

# THE MINERAL CORPORATION

ADVISORS TO THE MINERAL BUSINESS

# Prepared on behalf of Tembo Gold Corp

#### Technical Report on the Tembo Gold Project, Geita Region, Tanzania Prepared under the Guidelines of National Instrument 43-101 and accompanying documents 43-101F1 and 43-101CP

By The Mineral Corporation Effective Date: July 31, 2012

Prepared by:

N D Pauls; MSc, PrSciNat

A C Goldsmith; MSc, PrSciNat, ACSM

1 TITLE PAGE Report No. C-LRT-TTT-1269-793

P O Box 1346, Cramerview 2060, South Africa Homestead Office Park, 65 Homestead Avenue, Bryanston 2021 Telephone: +27 11 463-4867 Facsimile: +27 11 706-8616 e-mail: business@mineralcorp.co.za

© Copyright Mineral Corporation Consultancy (Pty) Ltd

This document is for the use of Tembo Gold Corp only and may not be transmitted to any other party, in whole or in part, in any form without the written permission of Mineral Corporation Consultancy (Pty) Limited

#### DATE AND SIGNATURE

Effective date: July 31, 2012

Signatories:

N D Pauls Senior Geological Advisor

aller

A C Goldsmith Senior Geological Advisor

Dated: August 31, 2012



the MINERAL CORPORATION ADVISORS TO THE MINERAL BUSINESS

ii

## ILLUSTRATIONS

All illustrations are located at the appropriate part of the report.



iii

#### 2 TABLE OF CONTENTS

1	TITLE PAGE	
2	TABLE OF CONTENTS	iv
3	SUMMARY (ITEM 1)	1
4	INTRODUCTION (ITEM 2)	6
	4.1 Terms of Reference	6
	4.2 Information Sources	6
	4.3 Structure of the Report	
5	RELIANCE ON OTHER EXPERTS (ITEM 3)	6
6	PROPERTY DESCRIPTION AND LOCATION (ITEM 4)	7
	6.1 Mineral Right Legislation in Tanzania	7
	6.2 Prospecting Licences on the Property	8
	6.3 Primary Mining Licences	.10
7	ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY	
	(ITEM 5)	.12
8	PROJECT INFRASTRUCTURE (ITEM 18)	.14
9	HISTORY (ITEM 6)	.14
	9.1 Previous Ownership	.14
	9.2 Previous Work	.14
	9.2.1 Mapping	.15
	9.2.2 Geophysics	
	9.2.3 Surface Geochemistry	.15
	9.2.4 Drilling	
	9.2.5 Artisanal Mining	
10	EXPLORATION (ITEM 9)	
	10.1 Exploration Rationale and Objectives	
	10.2 Database Review of historical work	
	10.3 Geological Mapping	
	10.4 LIDAR Survey	
	10.5 Reinterpretation of Airborne Geophysics	
	10.6 Ground Geophysics Survey	
	10.7 Geochemical Sampling	
	10.8 Database Management	
11	DRILLING (ITEM 10)	
	11.1 Ngula 1	
	11.2 Ngula 2	
	11.3 Nyakagwe East	
	11.4 Nyakagwe Village	
	11.5 Mgusu	
10	11.6 Iyenze/Bulyanhulu	
12	DEPOSIT TYPES (ITEM 8)	
13	GEOLOGICAL SETTING AND MINERALIZATION (ITEM 7)	
	13.1 Regional Geology	
	13.2 Local Geology	
	13.3 Project Geology Structure Alteration and Mineralization	
1/	13.4 Mineralization Model SAMPLING METHOD AND APPROACH <i>(ITEM11)</i>	.20
14		
	14.1 Diamond Holes	
	<ul><li>14.1.1 Sample Collection</li><li>14.1.2 Core Orientation</li></ul>	
	<ul><li>14.2 Reverse Circulation Drilling</li><li>14.2.1 Sample Collection</li></ul>	
	14.2.1 Sample Collection	
		. UZ



	14.2.3 Collar Surveys	62
15	SAMPLE PREPARATION ANALYSIS AND SECURITY (ITEM11)	62
	15.1 Sample Preparation and Security	62
	15.2 Analysis	
	15.2.1 Primary Analysis	63
	15.2.2 Quality Assurance/Control Analysis	63
16	DATA VERIFICATION (ITEM12)	68
17	MINERAL PROCESSING AND METALLURGICAL TESTING (ITEM13)	68
18	MINERAL RESOURCE ESTIMATES (ITEM 14)	
19	MINERAL RESERVE ESTIMATES (ITEM 15)	
20	MINING METHODS (ITEM 16)	70
21	RECOVERY METHODS (ITEM 17)	70
22	MARKET STUDIES AND CONTRACTS (ITEM 19)	70
23	ADJACENT PROPERTIES (ITEM 23)	70
24	OTHER RELEVANT DATA AND INFORMATION (ITEM 24)	70
25	INTERPRETATION AND CONCLUSIONS (ITEM 25)	72
26	RECOMMENDATIONS (ITEM 26)	72
27	REFERENCES (ITEM 27)	76

