2.5 metres for well-informed areas. Grade cut-offs used for the Mineral Resources are 0.16% Ni for MMZ and PCMZ (open-pit) and 0.30% Ni for MMZ and PCMZ (underground).

The underground and open-pit Mineral Resources were based on the 2016 and 2019 Mineral Resource models respectively, which were created on-mine and internally reviewed. An external audit was undertaken by MSA in March 2019 to review the open-pit Mineral Resource estimate. No fatal flaws or critical issues were identified. There were, however, some issues necessary to implement as well as some continuous improvement items which have since been addressed or are currently being implemented.

A three-dimensional approach to the Mineral Resource classification is applied. It allows for the classification of each block model cell based on a combination of model cell geostatistical parameters and geological confidence. The geostatistical parameters considered are search volume, Kriging variance, Kriging efficiency and regression slope. The geological confidence is based on geological continuity, influence of geological structures and the quality of geological data.

The Mineral Resources for Nkomati Mine have reasonable and realistic prospects for eventual economic extraction on the basis of the following:

- Location, quality, grade and geological continuity which are known and are supported by drilling information which includes sampling
- Appropriate grade cut-offs used for the Mineral Resources are 0.16% Ni for MMZ and PCMZ (open-pit) and 0.30% Ni for MMZ and PCMZ (underground). These grade cut-offs are based on material that can be processed in the current plants and on material that is economic now or historically
- Mining and processing methods are well established at the operation and are currently used to exploit the orebody
- All other considerations such as legal, infrastructural, environmental, marketing, social and economic factors are covered as part of the mining plan for the operation

**MINERAL RESERVES**

Mineral Reserves for the Nkomati open-pit area were derived from application of modifying factors to the Measured and Indicated Resources. The factors included mining method and design, mining recovery factors, mining dilution, plant recovery factors and mine optimisation at specific metal prices. Details of some of these parameters are provided as footnotes below the Mineral Reserves tables. The open-pit optimisation also considered the following parameters: mining cost, processing cost, services and supplementary cost, geotechnical slope parameters and environmental aspects.

Nkomati is scaling down in preparation for care and maintenance. Final cessation of production initially planned for September 2020 has been delayed to February 2021 due to lockdown and mining optimisations which have extended production marginally.

## ARM PLATINUM continued

## NKOMATI MINE: MINERAL RESOURCES ESTIMATES AS AT 30 JUNE 2020

* Mineral Resources are reported on a 100% basis.	Measured Resources						Indicated Resources						Measured and Indicated Resources						Inferred Resources					
	Mt	Ni%	Cu%	Co%	4E g/t	Cr <sub>2</sub> O <sub>3</sub> %	Mt	Ni%	Cu%	Co%	4E g/t	Cr <sub>2</sub> O <sub>3</sub> %	Mt	Ni%	Cu%	Co%	4E g/t	Cr <sub>2</sub> O <sub>3</sub> %	Mt	Ni%	Cu%	Co%	4E g/t	Cr <sub>2</sub> O <sub>3</sub> %
<b>Underground</b>																								
MMZ	10.04	0.57	0.20	0.03	1.19		37.37	0.48	0.21	0.02	1.19		47.41	0.50	0.21	0.02	1.19		6.30	0.41	0.20	0.02	1.26	
PCMZ	1.05	0.37	0.12	0.02	0.95	10.11	12.68	0.38	0.12	0.02	0.92	10.77	13.73	0.38	0.12	0.02	0.92	10.72	40.05	0.40	0.12	0.02	0.92	10.52
<b>Open-pit</b>																								
MMZ Pit 3	32.99	0.34	0.16	0.02	0.97		19.04	0.37	0.16	0.02	0.98		52.03	0.35	0.16	0.02	0.97							
PCMZ Pit 3	31.53	0.22	0.06	0.01	0.71	14.02	25.55	0.21	0.06	0.01	0.71	12.96	57.08	0.22	0.06	0.01	0.71	13.55						
<b>Total 2020 Mineral Resources</b>	<b>75.61</b>	<b>0.32</b>	<b>0.12</b>	<b>0.02</b>	<b>0.89</b>		<b>94.64</b>	<b>0.37</b>	<b>0.15</b>	<b>0.02</b>	<b>0.98</b>		<b>170.25</b>	<b>0.35</b>	<b>0.14</b>	<b>0.02</b>	<b>0.94</b>		<b>46.35</b>	<b>0.40</b>	<b>0.13</b>	<b>0.02</b>	<b>0.97</b>	
<b>Total 2019 Mineral Resources</b>	<b>81.10</b>	<b>0.32</b>	<b>0.12</b>	<b>0.02</b>	<b>0.88</b>		<b>94.64</b>	<b>0.37</b>	<b>0.15</b>	<b>0.02</b>	<b>0.98</b>		<b>175.74</b>	<b>0.35</b>	<b>0.14</b>	<b>0.02</b>	<b>0.94</b>		<b>46.35</b>	<b>0.40</b>	<b>0.13</b>	<b>0.02</b>	<b>0.97</b>	

4E = platinum + palladium + rhodium + gold.

The Measured and Indicated Mineral Resources are inclusive of those modified to produce Mineral Reserves.

Totals are rounded off.

**Key assumptions for Mineral Resources:**

Grade cut-off: Underground: 0.30% Ni MMZ and 0.30% Ni PCMZ. Open-pit: 0.16% Ni MMZ and 0.16% Ni PCMZ.

\* **Nkomati Mine attributable interests (ARM 50%; Norilsk Nickel Africa (Pty) Ltd 50%).**

## NKOMATI MINE: CHROMITE MINERAL RESOURCES ESTIMATES AS AT 30 JUNE 2020

* Mineral Resources are reported on a 100% basis.	Measured Resources		Indicated Resources		Measured and Indicated Resources		Inferred Resources	
	Mt	Cr <sub>2</sub> O <sub>3</sub> %	Mt	Cr <sub>2</sub> O <sub>3</sub> %	Mt	Cr <sub>2</sub> O <sub>3</sub> %	Mt	Cr <sub>2</sub> O <sub>3</sub> %
<b>Oxidised Massive Chromitite Pit 3 2020</b>	<b>0.13</b>	<b>27.16</b>	<b>0.05</b>	<b>23.28</b>	<b>0.18</b>	<b>26.08</b>		
Oxidised Massive Chromitite Pit 3 2019	0.13	27.16	0.05	23.28	0.18	26.08		
<b>Un-oxidised (fresh) Massive Chromitite Pit 3 2020</b>	<b>0.12</b>	<b>25.14</b>	<b>0.21</b>	<b>24.42</b>	<b>0.33</b>	<b>24.68</b>		
Un-oxidised (fresh) Massive Chromitite Pit 3 2019	0.12	25.26	0.21	24.42	0.33	24.73		

Totals are rounded off.

**Key assumptions for Mineral Resources:**

Grade cut-off: 20% Cr<sub>2</sub>O<sub>3</sub>.

\* **Nkomati Mine attributable interests (ARM 50%, Norilsk Nickel Africa (Pty) Ltd 50%).**



## ARM PLATINUM continued

## NKOMATI MINE: MINERAL RESERVES ESTIMATES AS AT 30 JUNE 2020

* Mineral Reserves are reported on a 100% basis.	Proved Reserves						Probable Reserves						Total Reserves					
	Mt	Ni%	Cu%	Co%	4E g/t	Cr <sub>2</sub> O <sub>3</sub> %	Mt	Ni%	Cu%	Co%	4E g/t	Cr <sub>2</sub> O <sub>3</sub> %	Mt	Ni%	Cu%	Co%	4E g/t	Cr <sub>2</sub> O <sub>3</sub> %
<b>Open-pit</b>																		
MMZ Pit 3	1.35	0.37	0.17	0.02	1.09								1.35	0.37	0.17	0.02	1.09	
PCMZ Pit 3	0.04	0.24	0.09	0.01	0.92	6.29							0.04	0.24	0.09	0.01	0.92	6.29
<b>Total Mineral Reserves 2020</b>	<b>1.39</b>	<b>0.37</b>	<b>0.17</b>	<b>0.02</b>	<b>1.09</b>								<b>1.39</b>	<b>0.37</b>	<b>0.17</b>	<b>0.02</b>	<b>1.09</b>	
Total Mineral Reserves 2019	6.48	0.30	0.12	0.02	0.91		0.31	0.28	0.11	0.02	0.89		6.79	0.30	0.12	0.02	0.91	

4E = platinum + palladium + rhodium + gold.

Totals are rounded off.

Modifying factors for the conversion of Mineral Resources to Mineral Reserves include:

Average plant recovery: 68%.

Price ranges (US\$): **Ni**: 11 646; **Cu**: 5 213/t; **Co**: 17/lb; **Pt**: 814/oz; **Pd**: 2 390/oz; **Au**: 1 732/oz.

Exchange rate (R/US\$): 17.43.

Grade cut-off: **Open-pit**: 0.16% Ni MMZ and 0.16% Ni PCMZ.

Life-of-mine: 3 months. Currently under review to incorporate recent mining optimisation work.

\* **Nkomati Mine attributable interests (ARM 50%; Norilsk Nickel Africa (Pty) Ltd 50%).**

## NKOMATI MINE: MMZ STOCKPILE MINERAL RESERVES ESTIMATES AS AT 30 JUNE 2020

* Mineral Reserves are reported on a 100% basis.	Proved Reserves						Probable Reserves						Total Reserves					
	Mt	Ni%	Cu%	Co%	4E g/t	Cr <sub>2</sub> O <sub>3</sub> %	Mt	Ni%	Cu%	Co%	4E g/t	Cr <sub>2</sub> O <sub>3</sub> %	Mt	Ni%	Cu%	Co%	4E g/t	Cr <sub>2</sub> O <sub>3</sub> %
<b>MMZ stockpiles 2020</b>	<b>0.20</b>	<b>0.25</b>	<b>0.19</b>	<b>0.03</b>	<b>1.16</b>								<b>0.20</b>	<b>0.25</b>	<b>0.19</b>	<b>0.03</b>	<b>1.16</b>	
MMZ stockpiles 2019	0.20	0.27	0.19	0.03	1.04								0.20	0.27	0.19	0.03	1.04	

4E = platinum + palladium + rhodium + gold.

Totals are rounded off.

Grade cut-off: 0.16% Ni.

\* **Nkomati Mine attributable interests (ARM 50%; Norilsk Nickel Africa (Pty) Ltd 50%).**

## NKOMATI MINE: PCMZ STOCKPILE MINERAL RESERVES ESTIMATES AS AT 30 JUNE 2020

* Mineral Reserves are reported on a 100% basis.	Proved Reserves						Probable Reserves						Total Reserves					
	Mt	Ni%	Cu%	Co%	4E g/t	Cr <sub>2</sub> O <sub>3</sub> %	Mt	Ni%	Cu%	Co%	4E g/t	Cr <sub>2</sub> O <sub>3</sub> %	Mt	Ni%	Cu%	Co%	4E g/t	Cr <sub>2</sub> O <sub>3</sub> %
<b>PCMZ stockpiles 2020</b>	<b>0.36</b>	<b>0.20</b>	<b>0.06</b>	<b>0.01</b>	<b>0.67</b>	<b>13.33</b>							<b>0.36</b>	<b>0.20</b>	<b>0.06</b>	<b>0.01</b>	<b>0.67</b>	<b>13.33</b>
PCMZ stockpiles 2019	0.60	0.19	0.05	0.01	0.66	14.50							0.60	0.19	0.05	0.01	0.66	14.50

4E = platinum + palladium + rhodium + gold.

Totals are rounded off.

Grade cut-off: 0.16% Ni.

\* **Nkomati Mine attributable interests (ARM 50%; Norilsk Nickel Africa (Pty) Ltd 50%).**

## NKOMATI MINE: CHROMITE STOCKPILE MINERAL RESERVES ESTIMATES AS AT 30 JUNE 2020

* Mineral Reserves are reported on a 100% basis.	Proved Reserves		Probable Reserves		Total Reserves	
	Mt	Cr <sub>2</sub> O <sub>3</sub> %	Mt	Cr <sub>2</sub> O <sub>3</sub> %	Mt	Cr <sub>2</sub> O <sub>3</sub> %
PCR stockpile	1.00	19.20			1.00	19.20
Fresh – massive chrome	0.05	22.00			0.05	22.00
<b>Total stockpile Reserves 2020</b>	<b>1.05</b>	<b>19.33</b>			<b>1.05</b>	<b>19.33</b>
Total stockpile Reserves 2019	1.77	19.37			1.77	19.37

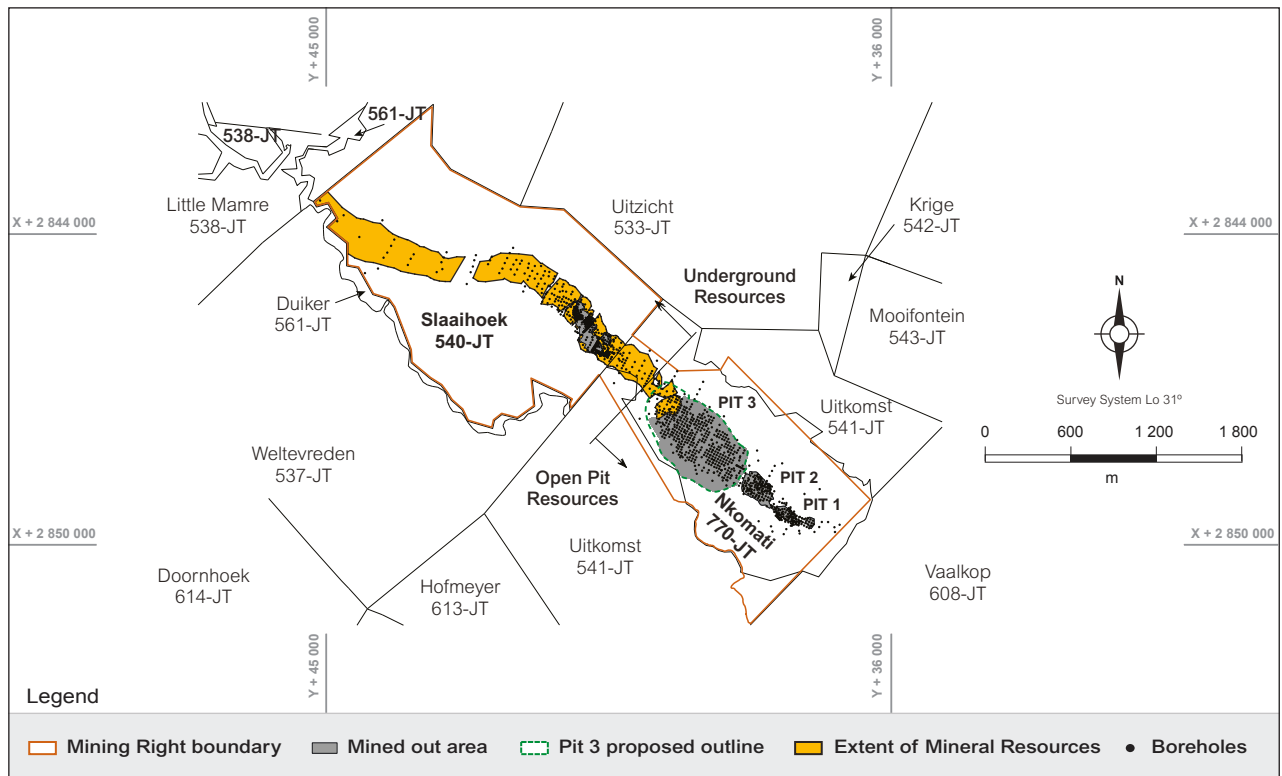
Totals are rounded off.

Grade cut-off: 20% Cr<sub>2</sub>O<sub>3</sub>.

\* **Nkomati Mine attributable interests (ARM 50%; Norilsk Nickel Africa (Pty) Ltd 50%).**

## ARM PLATINUM continued

## NKOMATI MINE MINERAL RESOURCES MAP



## Year-on-year change

The Measured and Indicated Mineral Resources for Nkomati Mine decreased from 175.74 million tonnes at 0.35% Ni to 170.25 million tonnes at 0.35% Ni mainly due to mining production. The Mineral Reserves in the open-pit area decreased from 6.79 million tonnes at 0.30% Ni to 1.39 million tonnes at 0.37% Ni mainly as a result of mining depletion.