#### LIST OF FIGURES

Figure 1:	Locality plan of the Project	.5
Figure 2:	Status of Mineral Title on the Project1	1
Figure 3:	Average temperature in °C in Project area1	.2
Figure 4:	Maximum and minimum temperatures in °C in Project area1	.2
Figure 5:	Average rainfall in mm in Project area1	3
Figure 6:	Humidity in percentage in Project area1	
Figure 7:	Fugro airborne magnetic/radiometric survey contracted by Lakota 20031	.8
Figure 8:	Summary of historical soil sampling, anomalies defined by Lakota 1999-20041	
Figure 9:	Summary of historical RAB drilling anomalies defined by Lakota 2002-20082	20
Figure 10:	Summary of historical reverse circulation and diamond drilling anomalies defined	
	by Lakota 2002-20082	21
Figure 11:	Historical gold mineralized zones and targets for follow up defined by Lakota 2008.2	22
Figure 12:	Tembo's exploration targets	
Figure 13:	LIDAR survey elevation contours	<u>2</u> 4
Figure 14:	LIDAR survey derived DEM shaded from the northeast2	25
Figure 15:	LIDAR survey ortho-rectified figure2	26
Figure 16:	LIDAR survey interpretation	27
Figure 17:	Area of reinterpreted airborne geophysics2	28
Figure 18:	Relationship of artisanal mining areas, northeast faulting and strong magnetic	
	trends2	29
Figure 19:	Gold targets determined from reinterpretation of Fugro airborne survey	30
Figure 20:	Field mapping and ground geophysics plan overlain on aeromagnetic data	31
Figure 21:	Locality plan of positions of artisanal sampling	32
Figure 22:	Planned phase 1 drilling programme overview	34
Figure 23:	Phase 1 drilling programme on Ngula 1	39
Figure 24:	Phase 1 drilling programme on Ngula 24	
Figure 25:	Phase 1 drilling programme on Nyakagwe East4	1
Figure 26:	Phase 1 drilling programme on Nyakagwe Village4	
Figure 27:	Phase 1 drilling programme on Mgusu4	
Figure 28:	Phase 1 drilling programme on Iyenze/Bulyanhulu4	14
Figure 29:	Regional geology (after Barth 1990)4	<del>1</del> 6
Figure 30:	Local geology (after geological survey of Tanzania 1999)4	ł7
Figure 31:	Interpreted local geology at Ngula 14	19
Figure 32:	Interpreted stratigraphic column for Ngula 15	50



Figure 33:	Interpreted north south section through Ngula 15	1
Figure 34:	Well developed shear fabric in TDD0004. Core width is 48mm5	2
Figure 35:	Sulphide rich metavolcanic rock with extensive chlorite mica alteration. Core	
	width is 48mm	2
Figure 36:	Typical light grey quartz vein within meta-volcanic rock. Core width is 48mm5	3
Figure 37:	Interpreted geology of Nyakagwe East5	4
Figure 38:	Interpreted stratigraphic column for Nyakagwe East5	5
Figure 39:	Interpreted southwest to northeast section through Nyakagwe East5	6
Figure 40:	Massive quartz vein with abundant euhedral pyrite grains. Core width is 48mm5	7
Figure 41:	Visible gold hosted by a smoky grey quartz vein. Core width is 48mm5	7
Figure 42:	Mineralization model (Groves & Phillips 1987)5	9
Figure 43:	Splitting process for reverse circulation sampling	
Figure 44:	Mwanza blanks for different batches	5
Figure 45:	AuBlank42 blanks for different batches6	
Figure 46:	AMIS 108 blanks for different batches6	6
Figure 47:	Plot of the error deviations defined by comparisons of the assayed abundances	
	and certified abundances for standards inserted in the sample streams	6
Figure 48:	Error Deviations plotted against certified Au concentrations of specific Standards6	7
Figure 49:	% Mean Deviations for Field repeats	
Figure 50:	Mean deviations for repeat samples on diamond drill holes	8
Figure 51:	Properties adjacent to and within the Project7	1
Figure 52:	Proposed short term drilling programme (June to August 2012)7	5

#### LIST OF TABLES

Table 1:	Granted prospecting licences and pending prospecting licence applications	10
Table 2:	Summary of historical exploration activity on the Project prior to 2011	15
Table 3:	Summary of data used	64
	Indicative budget estimate for Phase 1 follow up exploration programme	
Table 5:	Indicative budget estimate for Phase 2 follow up exploration programme	.74



#### 3 SUMMARY (ITEM 1)

#### **Property and Ownership**

Tembo Gold Corp ("Tembo") is the successor through corporate re-organisation and management changes to Lakota Resources Incorporated ("Lakota"). Tembo's wholly owned Tanzanian-registered subsidiaries are the sole licence holders of the Prospecting Licences that make up the Tembo gold project (the "Project").

The Project comprises 33 Prospecting Licences and five Prospecting Licence applications.

#### Location

The project area is 101 km<sup>2</sup> in extent, centred at 32° 26' east and 3° 11' south. It is mainly situated in the Geita Region of northwest Tanzania, but extends south into the Kahama District of the Shinyanga Region (Figure 1). African Barrick Gold's Bulyanhulu Mine is situated immediately adjacent to the Project.