## HISTORICAL PRODUCTION AT NKOMATI NICKEL MINE (MMZ AND PCMZ)

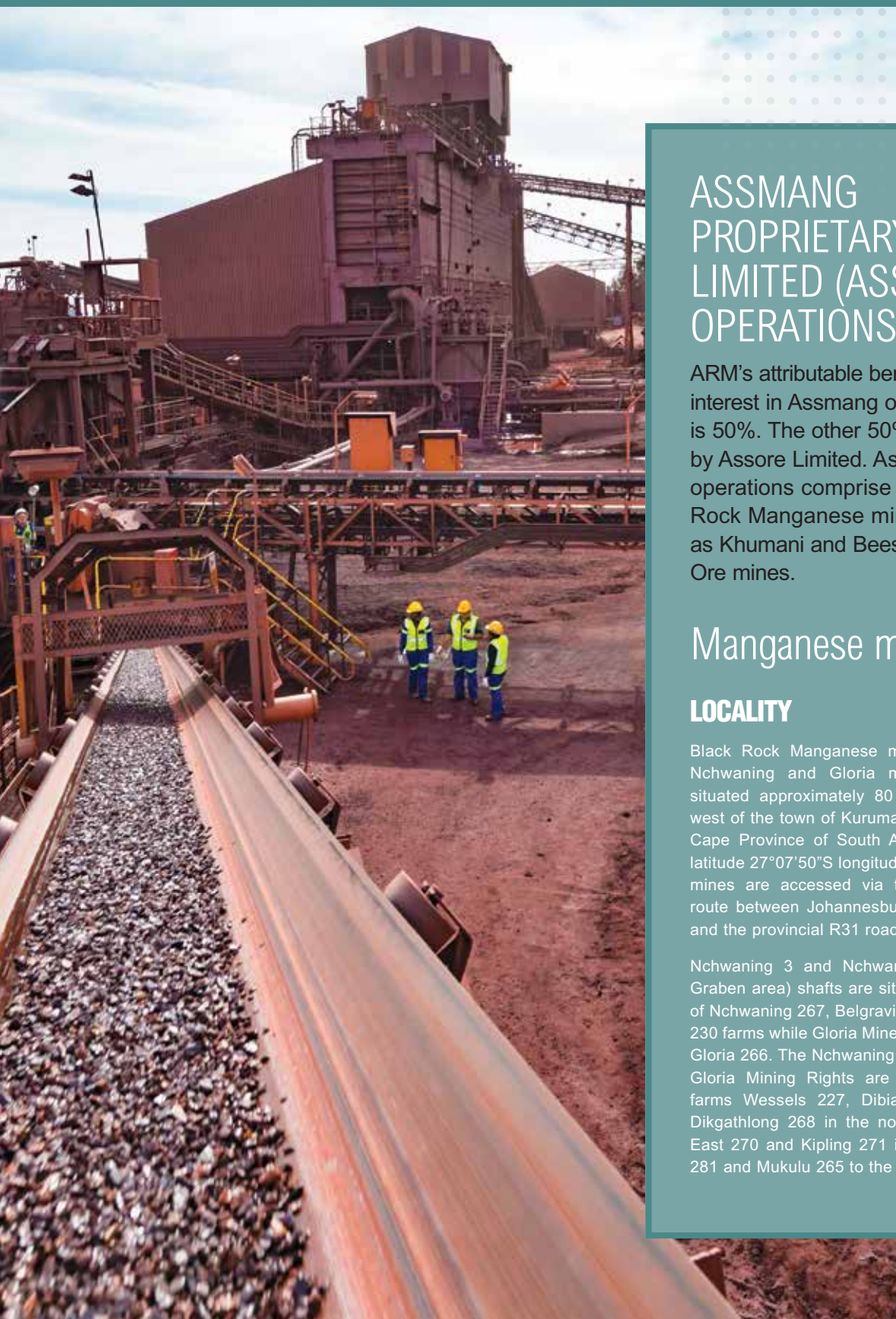
Financial year	ROM		Milled	
	Mt	Ni%	Mt	Ni%
2015/2016	7.61		8.24	
2016/2017	5.20	0.38	7.49	0.30
2017/2018	5.90	0.26	8.04	0.24
2018/2019	7.09	0.28	8.15	0.26
2019/2020	5.18	0.27	6.62	0.25



Additional information regarding production figures can be found in the ARM Platinum section of the 2020 ARM integrated annual report which can be found at [www.arm.co.za](http://www.arm.co.za).



# ARM FERROUS



## ASSMANG PROPRIETARY LIMITED (ASSMANG) OPERATIONS

ARM's attributable beneficial interest in Assmang operations is 50%. The other 50% is held by Assore Limited. Assmang operations comprise Black Rock Manganese mines as well as Khumani and Beeshoek Iron Ore mines.

## Manganese mines

### LOCALITY

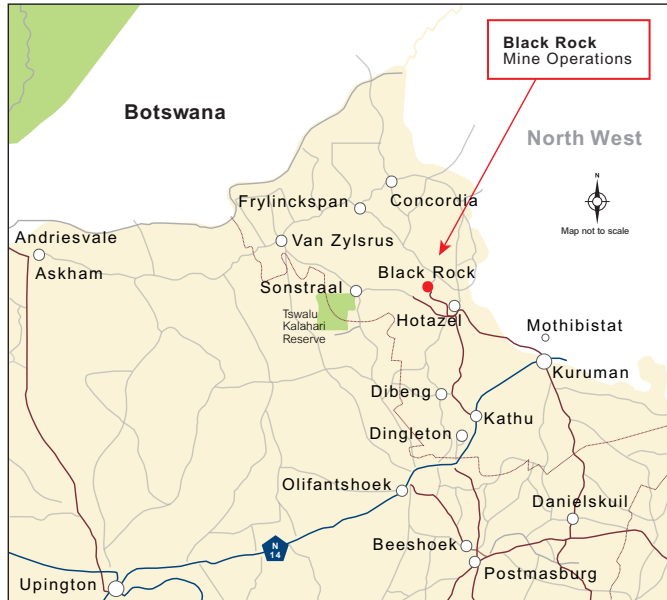
Black Rock Manganese mines encompass Nchwaning and Gloria mines which are situated approximately 80 kilometres north west of the town of Kuruman in the Northern Cape Province of South Africa. Located at latitude 27°07'50"S longitude 22°50'50"E, the mines are accessed via the national N14 route between Johannesburg and Kuruman, and the provincial R31 road.

Nchwaning 3 and Nchwaning 2 (including Graben area) shafts are situated on portions of Nchwaning 267, Belgravia 264 and Santoy 230 farms while Gloria Mine is on Portion 1 of Gloria 266. The Nchwaning and the adjoining Gloria Mining Rights are bounded by the farms Wessels 227, Dibiaghomo 226 and Dikgathlong 268 in the north, Rhodes 269, East 270 and Kipling 271 in the east, Umtu 281 and Mukulu 265 to the south.



## ARM FERROUS continued

### LOCALITY MAP OF BLACK ROCK MANGANESE OPERATIONS



### HISTORY

In 1940, Assmang acquired a manganese ore outcrop on a small hillock known as Black Rock. Several large properties underlain by ore were subsequently found and acquired. Today, the Black Rock area is considered to be one of the largest and richest manganese deposits in the world. Manganese mining operations were extended and today include the Gloria and Nchwaning underground mines. Manganese ore is supplied locally to the Assmang-owned Cato Ridge Smelter, and is exported through Port Elizabeth, Durban and Richards Bay.

### COMPETENCE

The following competent persons were involved in the estimation of Black Rock Mineral Resources and Mineral Reserves. They are employed by Assmang.

Competent person	Professional organisation	Membership number	Qualifications	Relevant experience
B Ruzive (Mineral Resources)	SACNASP	400238/07	BSc, BSc Hons (Geology), MSc (Exploration Geology), MBA	20 years
J Smuts (Mineral Reserves)	ECSA	201270097	B Tech (Mining Engineering)	9 years

### MINING AUTHORISATION

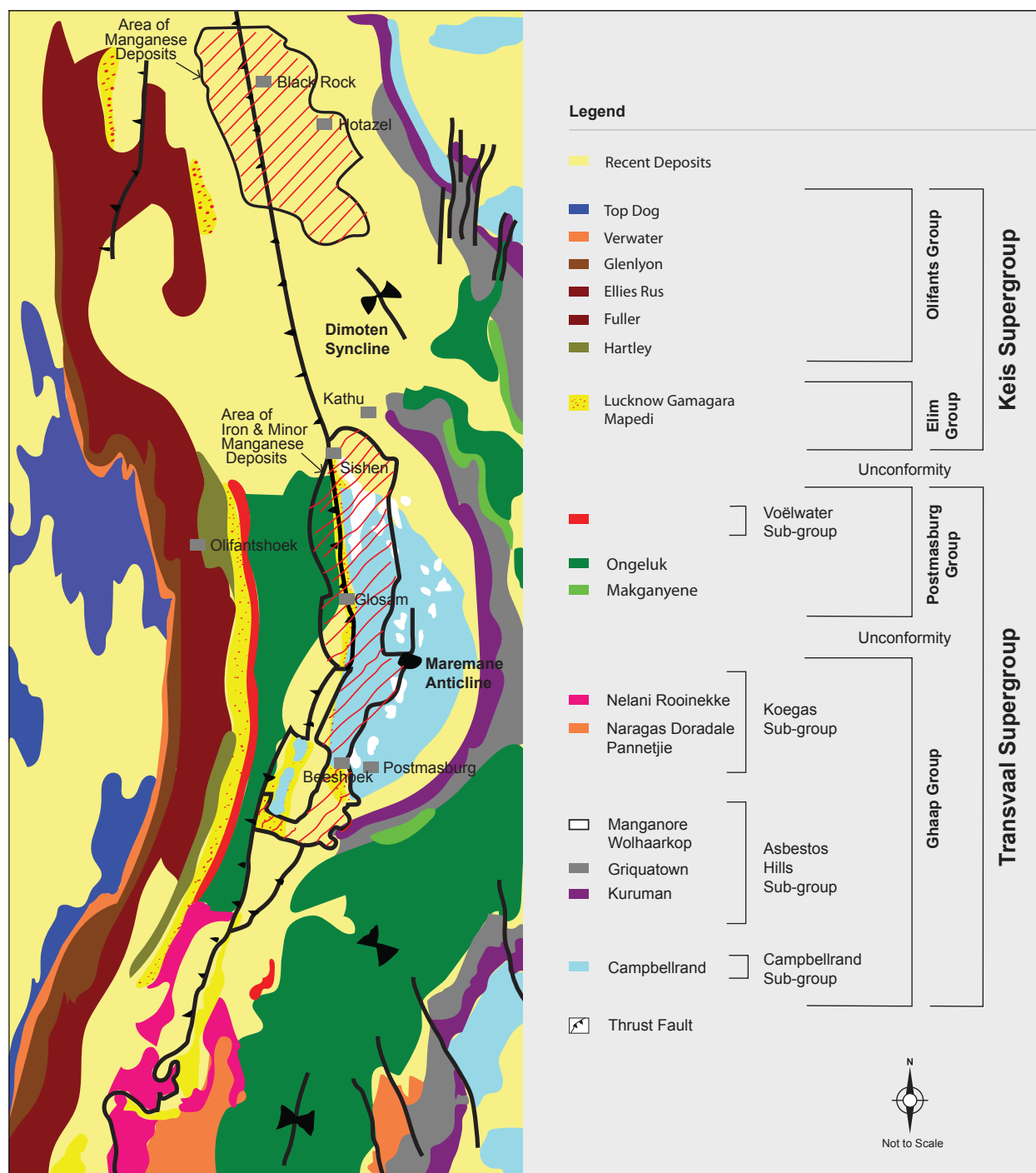
Legal entitlement	Minerals covered by Mining Right	Comment	Period of Mining Right (years)	Known impediments on legal entitlement
Mining Right NC 30/5/1/2/2/203 MRC	Manganese ore	None	30 years: 13 July 2011 to 12 July 2041	None

### GEOLOGY

The manganese ores of the Kalahari Manganese Field are contained within sediments of the Hotazel Formation in the Postmasburg Group of the Griqualand West Sequence, a sub-division of the Proterozoic Transvaal Supergroup. The Griqualand West Sequence comprises a basal dolomite and banded ironstones dominating the Ghaap, Postmasburg and the Olifantshoek Groups. The Postmasburg Group consists of basal basaltic andesites of the Ongeluk lava and banded ironstone and manganese of the Hotazel Formation.

## ARM FERROUS continued

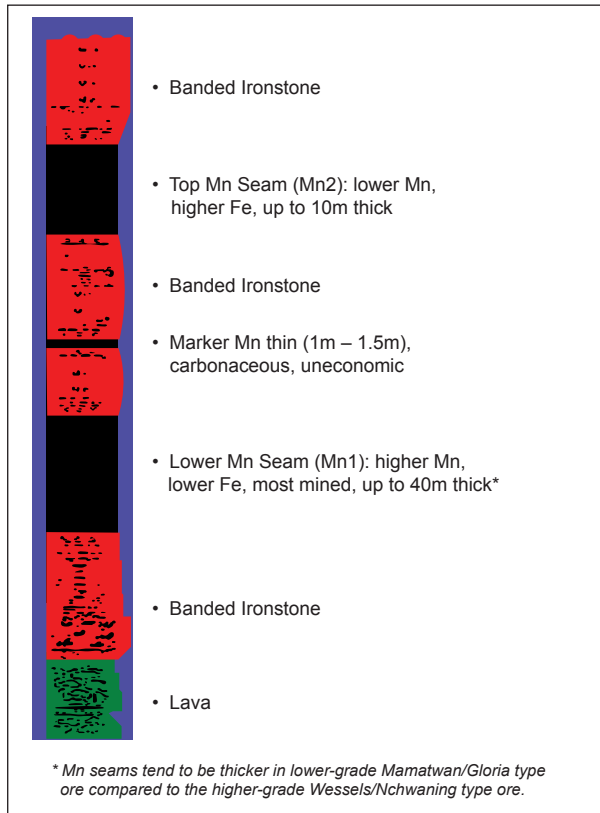
## REGIONAL GEOLOGICAL MAP



On Belgravia, Santoy and Nchwaning farms the Hotazel Formation and overlying Mapedi shales and Lucknow quartzite sequences have been duplicated by thrusting. The thrustured orebodies were mined from surface at the Kalahari Manganese Field discovery outcrop, the Black Rock Koppie and at two other down dip interconnected Belgravia 1 and Belgravia 2 shafts. Mining reached depths of approximately 200 metres. The manganese resources hosted in the thrustured orebodies are reported, collectively, under Black Rock (Koppie area) orebodies. The average thickness of the Hotazel Formation is approximately 75 metres, with the banded iron formation (BIF) hosted manganese orebodies occurring as three stratabound and stratiform units of variable thickness. The lowermost orebody (Seam 1) is of a higher grade in comparison to the topmost orebody (Seam 2). Seam 3, which occurs inbetween Seams 1 and 2, is thin and uneconomic.

## ARM FERROUS continued

### GENERALISED STRATIGRAPHY OF MANGANESE UNITS IN THE HOTAZEL FORMATION



The manganese orebodies exhibit a complex mineralogy and more than 200 ore and gangue mineral species have been identified. Hydrothermal upgrading has resulted in zoning of the orebody adjacent to fault positions in most instances. Distal areas exhibit more original and low-grade kutnohorite and braunite assemblages, while areas immediately adjacent to faults typically exhibit high-grade hausmannite rich ore. The intermediate areas exhibit mineralogy which includes bixbyite, braunite and jacobsonite among a host of other manganese-bearing minerals. Similar zonation also exists in the vertical sense.

At the top and bottom contacts it is common to have high iron (Fe) and low manganese (Mn) contents while the reverse is true towards the centre of the seam. This vertical zoning has given rise to a mining practice where only the 4.0 to 5.0 metre-high centre portion of the seam is being mined.

### EXPLORATION ACTIVITIES

At Nchwaning a total of nine boreholes were completed with a total meterage of 4 061 metres. Total expenditure on the drilling of these boreholes was R6.14 million. The boreholes have all intersected the Hotazel Formation. These results will be used in updating the Seam 1 and 2 Mineral Resource in this area. Plans for the next phase of exploration is to drill in the southern part of Nchwaning 3 and the Graben areas with the objective of resolving structural complexities in the two areas.

A total of 5 035 metres was drilled at Gloria Mine at a cost of R6.38 million. All completed boreholes intersected the Hotazel

Formation with all the three manganese seams preserved. Only one borehole did not intersect the seams as it went through a dyke. There are plans to drill the north-western part of Gloria to upgrade the Inferred Mineral Resource in the area.

### MINING METHODS AND INFRASTRUCTURE

Trackless mechanised equipment is used in the Bord and Pillar mining method. Two manganese seams are mined. The lowermost (Seam 1) at Nchwaning 3 is up to 6 metres thick, of which up to 5 metres is mined. There is, therefore, minimum dilution. Mining of Nchwaning Seam 2 has also been done on an optimum cut of 4.0 metres. Gloria Seam 1 is approximately 14 metres thick, but only an optimum cut of 4.0 metres is mined. No mining has been undertaken to date on Gloria Seam 2.

### NCHWANING MINE MINERAL RESOURCES

Nchwaning Mine was diamond drilled from surface at 330 metre grid centres and the data is captured in a Geological Database Management System (GDMS) developed by Datamine. The core is logged and 0.5 metre-long, half-core, diamond-saw cut samples are submitted to Assmang's laboratory at Black Rock for X-ray fluorescence (XRF) analyses. Mn and Fe values are checked by Wet Chemical analyses. Several standards are used to calibrate the XRF equipment, and results are compared with other laboratories on a regular basis.

At Nchwaning, boreholes and underground sample sections were considered in the geological modelling and grade estimation for Nchwaning Seams 1 and 2. The geological modelling and the grade estimation was undertaken using Datamine Studio 3 and Datamine Strat 3D software. The resource models were built on 50 metre x 50 metre x optimal mineable cut. The optimal mineable cuts were 4 to 5 metres for Nchwaning Seams. The blocks were sub-split in the X and Y directions to accurately follow the geological boundaries.