#### Geology

The Project is located on the Archaean age Tanzania Craton, which extends through central Tanzania, western Kenya and south-eastern Uganda (Figure 1). The Tanzanian Craton covers approximately 500,000 km<sup>2</sup>, and consists of a series of volcanosedimentary greenstone belts separated by granite-gneiss terranes.

The Sukumaland Greenstone Belt ("SGB") underlies the Project. The SGB consists of an inner belt which comprises predominantly mafic metavolcanics of the Lower Nyanzian Group, while an outer belt consists of the Upper Nyanzian metasediments, felsic and intermediate metavolcanics.

In general, the greenstone belts of the Tanzania Craton have been subjected to lower to middle greenschist facies metamorphism, with little significant fabric except around contact aureoles with the granitic plutons, and within shear zones. The area has also been subjected to Tertiary age weathering, resulting in the development of ferricretes, laterites and saprolites.

Drilling has indicated that the central portion of the Project is composed of mafic metavolcanics, which strike both northwest-southeast and east-west, and dip subvertically. These metabasalts are interspersed with isolated meta-sedimentary units, mafic to ultramafic intrusions, and quartz-feldspar porphyries. Gold mineralization is associated with quartz veins in mafic metavolcanics. Both reverse circulation and diamond core drilling have intersected significant gold values.

## **Exploration Rationale**

Tembo commenced a comprehensive exploration programme in 2012 to investigate seven target areas. The targets were defined from historical soil and RAB geochemistry and drilling, outlining artisanal gold workings from Laser Imaging, Detection and Ranging ("LIDAR") survey data, a revised interpretation of a 2003 airborne geophysics survey and field mapping.

## **Status of Exploration**

A drilling programme planned to comprise approximately 115 diamond core holes (27,500 m) and 470 reverse circulation holes (60,000 m) commenced in January 2012



to test certain of these targets. At the time of this report, the current Phase 1 exploration programme had delivered:

#### Diamond Core Drilling

- 43 completed holes
- 12,723.20 m drilled
- 5,646 samples submitted
- 5,066 assays received

#### **Reverse Circulation Drilling**

- 84 completed holes
- 15,041 m drilled
- 7,851 samples submitted
- 6,768 assays received

The current drilling phase is drawing to a close and, pending the return of the last drill results, the drilling programme has been slowed down to allow a thorough review, structural analysis and interpretation of all results prior to commencing the next phase.

No mining development or mining operations have been conducted by Tembo on the Project to date.

No Mineral Resource or Mineral Reserve estimates have been completed by Tembo to date.

#### **Conclusions and Recommendations**

The historical prospecting undertaken by various companies between 1997 and 2008 identified a number of drill targets, which were confirmed and enhanced by early stage reconnaissance mapping and sampling by Tembo during 2011.

The results of the current drilling programme, which was based on historical soil and RAB geochemistry and drilling, LIDAR, an aeromagnetic survey and field mapping, have confirmed the existence of gold mineralization. The short term focus of the drilling programme is on areas directly under artisanal mining operations. The long term objective of testing any areas that may host gold mineralization identified from previous exploration remains in place.

The reverse circulation and diamond drilling at Ngula 1 target has shown the presence of gold mineralization in a number of structures along a strike of 600 m, and at the Nyakagwe East target has defined a continuous zone of mineralization 1,000 m in strike extent.

Follow up drilling at both of these targets will be aimed at initially providing further structural definition. This will direct the drilling to extend these zones along strike and down dip with the aim of establishing the gold grade and defining a gold resource.

Diamond drilling will be continued on other targets beneath zones of artisanal mining to establish the presence of potentially economic gold mineralization and reverse circulation drilling will test hidden potential structures indicated by earlier exploration geophysical surveys and near surface sampling including soil geochemistry.



Subsequent to the completion of this current programme, Phase 1 will commence with one reverse circulation and one diamond rig. This phase will comprise approximately six diamond holes on Ngula 1 and two holes on Mgusu. Eight reverse circulation holes are planned on the Buly Trend target, fifteen on Mgusu and five holes on the Nyakagwe Village target. The exploration budget for this phase of exploration is summarized in the table below.

	TOTAL	Buly Trend	Mgusu	Ngula 1 & 2	Nyakagwe Village	Iyenze	Nyakagwe East
				US\$			
Personnel, consultants, travel and accommodation	39,0000	35,000	105,000	150,000	100,000	-	-
Drilling and geophysical surveys	177,5000	350,000	750,000	475,000	200,000	-	-
CSR, environmental and scoping studies	155,000	20,000	30,000	75,000	30,000	-	-
Analytical costs and metallurgical test work	190,000	30,000	50,000	45,000	65,000	-	-
Operating costs and overheads	75,000	10,000	12,500	37,500	15,000	-	-
Overheads, contingency and provision for additional work	390,000	50,000	150,000	140,000	50,000	-	-
TOTAL	2,975,000	495,000	1,097,500	922,500	460,000	-	-
Work Programme by target							
Diamond Drilling, metres	2,500		750	1,750	0		-
Reverse Circulation Drilling, metres	8,500	2,500	4,500	0	1,500		

On the completion of the Phase 1 follow up exploration programme, which is designed to improve targeting, Tembo will continue with a further phase of exploration as summarized in the following table.