Statistical and geostatistical analysis was done on the following variables: Mn, Fe,  $Al_2O_3$ , BaO, CaO,  $K_2O$ , MgO,  $Na_2O$ , P, S and  $SiO_2$ . Ordinary Kriging interpolation within Datamine Studio 3 was used to estimate the grade of each block. Borehole and/or underground sample data composited to the optimal mineable cut was used in the estimation of grades.

The relative density of the Nchwaning manganese Seams 1 and 2 was determined as 4.3 t/m<sup>3</sup> in the past and the figure has been applied historically as a default density. Recent work of measuring density of borehole cores of manganese Seams 1 and 2 using Archimedes principles has resulted in the accumulation of sufficient data to determine new densities. The measurements have resulted in the following changes to the densities:

- Nchwaning Seam 1 (high-grade domain) historical density of 4.3 t/m<sup>3</sup> has remained unchanged
- Nchwaning Seam 1 (low-grade domain) – historical density has been reduced from 4.3 t/m<sup>3</sup> to 4.0 t/m<sup>3</sup>
- Nchwaning Seam 2 – density has increased from the historical figure of 4.3 t/m<sup>3</sup> to 4.4 t/m<sup>3</sup>

As more density data is collected, it is planned that the next Mineral Resource model will have density estimated for each block in the Mineral Resource model.

## ARM FERROUS continued

Mineral Resource classification at Nchwaning Mine is based on a number of parameters: Kriging variance, Kriging efficiency, regression slope, geological continuity of the manganese seams, geological structures and quality of assay data. Each of these parameters contributes to the overall classification. Measured and Indicated Resources have been declared for Nchwaning.

The Mineral Resources declared have reasonable and realistic prospects for eventual economic extraction having considered the following:

- Location, quality, grade and geological continuity which are known and are supported by drilling information which includes sampling
- Only manganese seams greater than 2 metres thick with a grade of approximately 30% Mn and above are considered as Mineral Resources
- Mining and processing methods are well established at the operation and are currently used to exploit the orebody
- All other factors such as legal, infrastructural, environmental, marketing, social and economic factors are covered as part of the mining plan for the operation

## NCHWANING MINE MINERAL RESERVES

Conversion of the Mineral Resources to Mineral Reserves is done for the Measured and Indicated Mineral Resources. The main modifying factors for the conversion are: plant recovery factor, manganese prices and mining extraction factors. Details of these factors are listed below the Mineral Reserves tables.

Mining in the eastern extremity of Nchwaning occurs at a depth of 200 metres, while the deepest (current) excavations are 519 metres below surface. Ore from Nchwaning No 2 Mine is crushed underground before being hoisted to a surface stockpile via a vertical shaft. Similarly, ore from the Nchwaning No 3 Mine is crushed underground before being conveyed to a surface stockpile via a declined conveyor system. Ore is withdrawn from the surface stockpile and undergoes two stages of crushing, dry screening and wet screening to yield lumpy and fine products.

At the plant, the finer fractions are stockpiled while the coarser fractions are extracted from the respective product boxes into road haulers, sampled, weighed and stored on stacks ahead of despatch. Samples from each stack are analysed for chemical content and size distribution. This ensures good quality control and enables the ore control department to blend various stacks according to customer requirements.

## NCHWANING MINE: SEAM 1 MANGANESE MINERAL RESOURCES AND MINERAL RESERVES ESTIMATES AS AT 30 JUNE 2020

* Mineral Resources and Mineral Reserves are reported on a 100% basis.	Mineral Resources				Mineral Reserves		
	Mt	Mn%	Fe%		Mt	Mn%	Fe%
Measured	84.88	44.71	8.94	Proved	37.51	44.29	8.94
Indicated	41.12	39.87	7.62	Probable	23.06	42.68	8.17
<b>Total Measured and Indicated (Seam 1) 2020</b>	<b>126.00</b>	<b>43.13</b>	<b>8.51</b>	<b>Total Reserves (Seam 1) 2020</b>	<b>60.57</b>	<b>43.68</b>	<b>8.65</b>
Total Measured and Indicated (Seam 1) 2019	131.16	43.09	8.61	Total Reserves (Seam 1) 2019	68.76	43.30	8.66

The Measured and Indicated Mineral Resources are inclusive of those modified to produce Mineral Reserves.

Totals are rounded off.

**Key assumptions for Mineral Resources:**

True thickness cut-off: 4.0 metres–5.0 metres.

Density: Low grade domain: 4.0 t/m<sup>3</sup>; high grade domain: 4.3 t/m<sup>3</sup>.

**Modifying factors for the conversion of Mineral Resources to Mineral Reserves include:**

Cut-off grade: 35% Mn.

Tramming loss factor: 1%.

Plant recovery: 91%.

Mine extraction factor: 68%–78%.

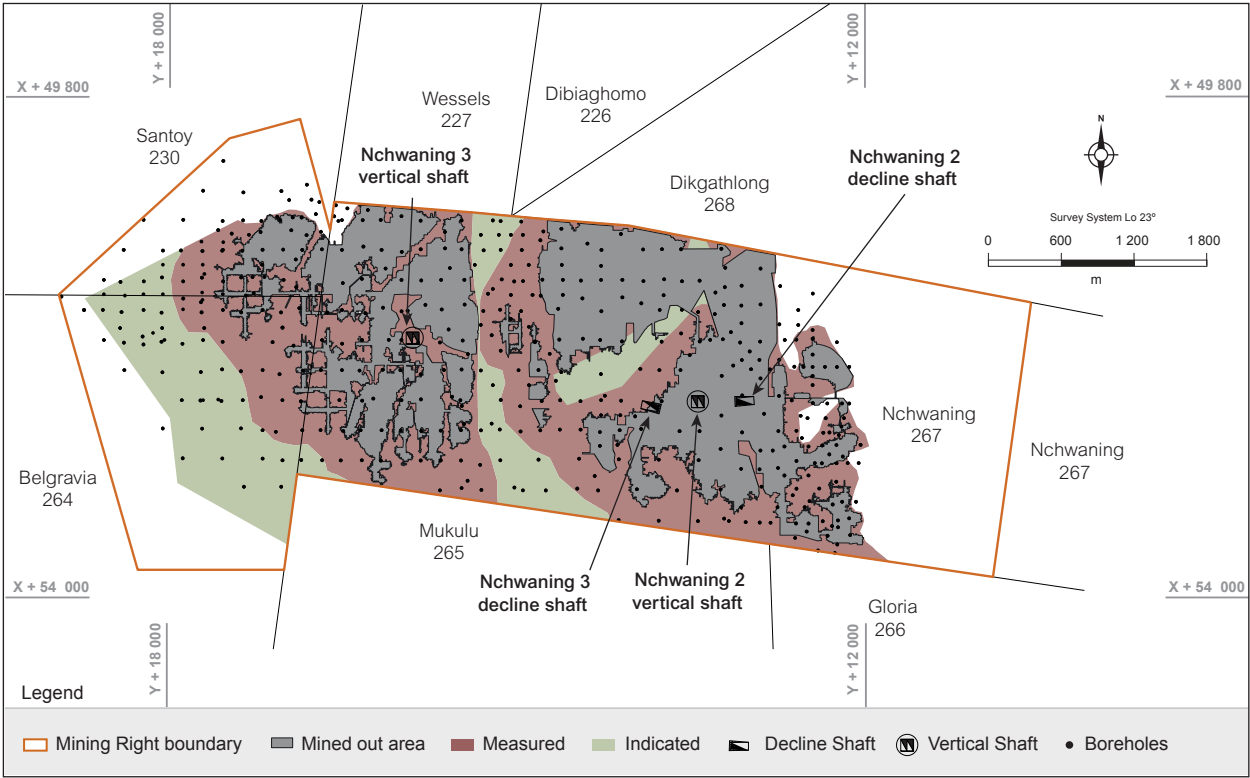
Price ranges: Based on market-related long-term view.

Exchange rate used: Market-related.

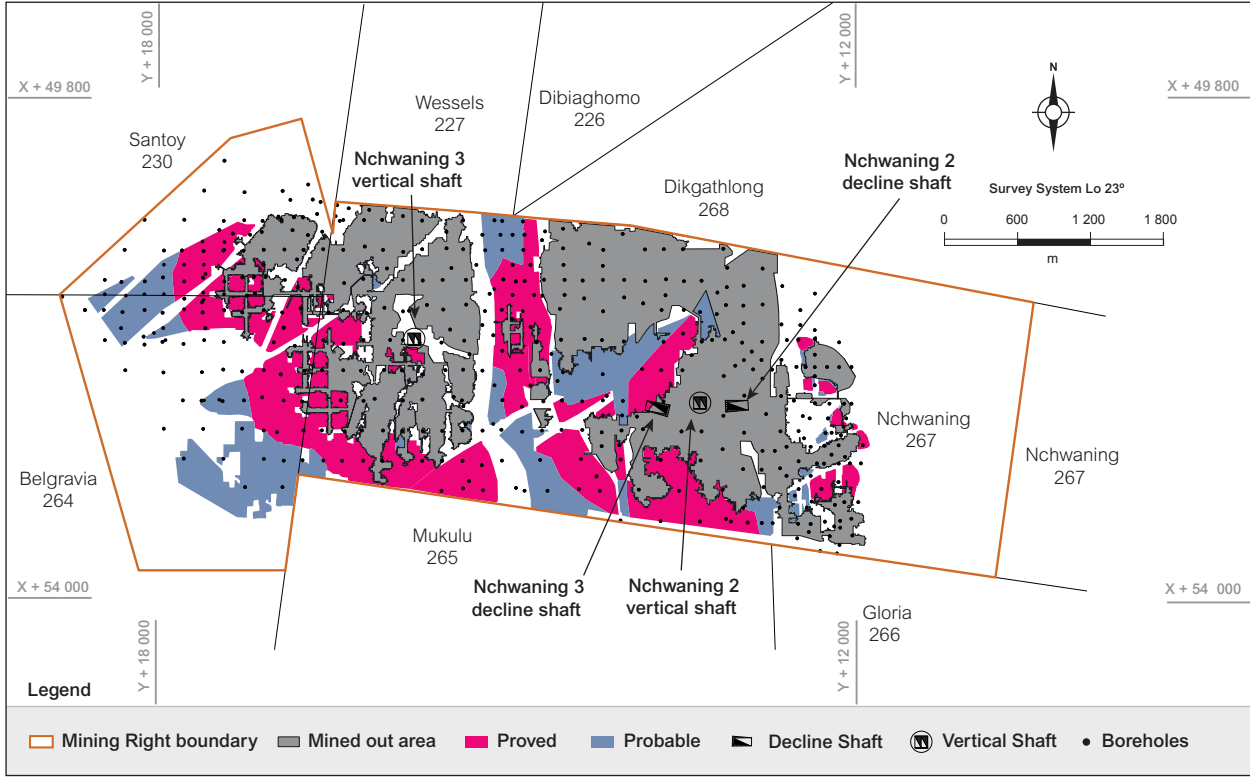
Life-of-mine: >30 years.

\* **Black Rock Manganese Mine attributable interests (ARM 50%; Assore 50%).**

NCHWANING MANGANESE SEAM 1 MINERAL RESOURCES CLASSIFICATION



NCHWANING MANGANESE SEAM 1 MINERAL RESERVES CLASSIFICATION





## ARM FERROUS continued

**NCHWANING MINE: SEAM 2 MANGANESE MINERAL RESOURCES AND MINERAL RESERVES ESTIMATES AS AT 30 JUNE 2020**

* Mineral Resources and Mineral Reserves are reported on a 100% basis.	Mineral Resources				Mineral Reserves		
	Mt	Mn%	Fe%		Mt	Mn%	Fe%
Measured	106.29	42.83	15.56	Proved	72.72	42.69	15.64
Indicated	68.47	42.28	14.95	Probable	35.94	42.92	15.27
<b>Total Measured and Indicated (Seam 2) 2020</b>	<b>174.76</b>	<b>42.61</b>	<b>15.32</b>	<b>Total Reserves (Seam 2) 2020</b>	<b>108.66</b>	<b>42.77</b>	<b>15.52</b>
Total Measured and Indicated (Seam 2) 2019	172.79	42.53	15.62	Total Reserves (Seam 2) 2019	109.10	42.73	15.76

The Measured and Indicated Mineral Resources are inclusive of those modified to produce Mineral Reserves.

Totals are rounded off.

**Key assumptions for Mineral Resources:**

True thickness cut-off: 4.0 metres.

Density: 4.4 t/m<sup>3</sup>.

**Modifying factors for the conversion of Mineral Resources to Mineral Reserves include:**

Cut-off grade: 38% Mn.

Tramming loss factor: 1%.

Plant recovery: 91%.

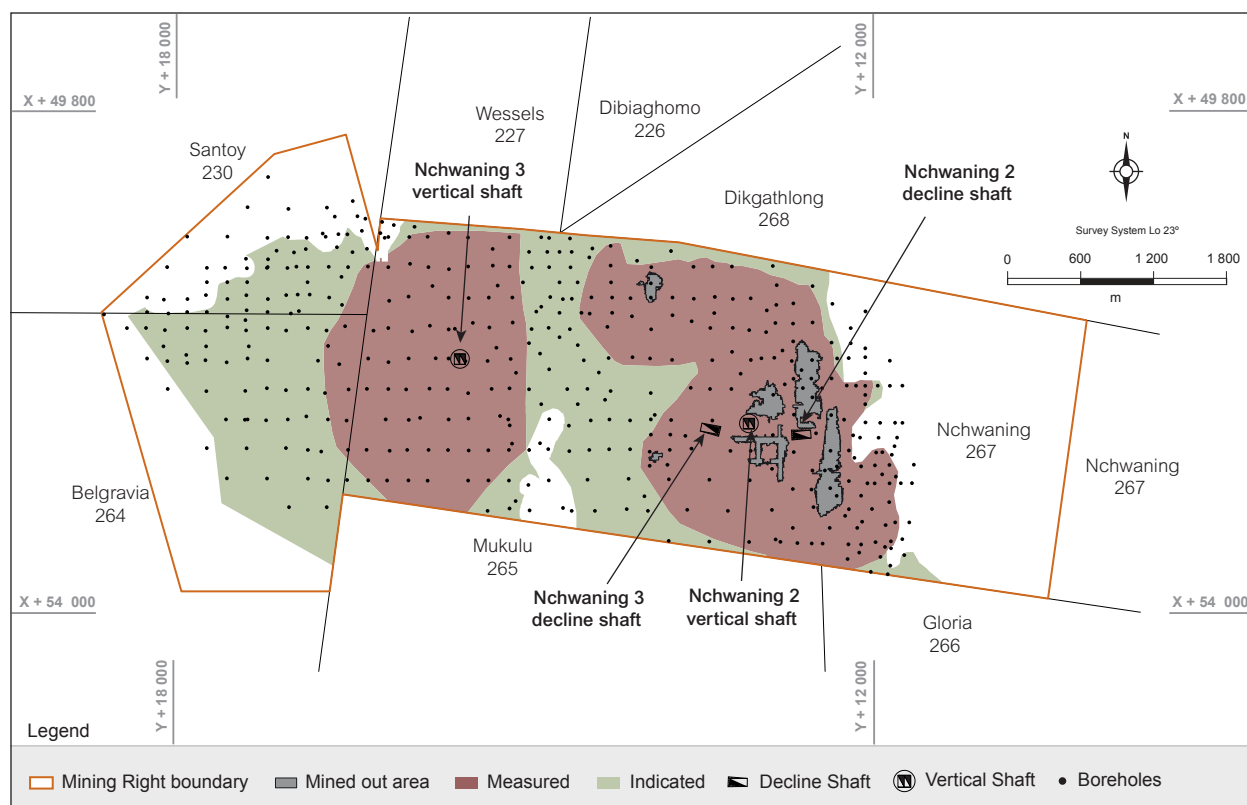
Mine extraction factor: 68%–78%.

Price ranges: Based on market-related long-term view.

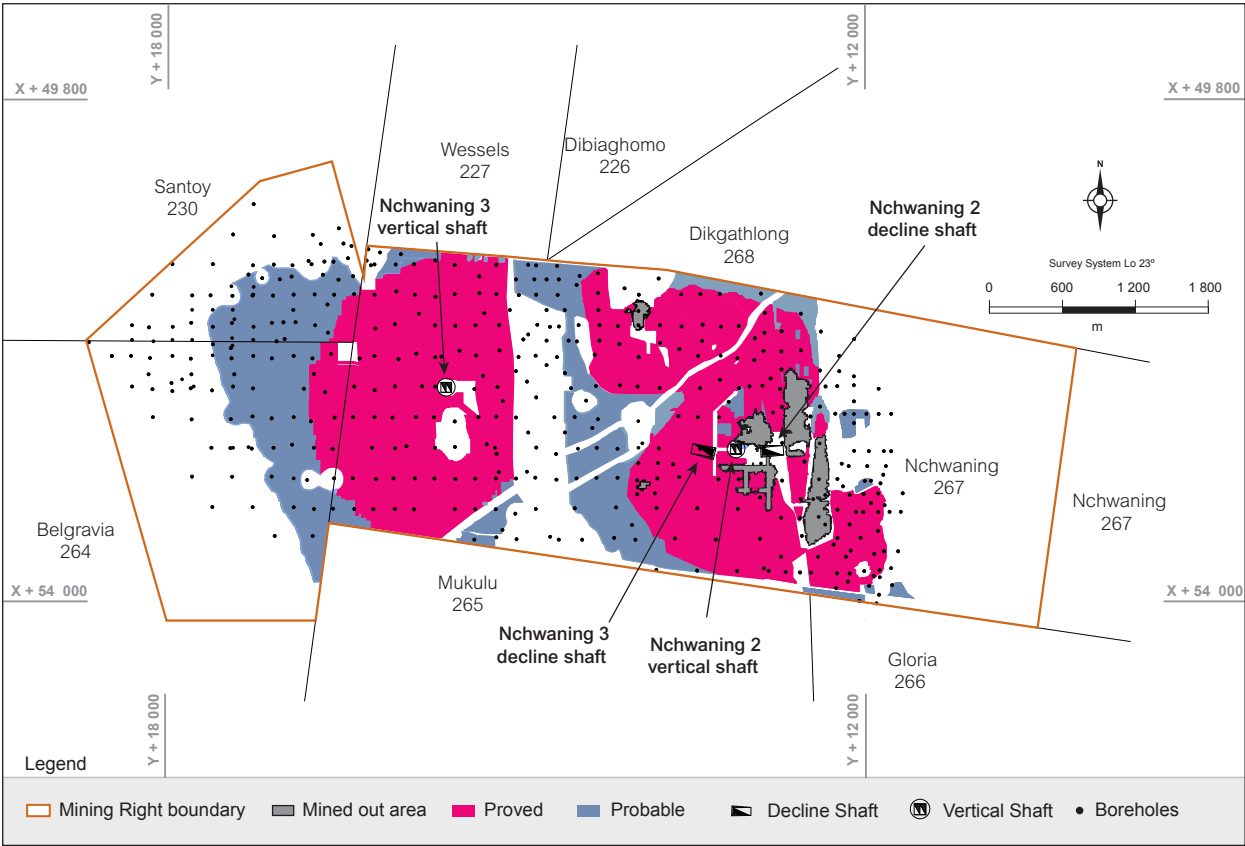
Exchange rate used: Market-related.

Life-of-mine: >30 years.

\* Black Rock Manganese Mine attributable interests (ARM 50%; Assore 50%).

**NCHWANING MANGANESE SEAM 2 MINERAL RESOURCES CLASSIFICATION**

NCHWANING MANGANESE SEAM 2 MINERAL RESERVES CLASSIFICATION



## ARM FERROUS continued

## Nchwaning year-on-year change

Measured and Indicated Mineral Resources for Nchwaning Seam 1 decreased by 4% to 126.00 million tonnes at 43.13% Mn due to production depletion and density changes. Mineral Reserves for Nchwaning Seam 1 decreased from 68.76 million tonnes at 43.30% Mn to 60.57 million tonnes at 43.68% Mn due to mining depletion, density and Mineral Resource modelling changes.

Nchwaning Seam 2 Mineral Reserves marginally decreased from 109.10 million tonnes at 42.73% Mn to 108.66 million tonnes at 42.77% Mn as the mining depletion was offset by gains from a density increase and modelling changes.

## HISTORICAL MANGANESE PRODUCTION AT NCHWANING MINE (SEAM 1 AND 2)

Financial year	ROM	Saleable
	Mt	Mt
2015/2016	2.54	2.39
2016/2017	2.79	2.35
2017/2018	3.45	3.00
2018/2019	3.29	2.99
2019/2020	3.15	2.90



Additional information regarding production figures can be found in the ARM Ferrous section of the 2020 ARM integrated annual report which can be found at [www.arm.co.za](http://www.arm.co.za).

## BLACK ROCK 'KOPPIE' MINERAL RESOURCES

The Black Rock orebodies occur in the Black Rock Koppie, Belgravia 1 and Belgravia 2 areas. They are all part of a large thrust complex. Modelling of these orebodies was undertaken using 151 Nchwaning boreholes that intersected the thrust complex and 174 Black Rock in-fill boreholes. During 2020, the Black Rock Koppie Mineral Resource model was updated.

A 30% Mn cut-off was used in the modelling. Seams 1 and 2 were modelled at variable thicknesses. Surface exploration borehole data, underground geological mapping, mine survey plans and peg data sets were utilised in the geological modelling of the Black Rock orebodies. A total of 22 structurally discrete orebodies were identified and grouped into Seam 1 and Seam 2 based on stratigraphic positioning and grades.

No mining is currently being done at Black Rock Koppie. The RPEEE factors considered for Nchwaning are applicable for Black Rock Koppie.

## BLACK ROCK (KOPPIE AREA): SEAM 1 MANGANESE MINERAL RESOURCES ESTIMATES AS AT 30 JUNE 2020

* Mineral Resources are reported on a 100% basis.	Mineral Resources		
	Mt	Mn%	Fe%
Measured	15.80	40.0	19.0
Indicated	23.00	39.3	18.2
<b>Total Resources (Seam 1) 2020</b>	<b>38.80</b>	<b>39.6</b>	<b>18.5</b>
Total Resources (Seam 1) 2019	43.60	40.6	18.1
<b>Inferred (Seam 1) 2020</b>	<b>25.20</b>	<b>41.1</b>	<b>18.3</b>
Inferred (Seam 1) 2019			

Totals are rounded off.

**Key Resources assumptions:**

Cut-off: 30% Mn.

Density: 4.0 t/m<sup>3</sup>.

\* Black Rock Manganese Mine attributable interests (ARM 50%; Assore 50%).

## BLACK ROCK (KOPPIE AREA): SEAM 2 MANGANESE MINERAL RESOURCES ESTIMATES AS AT 30 JUNE 2020

* Mineral Resources are reported on a 100% basis.	Mineral Resources		
	Mt	Mn%	Fe%
Measured	7.30	39.1	19.3
Indicated	8.00	35.8	21.6
<b>Total Resources (Seam 2) 2020</b>	<b>15.30</b>	<b>37.4</b>	<b>20.5</b>
Total Resources (Seam 2) 2019	26.81	38.6	19.8
<b>Inferred (Seam 2) 2020</b>	<b>18.70</b>	<b>38.2</b>	<b>19.7</b>
Inferred (Seam 2) 2019			

Totals are rounded off.

**Key Resources assumptions:**

Cut-off: 30% Mn.

Density: 4.0 t/m<sup>3</sup>.

\* Black Rock Manganese Mine attributable interests (ARM 50%; Assore 50%).

## Black Rock Koppie year-on-year change

Measured and Indicated Mineral Resources for Black Rock Koppie Seam 1 decreased from 43.60 million tonnes at 40.6% Mn to 38.80 million tonnes at 39.6% Mn due to remodelling and new Mineral Resource classification, the latter resulting in a downgrade of some of the Mineral Resources to Inferred category. A total of 25.20 million tonnes at 41.1% Mn Inferred Mineral Resources were declared. The overall Mineral Resources for Seam 1 have increased partly due to a lower cut-off of 30% Mn that was applied.



## ARM FERROUS continued

Measured and Indicated Mineral Resources for Seam 2 reduced from 26.81 million tonnes at 38.6% Mn to 15.30 million tonnes at 37.4% Mn as a result of the remodelling. Inferred Mineral Resources which were not declared in previous model have been declared at 18.70 million tonnes at 38.2% Mn. The increase in the overall Mineral Resource for Seam 2 is mainly due to a lower Mn cut-off that has been used.

The relative density applied for both seams is 4.0 t/m<sup>3</sup>.

## GLORIA MINE MINERAL RESOURCES

Procedures for drilling and assaying at Gloria Mine are the same as at Nchwaning. Both boreholes and underground sample sections were considered in the evaluation of Gloria Seam 1 and Seam 2. Gloria was modelled similarly to Nchwaning using Datamine Studio 3 and Datamine Strat 3D software for the geological modelling and for the grade estimation. The geological block model was created for an optimum cut of 4 metres for Seams 1 and 2. Block sizes in the X and Y directions were 50 x 50 metres allowing for sub-splitting. The relative density which was at 3.8 t/m<sup>3</sup> for both Seams in the past has now been determined using Archimedes methods as follows:

- Seam 1 new default density is 3.6 t/m<sup>3</sup>
- Seam 2 new default density is 3.5 t/m<sup>3</sup>

Work is still in progress on the densities and the plan is to eventually have enough data to estimate the density for each block in the model.

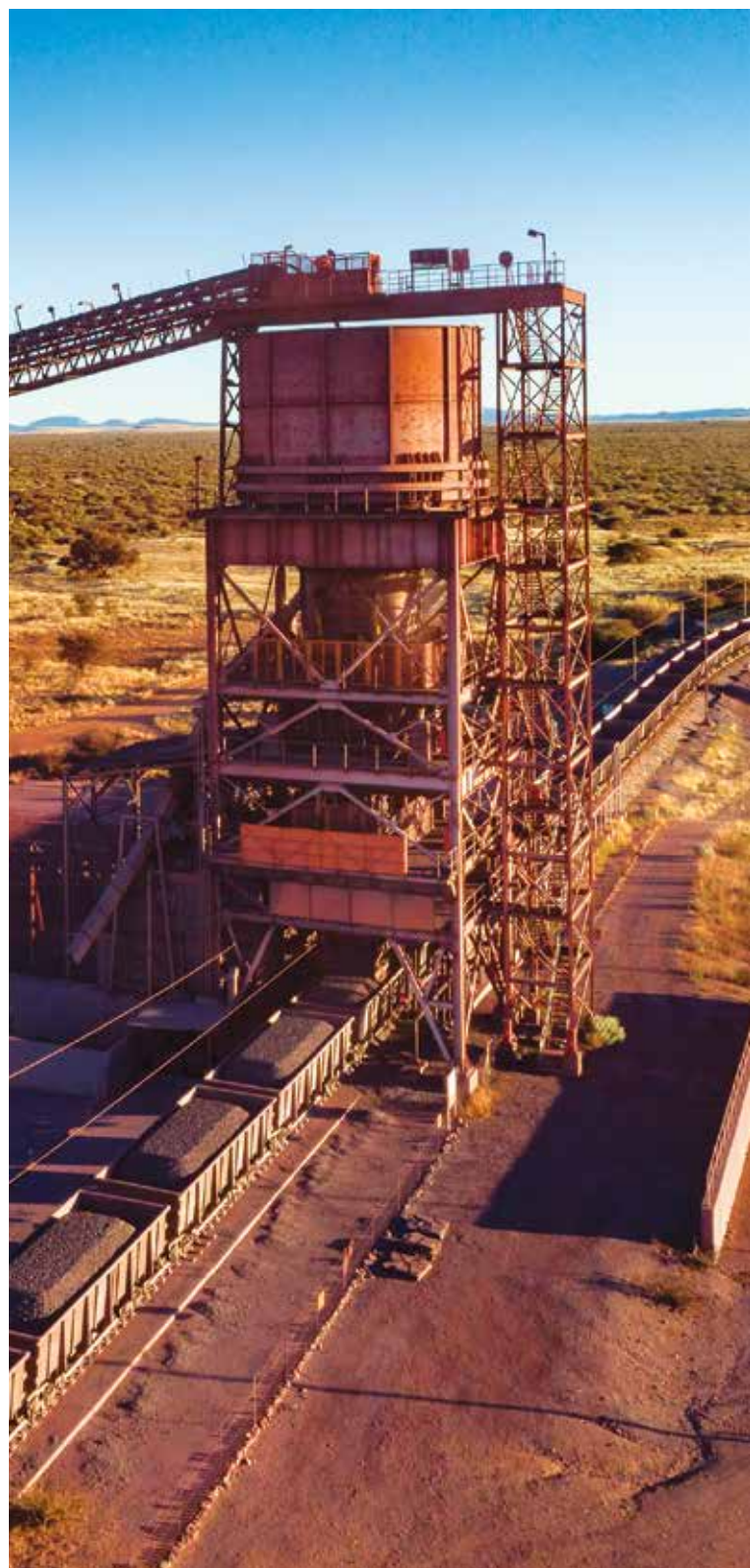
Statistical and geostatistical analysis for the following variables: Mn, Fe, Al<sub>2</sub>O<sub>3</sub>, BaO, CaO, K<sub>2</sub>O, MgO, Na<sub>2</sub>O, P, S and SiO<sub>2</sub> was undertaken. Ordinary Kriging interpolation within Studio 3 was used to estimate the grade in the 50 x 50 x 4 metre blocks using borehole and/or underground sample data. Mineral Resource classification methods were similar to those applied at Nchwaning Mine.

The RPEEE factors considered for Nchwaning are applicable for Gloria Mine.

## GLORIA MINE MINERAL RESERVES

Conversion of the Gloria Seam 1 Mineral Resources to Mineral Reserves is done for Measured and Indicated Mineral Resources. The main modifying factors for the conversion are: plant recovery factor, manganese prices and mining extraction factors. Details of these factors are listed below the Mineral Reserves tables.

Manganese is extracted at depths that vary between 180 to 250 metres. Ore is crushed underground before being conveyed to a surface stockpile via a decline shaft. Ore is withdrawn from the surface stockpile and forwarded to two stages of crushing, dry screening, and wet screening to yield lumpy and fine products. At the plant, the ore is processed similarly to Nchwaning run-of-mine ore.



## ARM FERROUS continued

**GLORIA MINE: SEAM 1 MANGANESE MINERAL RESOURCES AND MINERAL RESERVES ESTIMATES AS AT 30 JUNE 2020**

* Mineral Resources and Mineral Reserves are reported on a 100% basis.	Mineral Resources				Mineral Reserves		
	Mt	Mn%	Fe%		Mt	Mn%	Fe%
Measured	69.39	37.29	4.86	Proved	44.61	37.20	4.83
Indicated	80.08	37.56	4.92	Probable	60.37	37.32	4.83
<b>Total Measured and Indicated (Seam 1) 2020</b>	<b>149.47</b>	<b>37.43</b>	<b>4.89</b>	<b>Total Reserves (Seam 1) 2020</b>	<b>104.98</b>	<b>37.27</b>	<b>4.83</b>
Total Measured and Indicated (Seam 1) 2019	156.94	37.58	4.89	Total Reserves (Seam 1) 2019	115.04	37.41	4.83
<b>Inferred 2020 (Seam 1)</b>	<b>30.19</b>	<b>36.91</b>	<b>5.46</b>				
Inferred 2019 (Seam 1)	31.87	37.29	5.43				

The Measured and Indicated Mineral Resources are inclusive of those modified to produce Mineral Reserves. Totals are rounded off.

**Key assumptions for Mineral Resources:**

True thickness cut-off: 4.0 metres.

Density: 3.6 t/m<sup>3</sup>.

**Modifying factors for the conversion of Mineral Resources to Mineral Reserves include:**

Cut-off grade: 35% Mn.

Tramming loss factor: 1%.

Plant recovery: 92%.

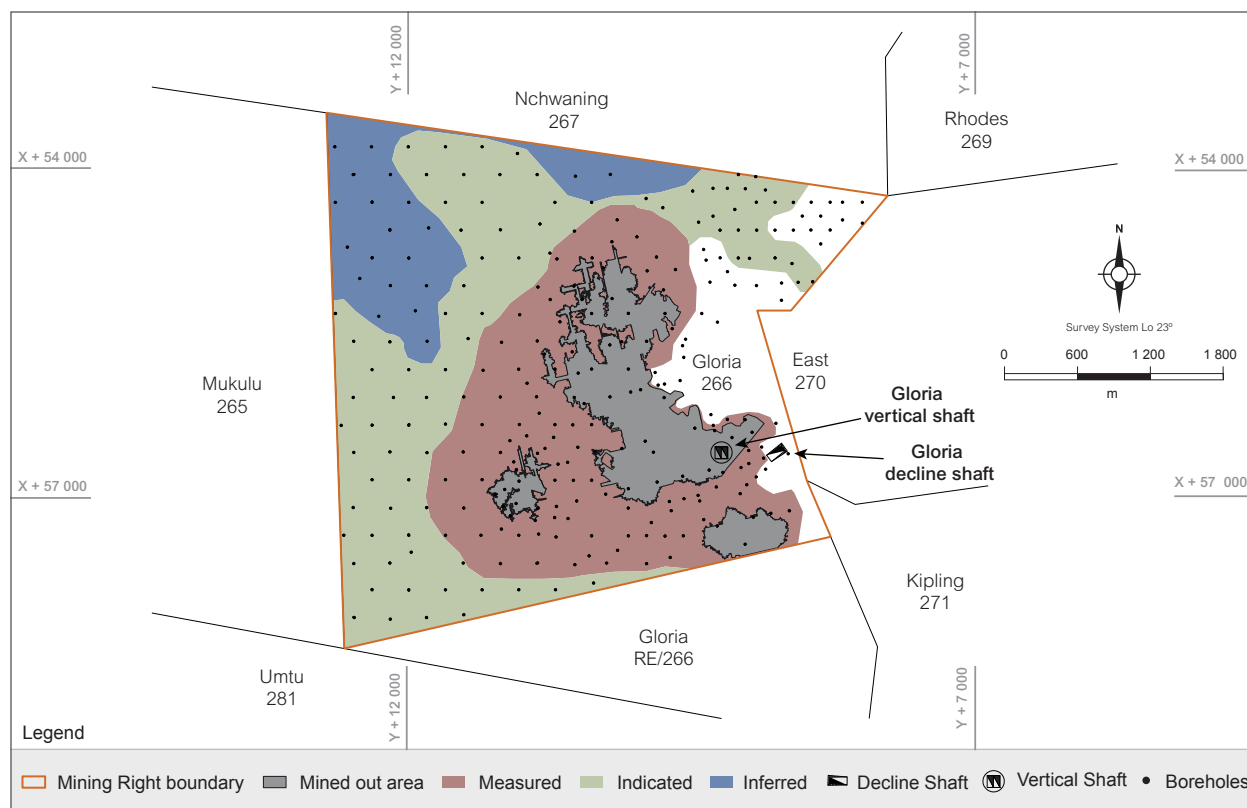
Mine extraction factor: 82%.