The final interpretation of all results from the completed drilling programs may affect the details of the proposed and planned drill program of the next phase of exploration and the distribution of expenditure between targets.



	TOTAL	Buly Trend	Mgusu	Ngula	Nyakagwe Village	Iyenze	Nyakagwe East
		5%	15%	40%	5%	5%	30%
				US\$			
Personnel, consultants, travel and accommodation	1,417,900	70,900	212,800	567,200	70,900	70,900	425,200
Drilling and geophysical surveys	6,467,600	323,400	970,000	2,586,700	323,400	323,400	1,940,700
CSR, environmental and scoping studies	1,032,800	51,600	155,000	413,300	51,600	51,600	309,700
Analytical costs and metallurgical test work	407,100	20,400	61,000	162,800	20,400	20,400	122,100
Operating costs and overheads	274,600	13,700	41,200	110,000	13,700	13,700	82,300
TOTAL	9,600,000	480,000	1,440,000	3,840,000	480,000	480,000	2,880,000
Corporate overheads contingency, provision work	, 5,						
TOTAL	2,400,000 <b>12,000,000</b>						

The complex and locally variable nature of gold mineralization within Archaean granite-greenstone terranes dictates the need for flexibility in the drilling programme, but perseverance on individual targets.



the MINERAL CORPORATION ADVISORS TO THE MINERAL BUSINESS



Figure 1: Locality plan of the Project



## 4 **INTRODUCTION** (ITEM 2)

#### 4.1 Terms of Reference

This document complements and updates the National Instrument 43-101 "Report on the Tembo Gold Project" by C. Verley and J. Krynauw, effective 30 October 2011.

The Tembo gold project (the "Project") in the United Republic of Tanzania ("Tanzania") is owned by Tembo Gold Corp ("Tembo"). The Mineral Corporation was contracted by Tembo in 2011 to manage a detailed, staged exploration programme on its Project to test anomalous gold zones. The authors of this report have conducted prolonged and extensive site visits to the Project.

The report has been prepared for Tembo as per the requirements of National Instrument 43-101 Standards of Disclosure for Mineral projects ("NI 43-101") as set out in Form 43-101F1 (June 2011).

## 4.2 Information Sources

Historical technical information has been provided by Tembo and was sourced from the digital data files of the exploration work conducted by Tembo's predecessor Lakota Resources Incorporated ("Lakota") and others who had explored the Project. The reader is referred to the NI 43-101 report of 30 October 2011 for the details of historical exploration conducted on the Project.

The current exploration detailed in this report consists of an exploration programme conducted on behalf of Tembo by The Mineral Corporation during 2011 and the current Phase 1 drilling which commenced in January 2012.

The authors have personally inspected the Project numerous times between August 2011 and July 2012 to verify the historical and current exploration programmes.

## 4.3 Structure of the Report

In accordance with the requirements of Form 43-101F1 all relevant items (the "Items") have been reported. These Items have been indicated in brackets in italics after the section headings.

## 5 **RELIANCE ON OTHER EXPERTS** (*ITEM 3*)

This report includes information from work performed on behalf of previous holders of the Project which was provided to The Mineral Corporation by Tembo. The Mineral Corporation has reviewed the historical data, information and reports listed below.

- The airborne geophysical surveys of Fugro Limited ("Fugro") as described in the Fugro Logistics' Report dated 2003 and discussed in Item 8; and
- The drillhole locations for the 2008 diamond drilling programme which have been verified, and the drill core generated by this drilling has been examined, Item 8.

Information pertaining to the exploration currently conducted by Tembo includes:



- - © Mineral Corporation Consultancy (Pty) Ltd Report No. C-LRT-TTT-1269-793, August 2012 NI 43-101 Technical Report on the Tembo Project

- Title and status of the mineral tenure as at July 2012, as described in Item 6, was supplied by Tembo;
- Re-interpretation of the Fugro geophysical data by GRS Consulting (Pty) Ltd ("GRS") in 2011, as described in Item 12;
- A Laser Imaging, Detection and Ranging ("LIDAR") survey commissioned in 2011 through the Aircraft Operating Company ("AOC"), as described in Item 12;
- Microsearch CC, petrographic descriptions of thin sections, as described in Item 11; and
- A modified gold deportment study by SGS South Africa (Pty) Ltd, as described in Item 13.

The authors of this report are not qualified to provide commentary on legal issues associated with Tembo and/or its subsidiaries' right to the Project and have relied on the documents noted above.

The authors disclaim responsibility for the accuracy of the information derived from these documents noted above.

#### 6 **PROPERTY DESCRIPTION AND LOCATION** (ITEM 4)

Tembo, through its wholly owned, Tanzanian registered subsidiaries, own numerous Prospecting Licences in Tanzania.

The Project covers an area of approximately 101 km<sup>2</sup> and is centred at latitude 3° 10' south and longitude 32° 26' east. It is situated in the Geita Region of northwest Tanzania, although the southern part extends into the Kahama District of the Shinyanga Region. African Barrick Gold plc's Bulyanhulu Mine is located approximately 4 km east of the Project boundary (Figure 1).