Price ranges: Based on market-related long-term view.

Exchange rate used: Market-related.

Life-of-mine: >30 years.

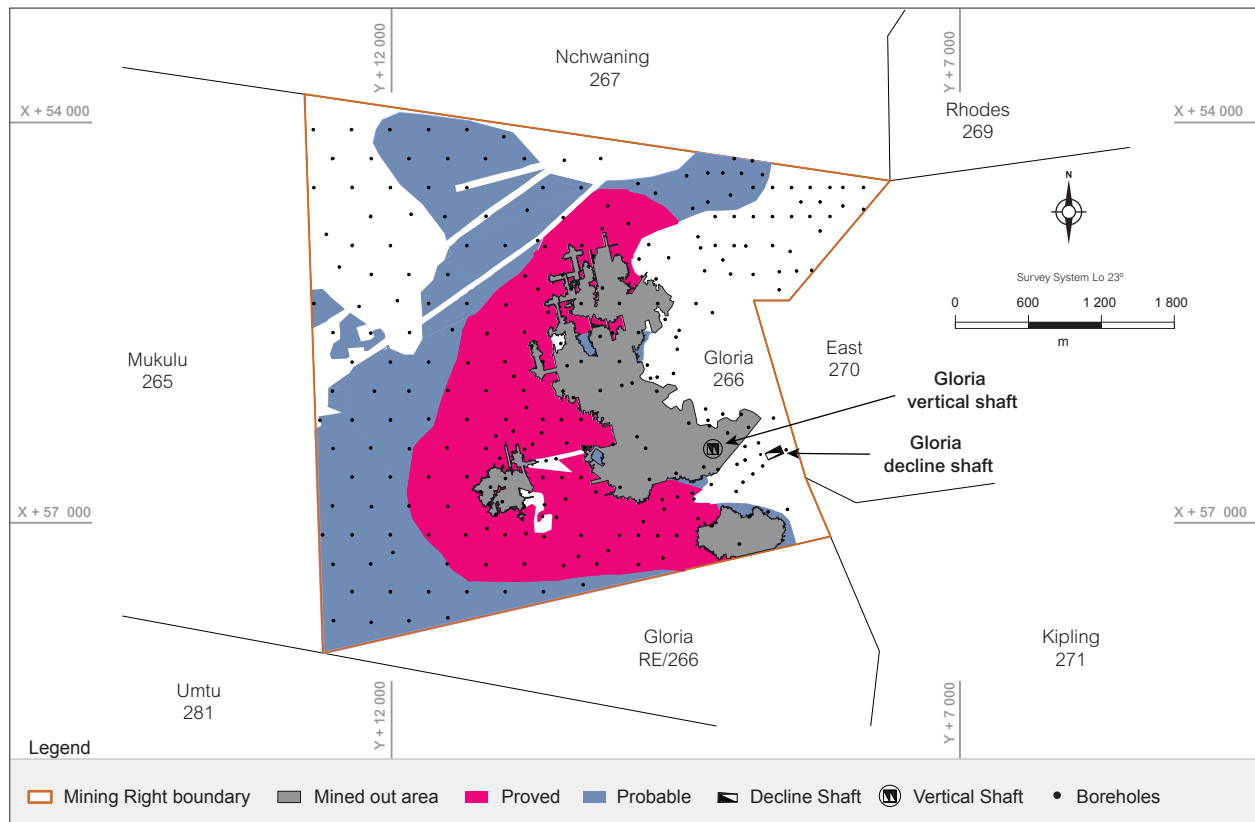
\* **Black Rock Manganese Mine attributable interests (ARM 50%; Assore 50%).**

**GLORIA MANGANESE SEAM 1 MINERAL RESOURCES CLASSIFICATION**



## ARM FERROUS continued

## GLORIA MANGANESE SEAM 1 MINERAL RESERVES CLASSIFICATION



## GLORIA MINE: SEAM 2 MANGANESE MINERAL RESOURCES ESTIMATES AS AT 30 JUNE 2020

	Mineral Resources		
	Mt	Mn%	Fe%
Measured			
Indicated	32.06	28.41	9.39
<b>Total Measured and Indicated (Seam 2) 2020</b>	<b>32.06</b>	<b>28.41</b>	<b>9.39</b>
Total Measured and Indicated (Seam 2) 2019	34.81	28.41	9.39
<b>Inferred 2020 (Seam 2)</b>	<b>122.92</b>	<b>30.03</b>	<b>9.67</b>
Inferred 2019 (Seam 2)	133.46	30.03	9.67

Totals are rounded off.

**Key assumptions for Mineral Resources:**

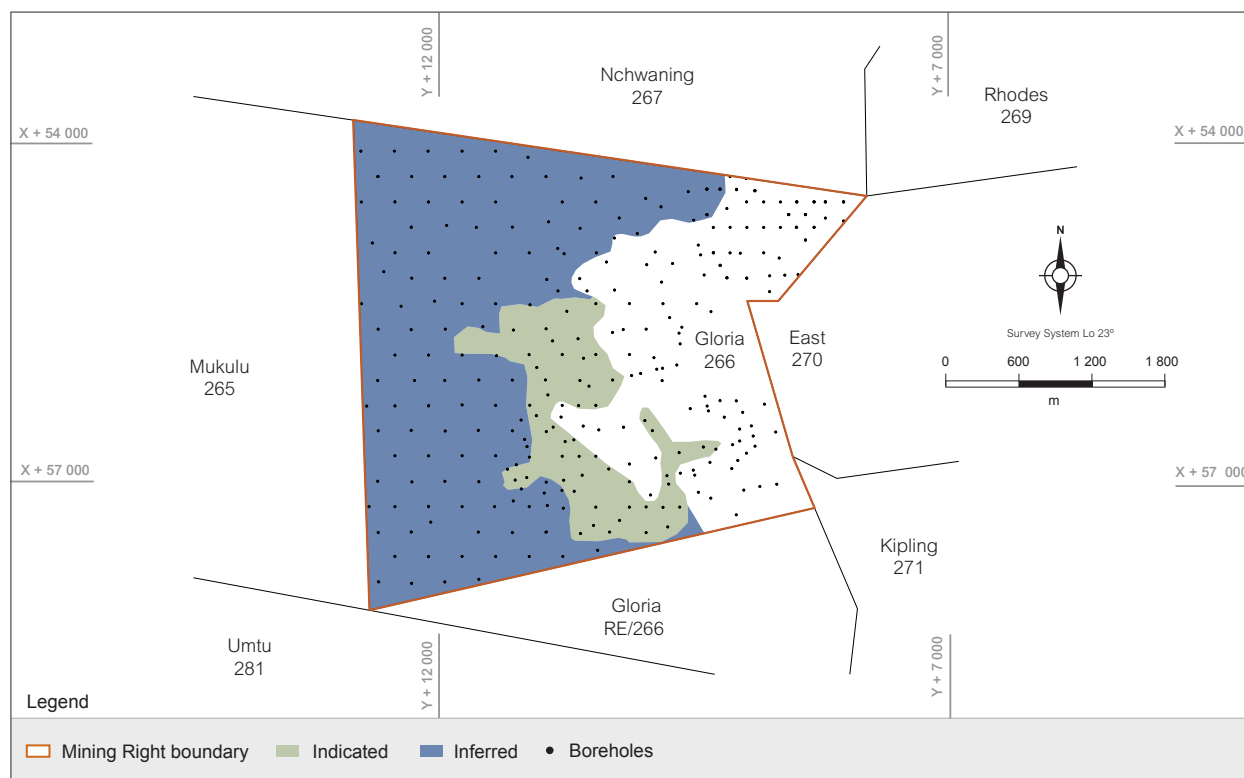
True thickness cut-off: 4.0 metres.

Density: 3.5 t/m<sup>3</sup>.

\* Black Rock Manganese Mine attributable interests (ARM 50%; Assore 50%).

## ARM FERROUS continued

## GLORIA MANGANESE SEAM 2 MINERAL RESOURCES CLASSIFICATION



## Gloria year-on-year change

Gloria Mine Seam 1 Measured and Indicated Mineral Resources decreased from 156.94 million tonnes at 37.58% Mn to 149.47 million tonnes at 37.43% Mn mainly due to production depletion and density which changed from 3.8 t/m<sup>3</sup> to 3.6 t/m<sup>3</sup>. Inferred Mineral Resources decreased by 5% to 30.19 million tonnes at 36.91% Mn as a result of the density change. Mineral Reserves for Seam 1 decreased from 115.04 million tonnes at 37.41% Mn to 104.98 million tonnes at 37.27% Mn mainly due to the density change. Other factors that accounted for the change were mining depletion, model refinement and mine design changes.

Gloria Seam 2 Indicated and Inferred Mineral Resources both decreased by 8% to 32.06 million tonnes at 28.41% Mn and 122.92 million tonnes at 30.03% Mn respectively due to the decrease in density from 3.8 t/m<sup>3</sup> to 3.5 t/m<sup>3</sup>.

## HISTORICAL MANGANESE PRODUCTION AT GLORIA MINE (SEAM 1)

Financial year	ROM	Saleable
	Mt	Mt
2015/2016	0.54	0.55
2016/2017	0.71	0.72
2017/2018	0.67	0.71
2018/2019	0.45	0.42
2019/2020	0.70	0.72



Additional information regarding production figures can be found in the ARM Ferrous section of the 2020 ARM integrated annual report which can be found at [www.arm.co.za](http://www.arm.co.za).



## IRON ORE MINES

### LOCALITY

The iron ore mines are made up of Beeshoek Mine located on the farms Beesthoek 448 and Olyn Fontein 475 and Khumani Mine situated on farms Bruce 544, King 561 and Mokaning 560. All properties are approximately 200 kilometres west of Kimberley in the Northern Cape. The Beeshoek open-pit operations are situated 7 kilometres west of Postmasburg and the Khumani open pits are adjacent to, and south-east of Kumba Iron Ore's Sishen Mine. Beeshoek and Khumani mines are located at latitude 28°30'00"S/longitude 23°01'00"E, and latitude 27°45'00"S/longitude 23°00'00"E respectively.



### HISTORY

Mining of iron ore (mainly specularite) was undertaken as early as 40 000 BC on the farm Doornfontein which is due north of Beeshoek. The potential of iron ore in this region was discovered in 1909, but, due to lack of demand and limited infrastructure, this commodity was given little attention. In 1929, the railway line was extended from Koopmansfontein (near Kimberley) to service a manganese mine at Beeshoek. In 1935, the Associated Manganese Mines of South Africa Limited (Assmang) was formed. In 1964, Beeshoek Iron Ore Mine was established, with a basic hand-sorting operation. In 1975, a full washing and screening plant was installed at Beeshoek Mine. The Khumani Iron Ore Mine was commissioned in 2007.

### COMPETENCE

The following competent persons were involved in the estimation of Mineral Resources and Mineral Reserves for the iron ore operations. R Jooste is employed by ARM while the other competent persons are employed by Assmang.

Mining operation	Competent person	Professional organisation	Membership number	Qualifications	Relevant experience
Beeshoek Mine	<b>R Jooste (Mineral Resources)</b>	SACNASP	400163/05	BSc, BSc Hons (Geology), MEng (Mining Engineering)	19 years
	<b>A Burger (Mineral Reserves)</b>	SACNASP	400233/08	BSc (Geology), BSc Hons (Geology), GDE (Mining Engineering)	19 years
Khumani Mine	<b>M Burger (Mineral Resources and Mineral Reserves)</b>	SACNASP	400086/03333	BSc (Geochemistry), BSc Hons (Geochemistry), GDE (Mining Engineering)	37 years
	<b>I van Niekerk (Mineral Resources)</b>	SACNASP	400006/94	BSc Hons (Geology)	30 years
	<b>B Muzima (Mineral Reserves)</b>	SAIMM	707708	BTech (Mining Engineering)	13 years



## ARM FERROUS continued

## MINING AUTHORISATION

Mining operation	Legal entitlement	Minerals covered by Mining Right	Comment	Period of Mining Right (years)	Known impediments on legal entitlement
Beeshoek Mine	Mining Right NC 30/5/1/2/2/223 MRC	Iron ore	None	30 years: 16 March 2012 to 15 March 2042	None
Khumani Mine	Mining Right NC 50/5/1/2/5/2/70 MR	Iron ore	None	30 years: 25 January 2007 to 24 January 2037	None

## GEOLOGY

Beeshoek and Khumani mines are situated within a sequence of early Proterozoic sediments of the Transvaal Supergroup. Both mines are symmetrically located on the Maremane Anticline in the Griqualand West Sequence of the Transvaal Supergroup, as well as the Elim Group of the Keis Supergroup.

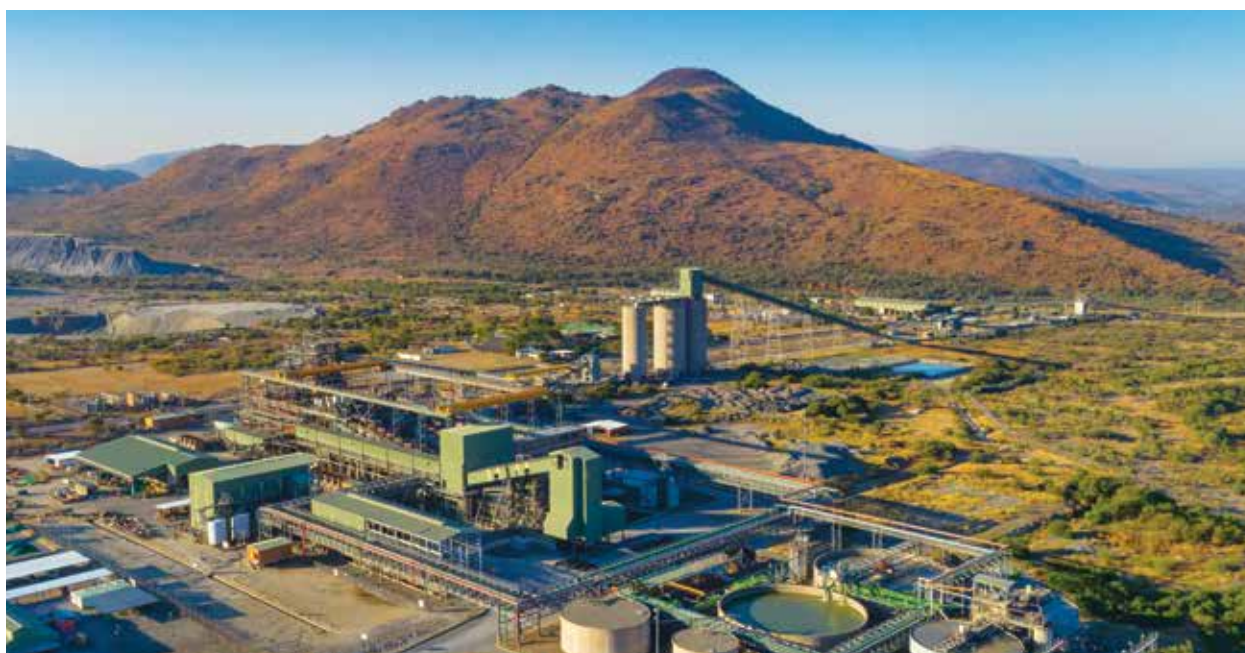


Refer to the regional geological map on page 34 (Beeshoek Mine) and detailed map on page 47 (Khumani Mine).

In general, two ore types are present: laminated hematite ore, forming part of the Manganore Iron Formation, and conglomerate ore, belonging to the Doornfontein Conglomerate Member at the base of the Gamagara Formation. The laminated ore types occur in the upper portion of the Manganore Iron Formation as enriched high-grade hematite bodies. The boundaries of high grade hematite orebodies cross-cut primary sedimentary bedding, indicating that secondary hematitisation of the iron formation took place. In all of these, some of the stratigraphic and sedimentological features of the original iron formation are preserved. The conglomeratic ore found in the Doornfontein Conglomerate Member of the Gamagara Formation, is lenticular but not consistently developed along strike. It consists of stacked, upward fining conglomerate-gritstone-shale sedimentary cycles.

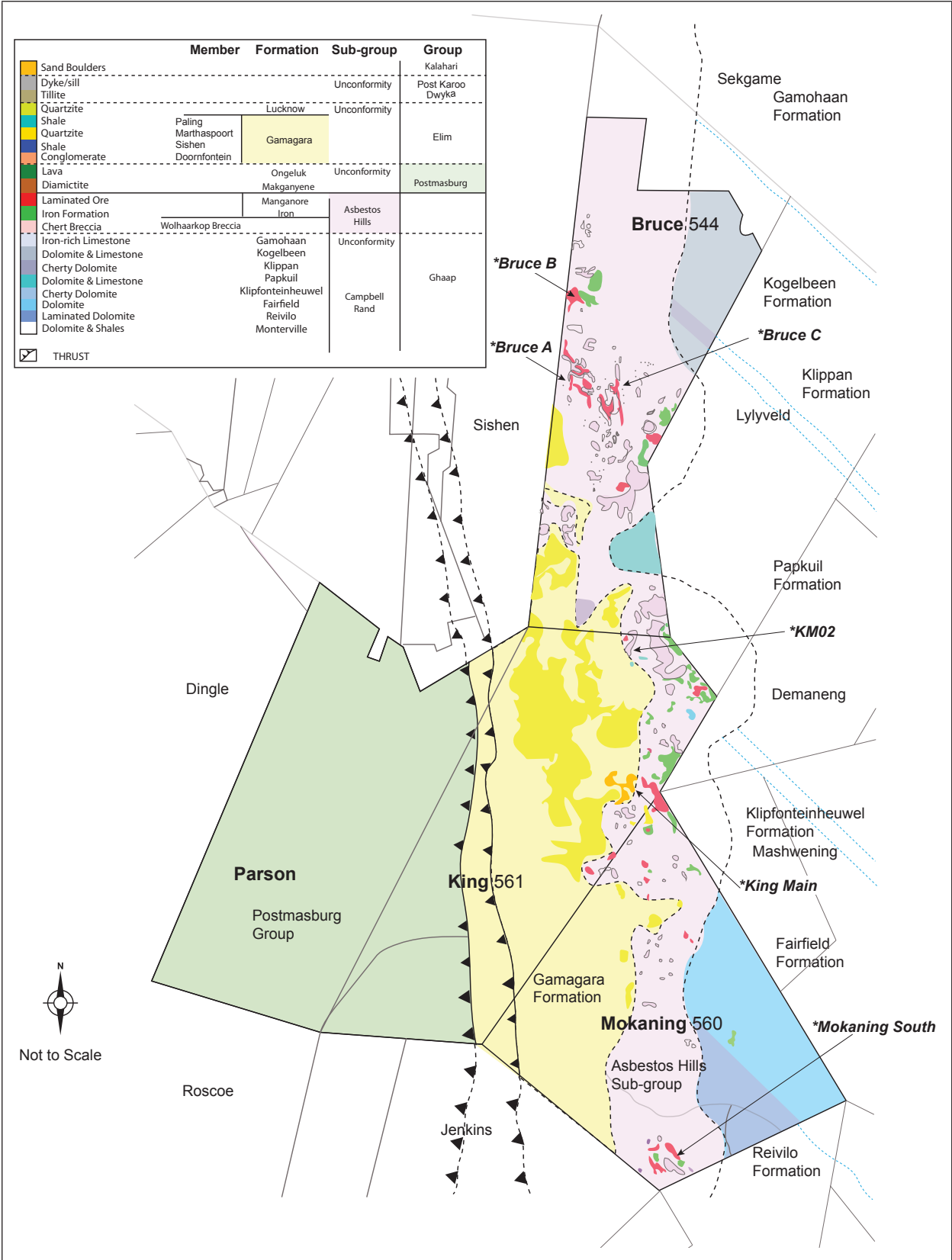
The lowest conglomerates and gritstones tend to be rich in subrounded to rounded hematite ore pebbles and granules and form the largest part of the resource. The amount of iron ore pebbles decreases upwards in the sequence so that upper conglomerates normally consist of poorly sorted, angular to rounded chert and banded iron formation pebbles. Hematite is the predominant ore mineral, but limonite and specularite also occur.

Erosion in the Khumani area is less than in the Beeshoek area. This results in Khumani being characterised by larger stratiform bodies and prominent hanging-wall outcrops. The down-dip portions are well preserved and developed, but in the outcrop the deposits are thin and isolated. Numerous deeper iron ore extensions occur into the basins due to karst development. A prominent north-south strike of the orebodies dipping to the west is notable. The southern Beeshoek orebodies were exposed to more erosion and hence are more localised and smaller. Outcrops are limited to the higher topography on the eastern side of the properties. Down-dip to the west, the ore is thin and deep. The strike of the orebodies is also in a north-south direction dipping to the west, but less continuous.



ARM FERROUS continued

KHUMANI SURFACE GEOLOGY MAP



\* Khumani Mine consists of Bruce A, Bruce B, Bruce C, KM02, King Main and Mokaning areas.



## ARM FERROUS continued

## EXPLORATION ACTIVITIES

The exploration effort at Khumani Mine for the past year was concentrated in three areas Bruce, King and Mokaning South (refer to map on page 52 for the location of these areas). The drilling was part of an in-fill drilling programme. The results of the drilling on Bruce and King will assist with grade control and improved mine planning while the Mokaning South drilling has already contributed to an increase in the Mineral Resource. The cost for the drilling was R24.37 million for a total of 35 507 metres.

Exploration activities carried out over the past year at Beeshoek Mine focused on the north-west to south-west area of the Village Pit as well as to the south of East Pit. The total number of boreholes drilled is 89. The total number of metres drilled for the period was 14 840 metres (diamond drilling: 5 506 metres and percussion drilling: 9 334 metres). Iron ore intersections in the new boreholes will be used for the update of the Beeshoek Mineral Resource models in F2021. Total exploration cost was approximately R24 million for both diamond and percussion drilling.



Refer to Khumani deposits and Beeshoek deposits maps on pages 52 and 50 respectively for the location of areas drilled.

## MINING METHODS AND INFRASTRUCTURE

Mining operations are all open-pit, based on the conventional drill-and-blast, truck-and-shovel operations. Run-of-mine ore is crushed and stored as 'on-' or 'off-grade' on blending stockpiles. Ore from the stockpiles is either sent to the wash-and-screen plants or, if 'off-grade', to the beneficiation plants. The washing and screening plants consist primarily of tertiary crushing, washing, screening, conveying and stacking equipment. The beneficiation plants consist of tertiary crushers; scrubbers; coarse and fine jigs; lumpy and fines product stockpiles; and a rapid load-out facility. No chemicals are being used in any of the treatment plants.

## MINERAL RESOURCES

The methodology followed to identify exploration targets is initiated with geological mapping, followed by geophysics (ground magnetics and gravity). Numerous exploration programmes have been completed in the past. Percussion drilling is used to pilot holes through overlying waste rock down to the iron orebodies. Diamond drilling is the next phase, which is usually on a 200 x 200 metre grid. Further in-fill drilling is carried out at spacing ranging from 100 x 100 metres to 25 x 25 metres, depending on the complexity of the geological structures. Core samples are logged and split by means of a diamond saw and the half-core is sampled at 0.5 metre intervals. The half-cores are crushed, split and pulverised and submitted to the owner-managed laboratory for assaying. All holes and blast holes in mineralisation are sampled and analysed for Fe, K<sub>2</sub>O, Na<sub>2</sub>O, SiO<sub>2</sub>, Al<sub>2</sub>O<sub>3</sub>, P, S, CaO, MgO, Mn and BaO. The analytical technique for elemental analyses is XRF spectroscopy. Volumetric titration is used as verification method for the determination of total iron in the ore. International standards (eg SARM11) and in-house iron standards are used for the calibration of the XRF spectrometer. The Khumani laboratory undertakes stringent quality control and assurance methods, including 'round robin' analysis with 11 laboratories for verification of assay results. A Datamine 'Fusion' database with all the borehole data has been established has been established at Khumani while the borehole data is Microsoft Access database at Beeshoek Mine.

The Khumani Mine geological model is built with Datamine's Strat 3D modelling functionality to create a 3D representation of the stratigraphy using all validated borehole information. The stratigraphy is modelled from the surface geology to the stratigraphic unit below the lowest mineralised zone.

Within the host stratigraphic units, Doornfontein (conglomeritic mineralisation) and Manganore (laminated mineralisation) outlines for mineralisation above a cut-off of 55% Fe are interpreted and solid wireframes created. Any lower-grade samples inside the orebody are defined as internal waste and modelled separately. Ordinary Kriging interpolation is used to estimate the grade of each 25 x 25 x 10 metre block generated within the geological model for the following separate units: mineralised envelopes (Fe >= 55%), and the internal shales and banded iron stone. Densities in the resource model are calculated using a polynomial fit applied to the estimated Fe grade. Mineral Resource classification is based on both geostatistical parameters as well as the geological continuity of the mineralisation. The geostatistical parameters that are considered are: Kriging efficiency, Kriging variance, number of samples, search volume and regression slope. The final assessment of the classification is done by the lead competent person who may make adjustments as necessary.

The geological modelling of the orebody at Beeshoek is similar to Khumani, although the cut-off grade used is 60% Fe.

The Mineral Resources declared have reasonable and realistic prospects for eventual economic extraction on consideration of the following:

- Location, quality, grade and geological continuity are known and are supported by drilling information which includes sampling
- Only iron ore bodies greater than 2 metres in thickness with a grade of above 55% Fe (Khumani) or above 60% Fe (Beeshoek) are considered as Mineral Resources
- Mining and processing methods are well established at the operation and are currently used to exploit the orebody
- All other factors such as legal, infrastructural, environmental, marketing, social and economic factors are covered as part of the mining plan for the operation

## MINERAL RESERVES

Only Measured and Indicated Mineral Resources are converted to Proved and Probable Mineral Reserves respectively. Modifying factors are applied to these Mineral Resources and are financially optimised. The financial parameters are used to define the optimal pit outline. The pit designs are based on mining and geotechnical parameters, mining fleet and selective mining unit (SMU). Some of these parameters are listed below the Mineral Reserves tabulations. The combined waste and mineralisation models are reblocked at 6.25 x 6.25 x 10 metre blocks. The Resources within this mining constraint (optimised pit-shell) with grades of greater than 54% Fe (Khumani) and greater than 60% Fe (Beeshoek), are defined as Mineral Reserves. These are categorised into different product types, destined for the different plant processes and then scheduled for mining. The average Fe, K<sub>2</sub>O, Al<sub>2</sub>O<sub>3</sub>, Mn and SiO<sub>2</sub> grades of the SMUs are used to define 'on-grade' (wash and screen) feed as well as 'off-grade' (jig) feed.

## ARM FERROUS continued

## BEESHOEK IRON ORE MINE: MINERAL RESOURCES AND MINERAL RESERVES ESTIMATES AS AT 30 JUNE 2020

* Mineral Resources and Mineral Reserves are reported on a 100% basis.	Measured Resources		Indicated Resources		Measured and Indicated Resources		Inferred Resources		Proved Reserves		Probable Reserves		Total Reserves	
	Mt	Fe%	Mt	Fe%	Mt	Fe%	Mt	Fe%	Mt	Fe%	Mt	Fe%	Mt	Fe%
Pit														
BN Pit	6.82	62.99			6.82	62.99			2.33	63.01			2.33	63.01
HF/HB Pit	14.68	64.62			14.68	64.62			3.96	65.25			3.96	65.25
BF Pit	7.50	63.51	0.23	63.54	7.73	63.51	0.00	65.24	0.60	61.59			0.60	61.59
East Pit	2.77	64.98	0.02	64.53	2.79	64.98			0.53	65.13			0.53	65.13
Village Pit	40.10	64.27	4.75	63.45	44.85	64.18	2.80	64.89	18.63	64.80	0.13	63.35	18.76	64.79
GF Pit	3.13	63.81	0.09	61.80	3.22	63.75								
HH Ext Pit	0.28	62.63			0.28	62.63								
HL Pit	1.98	64.82	0.02	65.21	2.00	64.82								
West Pit	9.45	63.19			9.45	63.19	0.05	61.88						
Detrital**							2.50	60.00						
<b>Total 2020</b>	<b>86.71</b>	<b>64.06</b>	<b>5.11</b>	<b>63.44</b>	<b>91.82</b>	<b>64.02</b>	<b>5.35</b>	<b>62.58</b>	<b>26.05</b>	<b>64.64</b>	<b>0.13</b>	<b>63.35</b>	<b>26.18</b>	<b>64.63</b>
Total 2019	90.56	64.11	5.11	63.44	95.67	64.07	5.35	62.58	29.71	64.70	0.13	63.35	29.84	64.69

The Measured and Indicated Mineral Resources are inclusive of those modified to produce Mineral Reserves.  
Totals are rounded off.

\*\* Detrital is loose fragmented material occurring in various areas at Beeshoek Mine.

**Key assumptions for Mineral Resources:**

Grade cut-off: 60% Fe.

**Modifying factors for the conversion of Mineral Resources to Mineral Reserves include:**

Grade cut-off: 60% Fe.

Mining loss: 2%.

Plant yield: On-grade (84%); Off-grade (28% to 45% depending on material type).

Price used for iron ore (US\$/t): Based on market-related long-term view and customer contracts.

Exchange rate used: Market-related.

Life-of-mine: 6 years.

\* Beeshoek Iron Ore Mine attributable interests (ARM 50%; Assore 50%).

## BEESHOEK IRON ORE MINE: STOCKPILES MINERAL RESERVES ESTIMATES AS AT 30 JUNE 2020

* Mineral Reserves are reported on a 100% basis.	Proved Reserves		Probable Reserves		Total Reserves	
	Mt	Fe%	Mt	Fe%	Mt	Fe%
Area						
North Mine (ROM on-grade)			0.04	64.00	0.04	64.00
North Mine (B ROM off-grade**)			0.04	55.00	0.04	55.00
North Mine HF Pit (ROM on-grade)			0.20	64.00	0.20	64.00
North Mine HF Pit (B ROM off-grade)			0.17	55.00	0.17	55.00
North Mine GF Pit (ROM on-grade)			0.01	64.00	0.01	64.00
South Mine Village Pit (on-grade)			0.39	64.00	0.39	64.00
South Mine Village Pit (off-grade)			0.17	55.00	0.17	55.00
South Mine East Pit (ROM on-grade)			0.04	64.00	0.04	64.00
South Mine East Pit (B ROM off-grade)			0.16	55.00	0.16	55.00
<b>Total 2020 Stockpiles</b>			<b>1.22</b>	<b>60.02</b>	<b>1.22</b>	<b>60.02</b>
Total 2019 Stockpiles			0.77	58.52	0.77	58.52

Totals are rounded off.

\*\* ROM off-grade ore is beneficiated to produce a saleable product.

\* Beeshoek Iron Ore Mine attributable interests (ARM 50%; Assore 50%).

## BEESHOEK IRON ORE MINE: LOW-GRADE STOCKPILES MINERAL RESOURCES AND MINERAL RESERVES ESTIMATES AS AT 30 JUNE 2020

* Mineral Resources and Mineral Reserves are reported on a 100% basis.	Measured Resources		Indicated Resources		Measured and Indicated Resources		Inferred Resources		Proved Reserves		Probable Reserves		Total Reserves	
	Mt	Fe%	Mt	Fe%	Mt	Fe%	Mt	Fe%	Mt	Fe%	Mt	Fe%	Mt	Fe%
Stockpile														
Tailings stockpile	2.41	56.46	0.04	54.52	2.45	56.43								
Jig stockpile			12.60	53.22	12.60	53.22					11.97	53.22	11.97	53.22
<b>Total 2020</b>	<b>2.41</b>	<b>56.46</b>	<b>12.64</b>	<b>53.22</b>	<b>15.05</b>	<b>53.74</b>					<b>11.97</b>	<b>53.22</b>	<b>11.97</b>	<b>53.22</b>
Total 2019	2.41	56.46	12.64	53.22	15.05	53.74			2.29	56.46	11.97	53.22	14.26	53.74

Mineral Resources are inclusive of Mineral Reserves.

Totals are rounded off.