#### 6.1 **Mineral Right Legislation in Tanzania**

The mineral rights in Tanzania fall under the jurisdiction of the Ministry of Energy and Minerals of the central government. Mineral rights take several forms depending on the nature of the commodity sought and the applicant. For most commodities, with the exception of diamonds, gemstones and building materials, and for applicants that are not Tanzanian Nationals - as is the case with Tembo -Prospecting Licences are the most common form of tenure.

Under PART IV of the Mining Act, 2010, (the "Mining Act") Tanzania issues the following licences:

Prospecting Licence issued under:

32.-(1) (a) for the initial prospecting period for which the applicant has applied, a period not exceeding four years;

32.-(1) (b) where application for renewal has been made by the holder in the prescribed form, for the first period of renewal for which the applicant has applied, a period not exceeding three years;

32.-(1) (c) where application for renewal has been made by the holder in the prescribed form, for the second period of renewal for which the applicant has applied, a period not exceeding two years;

32.-(1) (d) where the holder is not in default and at the end of the second period of renewal a further period is required to complete a feasibility



study, already commenced by the holder, for such further period as may be reasonably required for that purpose, but not exceeding two years.

• Retention Licence is issued under:

37.-(1) to the holder of a Prospecting Licence other than a Prospecting Licence for building materials or gemstones who may apply to the Minister for the grant of a retention licence on the grounds that -

- (a) he has identified a mineral deposit within the prospecting area which is potentially of commercial significance; and
- (b) the mineral deposit cannot be developed immediately by reason of technical constraints, adverse market conditions or other economic factors which are, or may be, of a temporary character.

A Retention Licence is granted for a period not exceeding five years and on such conditions for the preservation of the mineral deposit and the protection of the environment as the Minister may determine.

• Special Mining Licence and Mining Licence

The holder of a Prospecting Licence or a Retention Licence is entitled to the grant of a Special Mining Licence under Section 42 or a Mining Licence under Section 50 for the mining within the prospecting area or the retention area of minerals to which the Prospecting Licence, or the Retention Licence, applies.

A Special Mining Licence is issued for a large scale mining operation, whose capital investment is not less than US\$ 100 M or its equivalent in Tanzanian shillings. This type of licence shall be for the estimated life of the ore body indicated in the feasibility study report, or such period as the applicant may request, whichever period is shorter. A renewal may be applied for a period not exceeding the estimated life of the ore body.

A Mining Licence is issued for a medium scale mining operation, whose capital investment is between US\$ 100,000 and US\$ 100 M or its equivalent in Tanzanian shillings. The maximum initial period for which a Mining Licence may be granted is ten years, and the licence may be renewed for a period not exceeding ten years.

• A Primary Mining Licence is issued to Tanzanian Nationals for a small scale mining operation whose capital investment is less than US\$ 100,000 or its equivalent in Tanzanian shillings. It is issued by the Zonal Mines Officer of the respective Zone under Section 55.-(1) of the Mining Act for a period of seven years and may be renewed if the applicant has been compliant with the Mining Act as stipulated in 56.1(1).

## 6.2 Prospecting Licences on the Property

The Project currently comprises 33 active Prospecting Licences with a further five under application (Table 1 and Figure 2). Exploration is being conducted on PL4506/2007; PL4265/2006; PL7182/2011; PL2678/2004 and PL22966/2003.

Prospecting Licences are issued for an initial term of four years. During that term the holder of the licence must pay annual rent of  $US 20/km^2$  and must



undertake minimum exploration expenditures of \$US 300/km<sup>2</sup>. At the end of the initial four year term, and at the option of the licence holder, 50% of the area of the original Prospecting Licence may be reapplied for, for a three year term, referred to as the first renewal period. Annual rental fees of \$US 30/km<sup>2</sup> and minimum exploration expenditures of \$US 1,000/km<sup>2</sup> must be made in order to maintain the licence in good standing during the first renewal period. At the end of the first renewal period the Licence holder may apply for a second renewal of a two year term for 50% of the first renewal licence area. Annual rental fees of \$US50/km<sup>2</sup> and minimum exploration expenditures of \$US3,000/km<sup>2</sup> must be made in order to maintain the licence holder to maintain the licence holder may apply for a second renewal of a two year term for 50% of the first renewal licence area.

A Prospecting Licence has a minimum size of  $20 \text{ km}^2$  and on renewal of a licence the area applied for should not be less than this minimum. Tembo's licences are already less than this minimum (under the old Act) and there will be no further relinquishment.

There are provisions in the Mining Act, to maintain the area of a Prospecting Licence if the holder thereof has initiated a feasibility study. Application and document preparation fees are also payable for licences and range from \$US 15 to \$US 200.

In addition to these obligations of licence holders, quarterly reports on activities are required to be submitted to the Ministry of Energy and Minerals and summary reports of activities during the period which a licence was held are required to be submitted with applications for renewal of a licence along with financial statements demonstrating the financial viability of the applicant. Compliance with Tanzanian Mining Law is critical to maintaining title to Prospecting Licences and other forms of mineral rights.

There is a 4% royalty on the gross value of metallic minerals (including copper and gold) produced by a miner from his licence and payable to the Government of the United Republic of Tanzania.

The rights of surface holders are recognised in the Mining Act, and Tembo has established good relations with the communities that live on the Project. Arrangements for access and compensation for property disturbance are finalised before any invasive prospecting activities commence. Tembo has no ownership of surface rights in the prospecting area. In terms of the Mining Act, a prospecting company is granted free access to areas held under valid mineral rights and compensation is granted to surface rights holders where prospecting activities encroach on surface rights including dwellings and agricultural land.

There are no additional permits required under the Mining Act to perform early stage drill programmes. There are no material environmental liabilities that the authors are aware of on any of the licences on the Project.

The authors do not view the application approval process as a significant risk to the right or ability to perform work on the property nor do they see any other significant risks that may affect rights or ability to perform work.



#### 6.3 Primary Mining Licences

An estimated 64 Primary Mining Licences are held within the Project, covering approximately 6.4  $\text{km}^2$  (Figure 2). Local artisanal miners are active on the areas covered by many of these Primary Mining Licences and with whom Tembo has fostered good relationships.

Status	Number	Company	Application date	issue date	Expiry date
application	HQ-P25838	Lakota Resources (T) Limited	2012/05/16		
application	HQ-P25570	Mwamba Resources Limited	2012/04/05		
application	HQ-P21846	Mwamba Resources Limited	2010/06/14		
application	HQ-P24562, HQ-P24565	Mwamba Resources Limited	2011/10/19		
application	HQ-P25844	Mwamba Resources Limited	2012/05/16		
active	PL 2678/2004	Bemuda Limited	2004/03/23	2004/09/14	2013/09/12
active	PL4265/2006	Bemuda Limited	2011/07/28	2006/08/29	2013/08/28
active	PL 7826/2012	Bemuda Limited	2008/04/10	2012/04/23	2016/04/22
active	PL 7705/2012	Bemuda Limited	2008/06/06	2008/06/06	2016/02/02
active	PL 7818/2012	Bemuda Limited	2011/08/04	2012/04/23	2016/04/22
active	PL4506/2007	Bemuda Limited	2006/06/06	2007/06/12	2013/06/11
active	PL 7704/2012	Bemuda Limited	2010/08/09	2012/03/12	2016/03/11
active	PL 7820/2012	Bemuda Limited	2010/10/26	2012/04/23	2016/04/22
active	PL 7821/2012	Bemuda Limited	2010/02/15	2012/04/23	2016/04/22
active	PL 2296/2003	Charles Totera		2010/07/31	2012/07/30
active	PL4080/2007	Lakota Mining Company Limit	ed	2011/02/15	2013/02/14
active	PL 7733/2012	Lakota Resources (T) Limited	2011/12/16	2012/03/02	2016/03/01
active	PL 7817/2012	Lakota Resources (T) Limited	2010/10/04	2012/05/08	2016/05/07
active	PL 7816/2012	Lakota Resources (T) Limited	2008/06/16	2012/05/08	2016/05/07
active	PL 7815/2012	Mineral Products Limited	2010/05/24	2012/04/03	2016/04/02
active	PL4215/2007	Mwamba Resources Limited		2006/01/26	2013/04/06
active	PL4288/2007	Mwamba Resources Limited		2010/04/15	2012/04/15
active	PL4457/2007	Mwamba Resources Limited		2011/05/23	2013/05/23
active	PL4810/2007	Mwamba Resources Limited		2011/05/24	2013/10/25
active	PL 7537/2011	Mwamba Resources Limited		2012/01/06	2016/01/05
active	PL 7422/2011	Mwamba Resources Limited	2008/01/28	2011/12/06	2015/12/05
active	PL 7028/2011	Mwamba Resources Limited			2015/04/20
active	PL 7547/2012	Mwamba Resources Limited		2012/01/15	2016/01/14
active	PL 7824/2012	Mwamba Resources Limited	2008/10/31	2012/05/25	2016/05/24
active	PL 7822/2012	Mwamba Resources Limited	2009/08/31	2012/05/08	2016/05/07
active	PL4807/2007	Mwamba Resources Limited		2011/02/23	2013/10/25
active	PL5670/2009	Mwamba Resources Limited			
active	PL 7182/2011	Mwamba Resources Limited		2011/12/06	2015/12/05
active	PL 7825/2012	Mwamba Resources Limited	2008/06/27	2012/05/08	2016/05/07
active	PL4576/2007	Mwamba Resources Limited	2000,0072,	2312,03,00	2013/08/06
active	PL 7849/2012	Nyati Resources (T) Limited	2011/12/16	2012/04/04	2016/04/03
active	PL 7546/2012	Nyati Resources (T) Limited	2011/12/10	2012/01/16	2016/01/15
active	PL7776/2012	Shakaas Mining Limited		2012/04/03	2016/04/02

 Table 1: Granted prospecting licences and pending prospecting licence applications



10



Figure 2: Status of Mineral Title on the Project.



#### 7 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY (ITEM 5)

The Project is situated approximately 84 km southwest of Mwanza. The town of Geita, 35 km northwest of the Project, is the nearest large centre (Figure 1).

The Project is reasonably accessible. Julius Nyerere airport in Dar es Salaam and the Mwanza airport provide international and domestic flights, while private airstrips at Bulyanhulu and Geita Gold Mines provide charter opportunities.