**Modifying factors for the conversion of Mineral Resources to Mineral Reserves include:**

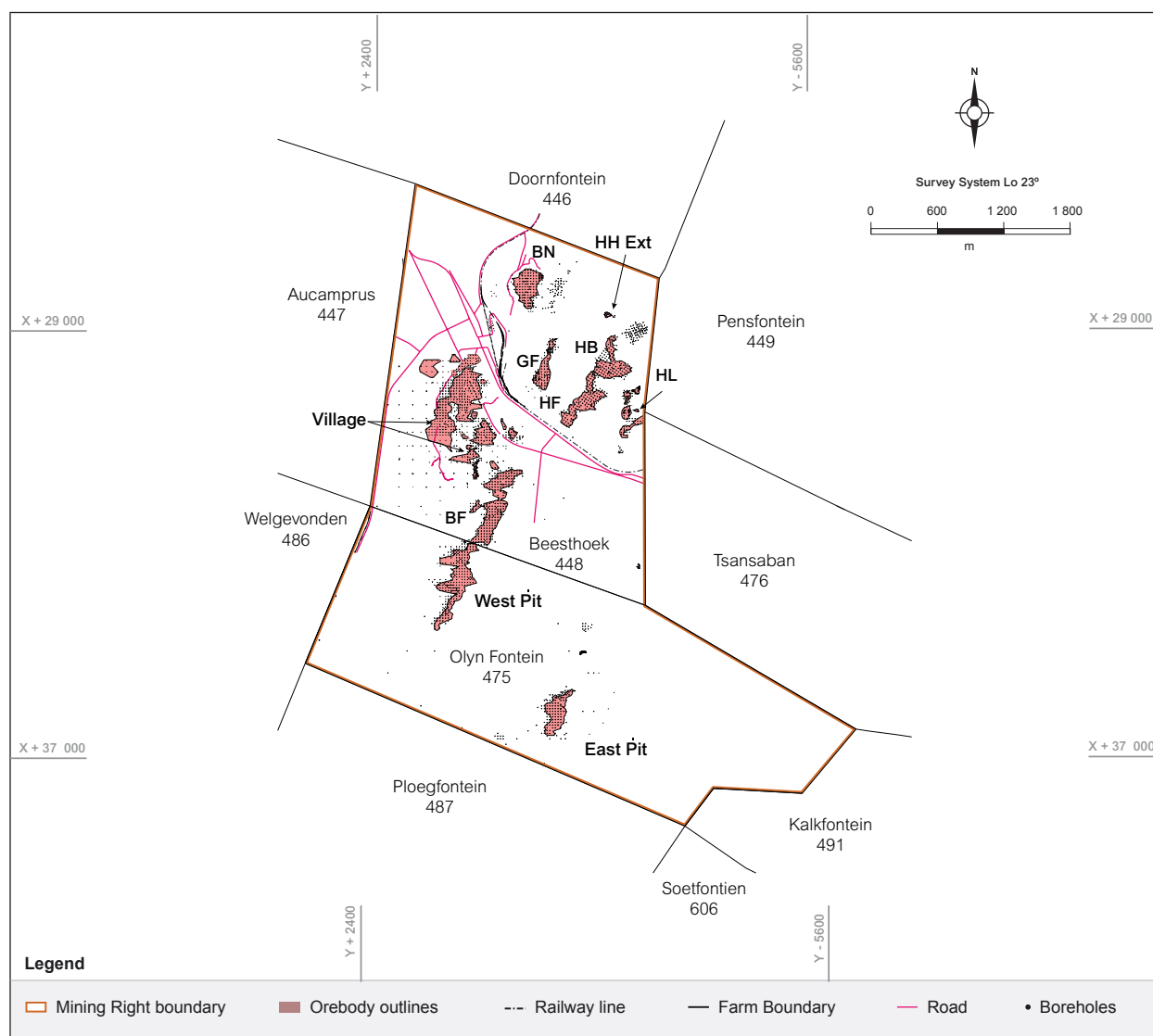
Mining loss: 5%.

Jig stockpile Yield: 49% (saleable product 5.86 Mt at 63% Fe).

\* Beeshoek Iron Ore Mine attributable interests (ARM 50%; Assore 50%).

## ARM FERROUS continued

## BEESHOEK DEPOSITS MAP



## Beeshoek year-on-year change

Measured and Indicated Mineral Resources decreased from 95.67 million tonnes at 64.07% Fe to 91.82 million tonnes at 64.02% Fe. The reduction was mainly due to production depletion.

Mineral Reserves decreased from 29.84 million tonnes at 64.69% Fe to 26.18 million tonnes at 64.63% Fe mainly due to mining depletions in Village North, HF, BN and East pits.

Stockpile Mineral Reserves increased from 0.77 million tonnes at 58.52% Fe to 1.22 million tonnes at 60.02% Fe as additional material from mining activities was stockpiled.

Measured and Indicated Mineral Resource estimates for the low-grade jig and tailings stockpiles remained the same as last year at 15.05 million tonnes at 53.74% Fe. Only the jig stockpile Mineral Reserves have been declared this year at 11.97 million tonnes at 53.22% Fe. Additional work is still in progress to convert the tailings stockpile into a Mineral Reserve.

## HISTORICAL PRODUCTION AT BEESHOEK MINE

Financial year	ROM	Saleable
	Mt	Mt
2015/2016	3.05	3.11
2016/2017	3.39	3.15
2017/2018	4.17	3.88
2018/2019	4.44	3.64
2019/2020	4.26	2.99



Additional information regarding production figures can be found in the ARM Ferrous section of the 2020 ARM integrated annual report which can be found at [www.arm.co.za](http://www.arm.co.za).

## ARM FERROUS continued

## KHUMANI IRON ORE MINE: MINERAL RESOURCES AND MINERAL RESERVES ESTIMATES AS AT 30 JUNE 2020

* Mineral Resources and Mineral Reserves are reported on a 100% basis.	Measured Resources		Indicated Resources		Measured and Indicated Resources		Inferred Resources		Proved Reserves		Probable Reserves		Total Reserves	
	Mt	Fe%	Mt	Fe%	Mt	Fe%	Mt	Fe%	Mt	Fe%	Mt	Fe%	Mt	Fe%
Pit/Area														
Bruce A	50.72	63.42	67.56	63.82	118.27	63.65			46.59	61.91	58.65	62.97	105.24	62.50
Bruce B	76.55	62.24	4.04	61.09	80.59	62.18			58.54	61.57	2.62	58.97	61.16	61.46
Bruce C	10.75	63.25			10.75	63.25			4.26	62.00			4.26	62.00
Total for Bruce pits	138.02	62.75	71.60	63.67	209.61	63.06			109.39	61.73	61.27	62.80	170.66	62.11
King Main	295.60	62.96	36.38	62.40	331.98	62.90	23.15	61.91	222.83	62.44	8.18	62.93	231.01	62.46
Mokaning South	15.46	62.35	24.78	62.62	40.25	62.51	12.03	61.78	8.79	62.08	14.12	61.43	22.91	61.68
Total King/Mokaning	311.06	62.93	61.16	62.49	372.23	62.86	35.18	61.87	231.62	62.43	22.30	61.98	253.92	62.39
<b>Total 2020</b>	<b>449.08</b>	<b>62.88</b>	<b>132.76</b>	<b>63.12</b>	<b>581.84</b>	<b>62.93</b>	<b>35.18</b>	<b>61.87</b>	<b>341.01</b>	<b>62.20</b>	<b>83.57</b>	<b>62.58</b>	<b>424.58</b>	<b>62.28</b>
Total 2019	418.99	63.01	137.30	63.22	556.29	63.06	36.10	61.13	340.19	61.97	93.25	62.58	433.44	62.10

The Measured and Indicated Mineral Resources are inclusive of those modified to produce Mineral Reserves.

Totals are rounded off.

**Key assumptions for Mineral Resources:**

Grade cut-off: 55% Fe.

**Modifying factors for the conversion of Mineral Resources to Mineral Reserves include:**

Mining loss factor: 2%.

Mining dilution: 3%.

Wash and screen recovery: 85% (on-grade).

Jig recovery: 65% (off-grade).

Grade cut-off: 54% Fe.

Price used for iron ore (US\$/t): Based on market-related long-term view and customer contracts.

Exchange rate used: Market-related.

Life-of-mine: 22 years.

\* **Khumani Iron Ore mine attributable interests (ARM 50%; Assore 50%).**

## KHUMANI IRON ORE MINE: STOCKPILES MINERAL RESERVES ESTIMATES AS AT 30 JUNE 2020

* Mineral Reserves are reported on a 100% basis.	Proved Reserves		Probable Reserves		Total Reserves	
	Mt	Fe%	Mt	Fe%	Mt	Fe%
Area						
Bruce			3.70	55.40	3.70	55.40
King			2.61	55.70	2.61	55.70
<b>Total 2020 Stockpiles**</b>			<b>6.31</b>	<b>55.52</b>	<b>6.31</b>	<b>55.52</b>
Total 2019 Stockpiles			6.04	55.08	6.04	55.08

Totals are rounded off.

\*\* Stockpiles are beneficiated to produce a saleable product.

\* **Khumani Iron Ore mine attributable interests (ARM 50%; Assore 50%).**

## KHUMANI IRON ORE MINE: LOW-GRADE STOCKPILES MINERAL RESOURCES ESTIMATES AS AT 30 JUNE 2020

* Mineral Resources are reported on a 100% basis.	Measured Resources		Indicated Resources		Measured and Indicated Resources		Inferred Resources	
	Mt	Fe%	Mt	Fe%	Mt	Fe%	Mt	Fe%
Stockpile								
Jig stockpile			17.18	54.29	17.18	54.29	1.78	55.07
<b>Total 2020</b>			<b>17.18</b>	<b>54.29</b>	<b>17.18</b>	<b>54.29</b>	<b>1.78</b>	<b>55.07</b>
Total 2019								

Totals are rounded off.

\* **Khumani Iron Ore mine attributable interests (ARM 50%; Assore 50%).**

## Khumani year-on-year change

The Measured and Indicated Mineral Resources increased from 556.29 million tonnes at 63.06% Fe to 581.84 million tonnes at 62.93% Fe after production depletion mainly due to the increase in Mokaning and King Mineral Resources.

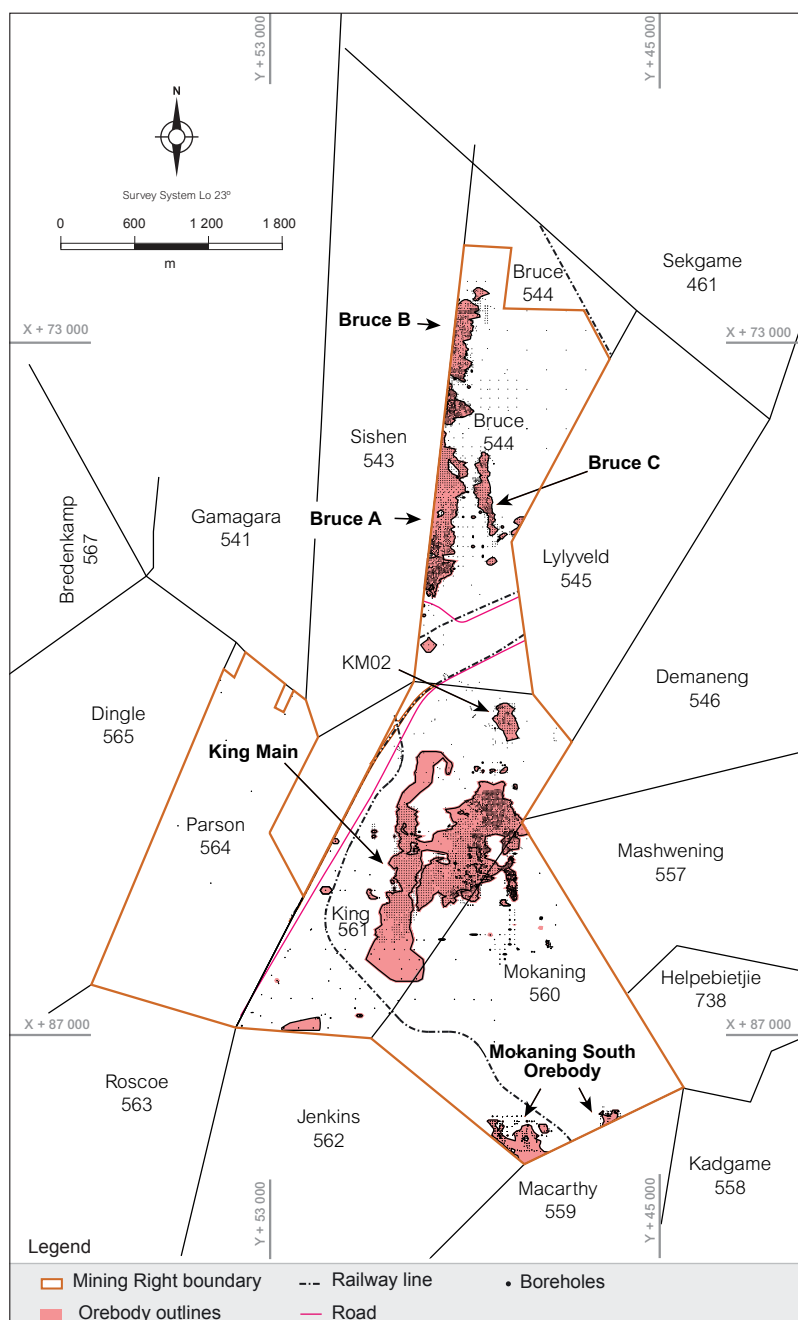
Mineral Reserves decreased from 433.44 million tonnes at 62.10% Fe to 424.58 million tonnes at 62.28% Fe primarily due to mining depletion and re-estimation of King and Mokaning areas.

Stockpile Mineral Reserves increased from 6.04 million tonnes at 55.08% Fe to 6.31 million tonnes at 55.52% Fe as a result of production from the pits.

Khumani low-grade jig stockpile of 17.18 million tonnes at 54.29% Fe of Indicated Mineral Resource and 1.78 million tonnes at 55.07% Fe Inferred Mineral Resource is declared for the first time after assessment of all the available sampling and survey data.

## ARM FERROUS continued

## KHUMANI DEPOSITS MAP



## HISTORICAL PRODUCTION AT KHUMANI MINE

Financial year	ROM	Saleable
	Mt	Mt
2015/2016	21.38	13.62
2016/2017	20.35	14.07
2017/2018	22.00	14.69
2018/2019	20.11	14.15
2019/2020	19.32	13.10



Additional information regarding production figures can be found in the ARM Ferrous section of the 2020 ARM integrated annual report, which can be found at [www.arm.co.za](http://www.arm.co.za).



# ARM COAL

## GOEDGEVONDEN COAL MINE

ARM's attributable beneficial interest in Goedgevonden's operations is 26%. The other 74% is held by Glencore Operations South Africa. The joint venture with Glencore also includes other coal operations in South Africa, Participative Coal Business (PCB), in which ARM has an economic interest of 20.2%.

PCB Coal Resources and Coal Reserves are not included in this report but are published in the Glencore report which can be found at [www.glencore.com](http://www.glencore.com)

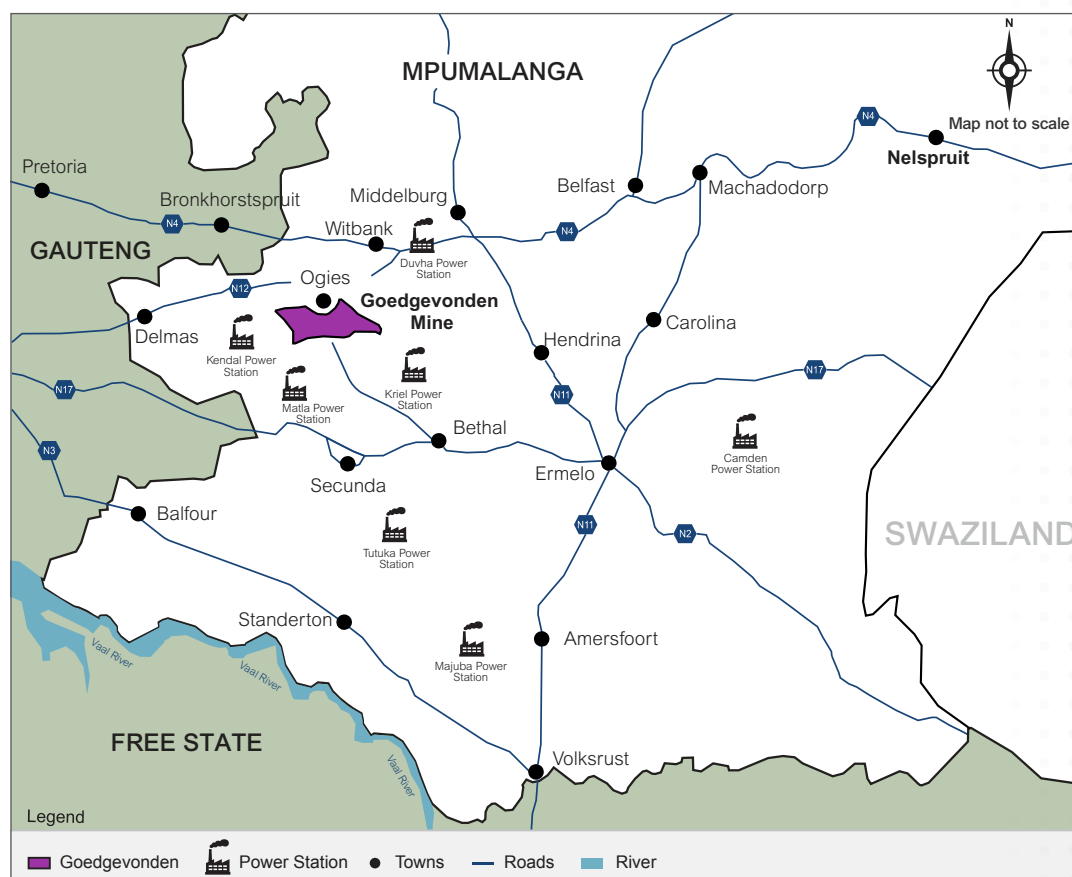
### LOCALITY

Goedgevonden Mine (GGV) is situated in the Witbank Coalfield about 7 kilometres south of the town of Ogies in Mpumalanga Province in South Africa.