The national tarred road from Mwanza to Geita is in good repair and the government ferry provides crossing of the Smith Sound. A stretch of untarred road links Geita to the Project.

The climate on the Project is typical of the central plateau and is illustrated in Figure 3 to Figure 6.



Figure 3: Average temperature in °C in Project area



Figure 4: Maximum and minimum temperatures in °C in Project area





Figure 5: Average rainfall in mm in Project area



Figure 6: Humidity in percentage in Project area

Infrastructure in Tanzania is generally in good condition. In addition to the international airport in Dar es Salaam, domestic flights connect all the major regional centres within the country. National roads are kept in reasonable repair by the Road Fund and Road Agency. The national power reticulation system provides limited national coverage and is unreliable. Water is piped from Lake Victoria to major centres in the district. Microwave radio relay stations provide a telecommunications network available in all major towns. This network is supplemented by a mobile cellular system available throughout most of the country.

The topography of the Project consists of gently rolling hills and flat savannahs between 1,240 to 1,370 m above mean sea level. Low lying areas are typically characterized by "mbuga", a thick black cotton soil. Upland areas are covered with secondary scrub bush and locally sparse forest. The seasonal Bulyanhulu River drains the southern part of the Project area, while the Bujula and Nyamigogo creeks – tributaries of the Bulyanhulu – drain the western and eastern parts of the Project respectively.



#### 8 **PROJECT INFRASTRUCTURE** (ITEM 18)

The route to the Project is 32 km south from Mwanza to the ferry at Smith Sound, then west on a secondary road, turning southwest at Sengerema to Geita (55 km), and 45 km southeast on the untarred road to the centre of the Project.

The operating season is year round although dirt tracks to specific Project areas are only passable by 4x4 vehicles.

Water, fuel and food are purchased from the surrounding villages. Labour for the exploration programme is also predominantly local. The towns of Geita and Mwanza provide the majority of mining and exploration supplies.

The possibility exists for Tembo to acquire surface rights for possible operations, although a discussion of availability of mining and related infrastructure requirements is premature at this point in the Project.

## 9 HISTORY (ITEM 6)

## 9.1 Previous Ownership

The three contiguous groups of licences that make up the current Project, the Tannor, Ikina Reefs and Bemuda properties, have historically been held and explored by a number of companies. In the early 1990's East Africa Mines PLC ("EAM"), a subsidiary of Spinifex Gold Ltd, carried out exploration programmes on the Ikina Reefs property. In the mid 1990's Lakota acquired interests in Prospecting Licences in the area. In 1999, Universal Gold N.L. ("Universal") optioned the Bemuda property, which adjoins the Ikina Reefs property to the north, from Lakota. Later that year, Universal's interest in the property was reacquired by Lakota.

In 2000, Lakota announced its intention to find partners for the exploration of its holdings and entered into an option agreement with Orezone Resources Inc ("Orezone") for the exploration and development of all of Lakota's Tanzanian holdings. In February 2001, the option agreement with Orezone was terminated.

In September 2003, Lakota entered into an option agreement with Orogen Holdings (BVI) Limited ("Orogen"), a subsidiary of Gold Fields Limited which lasted for two years. In February 2005, Lakota announced that Gold Fields had terminated the option agreement.

## 9.2 Previous Work

A number of exploration programmes were completed on the Project between 1997 and 2008 (Table 2). There are no historical Mineral Resource or Mineral Reserve estimates, or mining production on the Project.



Year	Nature and amount of work	Operator
1997	Percussion drilling: 36 holes; 1,017 m	Lakota
1999	Soil sampling: 1,021 samples	Universal Gold
2002	RAB drilling: 836 holes; 8,028 m	EAM
2002	reverse circulation drilling: 38 holes; 1,140m	EAM
2003	Airborne geophysical survey (Fugro)	Lakota
2005	Regolith mapping	Lakota
	Conventional soil sampling: 965 soils	Lakota
	Pit sampling:	Lakota
	1.5 m pits; 36 samples	Lakota
2004	Pit lag soils: 285 samples	Lakota
2004	Pit rock samples: 230 samples	Lakota
	Soil pH: 12,767 measurements	Lakota
	RAB drilling: 42 holes; 6,001 m	Lakota
	reverse circulation drilling: 29 holes; 2,000 m	Lakota
2005	Soil pH: 4,348 measurements	Lakota
2006	Conventional soils: 97 samples	Lakota
2006	RAB drilling: 1,392 holes; 14,400 m	Lakota
2007	RAB drilling: 667 holes; 4,833 m	Lakota
2007	reverse circulation drilling: 66 holes; 4,505 m	Lakota
2008	Diamond drilling: 12 holes; 1,865 m	Lakota

 Table 2: Summary of historical exploration activity on the Project prior to 2011

#### 9.2.1 Mapping

Historically there has been no bedrock geological mapping of the Project, although regolith mapping was completed in 2003. The data produced from this work was effective in outlining the nature and distribution of different surficial materials.

#### 9.2.2 Geophysics

Lakota contracted Fugro Airborne Surveys (Pty) Ltd ("Fugro") to undertake an airborne magnetic and radiometric survey over the Project in 2003.