## ARM COAL continued

## LOCALITY MAP OF GOEDGEVONDEN COAL MINE



Refer to page 1 for another locality map showing the Goedgevonden Coal Operation.

## HISTORY

A total of 548 surface diamond boreholes were drilled during 1964 to 2004 by Duiker Mining and Xstrata SA. Anglo Coal drilled an additional 102 boreholes for the Zaaiwater area. Most boreholes were drilled down to basement to define the seam locality and basement topography. Owing to the different campaigns, the database had to be validated to produce a consistent set of data.

## COMPETENCE

The following competent person was involved in the reporting of Goedgevonden Coal Resources and Reserves; he is employed by Glencore.

Competent person	Professional organisation	Membership number	Qualifications	Relevant experience
M Smith (Mineral Resources and Mineral Reserves)	SACNASP	400075/03	BSc Hons (Geology), MBA	28 years

## MINING AUTHORISATION

Legal entitlement	Minerals covered by Mining Right	Comment	Period of Mining Right (years)	Known impediments on legal entitlement
Mining Right MP 169MR	Coal	None	30 years: 13 November 2013 to 12 November 2043	None

## ARM COAL continued

### GEOLOGY

The stratigraphy of the Witbank Coalfield consists of five seams numbered from oldest to youngest: No 1 to No 5 Seam. The seams vary in thickness from less than 0.5 metres to over 6 metres and do not exceed 300 metres in depth from surface. The coal seams dip at less than 5°. However, coal seam morphology and qualities may be locally influenced by basement topography, surface weathering and intrusion of dolerite dykes and sills. The coal qualities vary both within and between individual coal seams.

Low-quality coals, suitable for the local steam coal market, have a calorific value of between 18 to 22 MJ/kg, whereas the high-quality export steam coal has a calorific value of greater than 27 MJ/kg. All five coal seams are developed on Goedgevonden. The No. 1 Seam is of low quality, thin and only developed in paleo-low areas. The No. 2 Seam is extensively developed and is of good quality and is, on average, 6 metres thick. The No. 3 Seam is of good quality but, with an average thickness of only 0.3 metres, is uneconomic. The No. 4 Seam, being closer to surface and although of the same thickness as the No.2 Seam, is influenced by weathering and is not as extensively developed. The No. 5 Seam is of good quality, but is preserved as erosional remnants on the high ground only and thus not extensively developed over the area. No major faults, structural disturbances or intrusives were observed in the boreholes drilled to date.

Opencast dragline mining operations in the area are extracting the No. 2, No. 4 and No. 5 Seams. The open-cut mine produces both export and domestic thermal coal.

### EXPLORATION ACTIVITIES

The exploration programme that ran from January 2019 to December 2019 targeted the mining area ahead of the current faces to be exploited during the 18 months window. Twelve TNW cored boreholes were drilled. All boreholes were drilled by Genet, and were logged and sampled on site by the resident geologist. The samples were sent to the SGS Laboratory.

Boreholes were drilled to the Pre-Karoo and most holes intercepted all the seams developed at GGV (5, 4, 3, and 2 seam). On the 2 and 4 seam intersections four and three samples were taken respectively per seam, while one sample were taken on the 3 and 5 seam. Full washability was conducted at an RD of 1.3 to 1.85 at 0.5 intervals. Proximate, as well as CV and sulphur analyses were conducted on all the floats and the sink fraction. The boreholes were incorporated into the 2020 geological model. The total cost of all the drilling and laboratory analyses was R0.78 million.

### MINING METHODS AND INFRASTRUCTURE

Open-cut mining methods are utilised at Goedgevonden Coal Mine.

### COAL RESOURCES

Borehole data for the mine is captured into the Geobank database. Minex provides the geological and mine planning software solution for the mine. Two-dimensional resource models are generated with block sizes of 50 x 50 metres.

All estimations of the individual blocks are done using inverse distance cubed with an isotropic search. Other software packages used in the evaluation are 'Washproduct' and 'Xpac'.

The Coal Resources declared have reasonable and realistic prospects for eventual economic extraction on consideration the following:

- Location, quality, grade and geological continuity which are known and are supported by drilling information which includes sampling
- Only coal in seams of specific thicknesses with coal qualities as specified under the Coal Resources table are declared as they meet customer requirements
- Mining and processing methods are well established at the operation and are currently used to exploit the orebody
- All other factors such as legal, infrastructural, environmental, marketing, social and economic factors are covered as part of the mining plan for the operation

### COAL RESERVES

Measured and Indicated Coal Resources are converted to Coal Reserves by applying the modifying factors such as mining losses, mining dilution, coal quality requirements, and seam thickness cut-offs. Details of these parameters are provided in the footnotes on the Coal Reserves tables.

The following tables show the Goedgevonden Coal Resources and Coal Reserves obtained from Glencore, reflecting the status as at 31 December 2019. Coal Resources and Reserves of the Glencore mines are the responsibility of the Glencore Coal Resources and Coal Reserves team.





## ARM COAL continued

**GOEDGEVONDEN COAL MINE: COAL RESOURCES ESTIMATES AS AT 31 DECEMBER 2019**

* Coal Resources are reported on a 100% basis.	Coal type and qualities	Coal Resources			
		Measured MTIS****	Indicated MTIS	Measured and Indicated MTIS	Inferred MTIS
<b>Total 2020</b>	<b>Thermal coal (Mt)</b>	<b>490</b>	<b>7</b>	<b>497</b>	<b>1</b>
	<b>CV (MJ/kg)</b>	<b>19.82</b>	<b>18.28</b>	<b>19.80</b>	<b>16.72</b>
	<b>Ash (%)</b>	<b>32.31</b>	<b>34.67</b>	<b>32.34</b>	<b>40.91</b>
	<b>VM (%)</b>	<b>21.86</b>	<b>21.29</b>	<b>21.85</b>	<b>18.96</b>
	<b>S (%)</b>	<b>1.16</b>	<b>1.07</b>	<b>1.16</b>	<b>0.85</b>
Total 2019	Thermal coal (Mt)	510	7	517	1
	CV (MJ/kg)	19.82	18.28	19.80	16.72
	Ash (%)	32.31	34.67	32.34	40.91
	VM (%)	21.86	21.29	21.85	18.96
	S (%)	1.16	1.07	1.16	0.85

Coal Resources are inclusive of those modified to produce Coal Reserves.

\*\*\*\* MTIS – Mineable Tonnes In Situ Coal Resources are now reported as per SAMREC Code of 2016 requirements.

*Mining method is open-cut.*

CV – calorific value; VM – volatile matter; S – sulphur.

Totals are rounded off.

**Key assumptions for Coal Resources:**

*Coal Resources qualities are reported on an air-dried moisture basis.*

Geological loss: 6%.

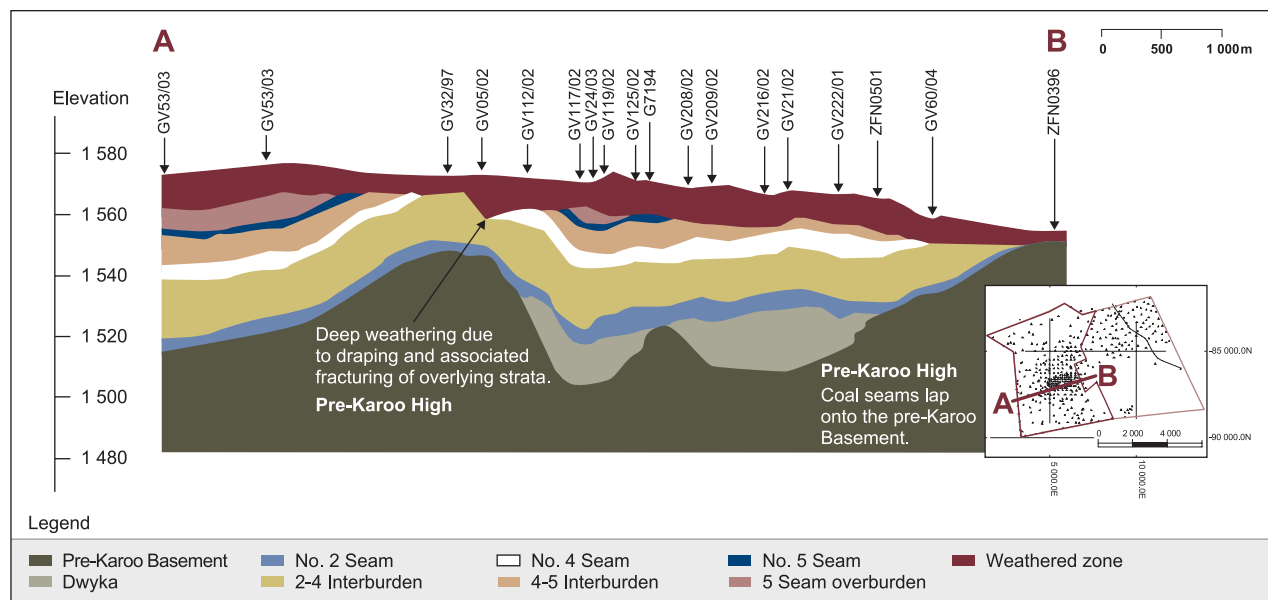
Density ranges: 1.3 t/m<sup>3</sup>–1.8 t/m<sup>3</sup>.

Seam thickness cut-off: 1 metre (combined Seams 2 and 4); 0.5 metres (Seams 1 and 5).

Qualities cut-off: Ash: 50%; VM: 20%; S: 3%.

\* *Goedgevonden Coal Mine attributable interests (ARM 26%; Glencore Operations 74%).*

## SECTION SHOWING GOEDGEVONDEN COAL SEAMS



## ARM COAL continued

## GOEDGEVONDEN COAL MINE: COAL RESERVES ESTIMATES AS AT 31 DECEMBER 2019

* Coal Reserves are reported on a 100% basis.	Coal type and qualities	Coal Reserves (ROM)			Coal type and qualities	Coal Reserves (Saleable)		
		Proved	Probable	Total Reserves		Proved	Probable	Total Reserves
<b>Total 2020</b>	<b>Thermal coal (Mt)</b> <b>CV (MJ/kg)</b> <b>Ash (%)</b> <b>VM (%)</b> <b>S (%)</b>	<b>280</b>		<b>280</b> <b>19.57</b> <b>33.73</b> <b>20.71</b> <b>1.03</b>	<b>Thermal coal (Mt)</b> <b>HG export (Mt)</b> <b>Export CV (Kcal/kg)</b> <b>LG export (Mt)</b> <b>LG export CV (MJ/kg)</b>	<b>172</b>		<b>172</b> <b>73</b> <b>6000</b> <b>99</b> <b>21.50</b>
Total 2019	Thermal coal (Mt) CV (MJ/kg) Ash (%) VM (%) S (%)	280	10	290 19.64 33.23 21.33 1.12	Thermal coal (Mt) Export (Mt) Export CV (Kcal/kg) Domestic (Mt) Domestic CV (MJ/kg)	173	5	178 79 6 000 99 21.50

Saleable Coal Reserves are on a net as received moisture basis.

Coal Reserves qualities are reported on an air-dried moisture basis.

Totals are rounded off.

Mining method is open-cut.

CV – calorific value; VM – volatile matter; S – sulphur.

**Modifying factors for the conversion of Coal Resources to Coal Reserves include:**

Mining loss factor: 6%.

Plant yields: Export – 15%; Domestic – 45%.

Price used: Short-term – based on the API4; Long-term – based on market-related long-term view and customer contracts.

Exchange rate (R/US\$): Market-related.

Seam thickness cut-off: 1 metre (combined Seams 2 and 4); 0.5 metres (Seam 5).

Qualities cut-off: Domestic: CV: 18%; Ash: 35%; VM: 20%; S: 1.5%. Export: All coal beneficiated.

Life-of-mine: 24 years.

\* Goedgevonden Coal Mine attributable interests (ARM 26%; Glencore Operations 74%).

## Year-on-year change

Measured and Indicated Coal Resources decreased from 517 million tonnes to 497 million tonnes mainly due to production depletion and a reduction in No. 2 Seam Coal Resources due to a re-interpretation of the No. 2 Seam sub-outcrop.

Coal Reserves (ROM) similarly decreased from 290 million tonnes to 280 million tonnes mainly due to mining depletion. A change in the mining plan accounted for an increase of 1.6 million tonnes in the Coal Reserves (ROM).

## HISTORICAL PRODUCTION AT GOEDGEVONDEN COAL MINE

Financial year	ROM	Saleable
	Mt	Mt
2015/2016	9.9	6.5
2016/2017	10.8	6.5
2017/2018	9.6	6.0
2018/2019	11.4	7.0
2019/2020	10.9	6.8



Additional information regarding production figures can be found in the ARM Coal section of the 2020 ARM integrated annual report which can be found at [www.arm.co.za](http://www.arm.co.za).

# HARMONY GOLD

ARM owns 12.4% of Harmony's issued share capital. Harmony is separately run by its own management team. Mineral Resources and Mineral Reserves of the Harmony mines are the responsibility of the Harmony team and are published in Harmony's annual report.



The report can be found on [www.harmony.co.za](http://www.harmony.co.za).



# Glossary of terms

## Mass units

### tonnes:

metric system unit of mass equal to 1 000 kilograms

### Mt:

million tonne; metric system unit of mass equal to 1 000 000 metric tonnes

### Moz:

million troy ounces

### MTIS:

Mineable Tonnes In Situ, adjusted for geological losses

## Grade units

### g/t:

grams per tonne

### 4E:

The sum of Platinum, Palladium, Rhodium and Gold grades in grams per tonne (g/t)

### 6E:

The sum of Platinum, Palladium, Rhodium, Ruthenium, Iridium and Gold in grams per tonne (g/t)

### % Fe:

weight percent Iron

### % Mn:

weight percent Manganese

### %Ni:

weight percent Nickel

### % Cu:

weight percent Copper

### % Co:

weight percent Cobalt

### CV:

Calorific Value

### kcal/kg:

kilocalories per kilogram

### MJ/kg:

megajoules per kilogram

## Professional organisations

### ECSA:

Engineering Council of South Africa

### GSSA:

Geological Society of South Africa

### IMSSA:

The Institute of Mine Surveyors of South Africa

### SACNASP:

South African Council for Natural Scientific Professions

### SAIMM:

South African Institute of Mining and Metallurgy

## Other abbreviations within the report

### ARM:

African Rainbow Minerals Limited

### ASSMANG:

Assmang Proprietary Limited

### IAR:

Integrated annual report

### JSE:

Johannesburg Stock Exchange

### QAQC:

Quality Assurance/Quality Control

### RPEEE:

Reasonable and realistic prospects for eventual economic extraction

### API4:

Benchmark price reference for coal exported from South Africa's Richards Bay terminal

# Contact details

## African Rainbow Minerals Limited

Registration number: 1933/004580/06  
Incorporated in the Republic of South Africa  
JSE share code: ARI  
A2X share code: ARI  
ISIN: ZAE000054045

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## Auditors

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Internal auditors: Deloitte & Touche and BDO South Africa

## External assurance provider

IBIS ESG Consulting Africa (Pty) Ltd

## Bankers

Absa Bank Limited  
FirstRand Bank Limited  
The Standard Bank of South Africa Limited  
Nedbank Limited

## Sponsors

Investec Bank Limited

## Transfer secretaries

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## Directors

Dr PT Motsepe (executive chairman)  
MP Schmidt (chief executive officer)  
F Abbott\*  
M Arnold\*\*  
TA Boardman\*  
AD Botha\*  
JA Chissano (Mozambican)\*  
WM Gule\*  
AK Maditsi\*  
J Magagula  
TTA Mhlana (finance director)  
HL Mkatshana  
P Mnisi\*  
DC Noko\*  
Dr RV Simelane\*  
JC Steenkamp\*

\* Independent non-executive

\*\* Non-executive

## FORWARD-LOOKING STATEMENTS

Certain statements in this report constitute forward-looking statements that are neither reported financial results nor other historical information. They include statements that predict or indicate future earnings, savings, synergies, events, trends, plans or objectives. Such forward-looking statements may or may not take into account and may or may not be affected by known and unknown risks, uncertainties and other important factors that could cause actual results, performance or achievements of the company to be materially different from future results, performance or achievements expressed or implied by such forward-looking statements. Such risks, uncertainties and other important factors include: economic, business and political conditions in South Africa; decreases in the market price of commodities; hazards associated with underground and surface mining; labour disruptions; changes in government regulations, particularly environmental regulations; changes in exchange rates; currency devaluations; inflation and other macro-economic factors; and the impact of the Covid-19 pandemic. The forward-looking statements apply only as of the date of publication of these pages. The company undertakes no obligation to update publicly or release any revisions to these forward-looking statements to reflect events or circumstances after the date of publication of these pages or to reflect any unanticipated events.



[www.arm.co.za](http://www.arm.co.za)