The magnetic data from the survey was useful for outlining regional scale structural trends in bedrock while the radiometric data assisted in defining major lithologies (Figure 7).

#### 9.2.3 Surface Geochemistry

Three surface soil sampling programmes were undertaken between 1999 and 2006. During the 2004 programme, samples were also collected at 1.5 m depth, and 'lag' samples (from the overburden-saprolite interface). Results of the surveys indicated the possibility of multiple, north-west trending gold mineralized structures, sub-parallel to the main structure exploited at the Bulyanhulu Mine. Clusters of anomalous samples were defined on the flanks of Nyakagwe Hill, with a second anomalous area 2.5 km north-northeast of Ngula (Figure 8).

Five rotary air blast ("RAB") sampling programmes were completed. Samples were collected at the overburden-saprolite interface, 'lag' samples, and saprolite samples in several of these programmes. On average, gold grade greater than 100 ppb was considered anomalous with values greater than 30 ppb considered of interest (Figure 9).



15

## 9.2.4 Drilling

Drilling activity between 1997 and 2008 included three reverse circulation ("reverse circulation") and one diamond drilling programme to test anomalous areas determined by the soil/RAB programmes. Boreholes with elevated gold grade are depicted in Figure 10.

The historical surface geochemical sampling and drilling provided a number of potential gold mineralized zones (Figure 11) which could be developed with a systematic drilling programme on the Project.

## 9.2.5 Artisanal Mining

Artisanal miners were active on several Primary Mining Licences within the Project during Lakota's exploration programme, specifically in the Nyakagwe Village and Ngula areas. The Project is still being worked by artisanal miners.

These miners recover gold from several sources:

- placer gold in alluvial environments;
- elluvial gold at the laterite/saprolite interface;
- quartz veins; and
- sheared metavolcanics immediately adjacent to veins.

## **10 EXPLORATION** (ITEM 9)

## 10.1 Exploration Rationale and Objectives

The Mineral Corporation was contracted in 2011 by Tembo to conduct a phased exploration programme on the Project.

There are currently seven exploration targets. These exploration targets were defined on the basis of historical soil and RAB geochemistry and drilling, outlining artisanal gold workings from the LIDAR data, a revised interpretation of the Fugro 2003 geophysics and from field mapping (Figure 7).

## 10.2 Database Review of historical work

In late 2011, The Mineral Corporation investigated the historical soil sampling database to verify the integrity of the historic geochemistry data. No other historical exploration information was stored in a database.

## 10.3 Geological Mapping

Reconnaissance geological mapping was undertaken by The Mineral Corporation on behalf of Tembo over Nyakagwe and Ngula 1 to record details of artisanal mining activity and geological units seen to be exploited by the miners. Although surface exposure was limited in the mapped areas, previously unknown artisanal mining zones were outlined and a number of lithological and structural observations made.

## **10.4 LIDAR Survey**

A LIDAR survey was commissioned through the AOC in mid-2011.



16

The deliverables of this survey included elevation contours at 0.5 m intervals (Figure 13) from which a digital elevation model ("DEM") was prepared (Figure 14). Ortho-rectified imagery, with a 10cm ground resolution, produced with the LIDAR survey (Figure 15) is a valuable tool to identify areas of artisanal mining (Figure 16).

## 10.5 Reinterpretation of Airborne Geophysics

Part of the Fugro 2003 magnetic and radiometric data was provided to GRS for reinterpretation in 2011 (Figure 17). A detailed structural analysis of the airborne data, and identification and prioritisation of gold targets was produced for Tembo through the process.

The structure and magnetic texture of the aeromagnetics were studied in the areas where artisanal workers are most active. Figure 18 shows an apparent association between the artisanal workings and east-west trending magnetic anomalies.

Interpreted northeast orientated brittle faulting is evident and these faults often appear to offset the magnetic 'vein' trends slightly. In some areas, the artisanal workings seem to be aligned along these interpreted brittle faults. The pattern in Figure 19 is interpreted to be characteristic of dextral shear stress in a semi-brittle deformation zone with the veins being sinuous and possibly formed in en-echelon extension gashes.

The re-processing and interpretation of the airborne magnetic data has provided a detailed structural interpretation and possible drill targets, identified as priority 1 and 2 by GRS.

## **10.6 Ground Geophysics Survey**

A series of general traverses and grid based lines were surveyed (Figure 20) with the objective of comparing ground magnetic data to the historical airborne data. This comparison indicated that the latter gave better results due to the closer spaced readings. The possible maghemite concentrations in surface/near-surface ferricrete/laterite could also adversely affect the ground magnetic readings.

Based on the negative results, no further ground magnetic surveys will be undertaken.

# **10.7 Geochemical Sampling**

In August 2011 a contract geologist was tasked by Tembo with mapping artisanal workings and taking channel samples from active artisanal shafts throughout the Project. Thirty-two samples were collected (Figure 21) and analysed for gold by fire assay and QEMSCAN - an automated electron beam mineralogical technique.

Subsequently, periodic sampling from active artisanal workings is done to increase Tembo's understanding of the variability of the gold grade over the Project. It is recognised that this sampling is unlikely to be representative of primary, in-situ mineralization.





Figure 7: Fugro airborne magnetic/radiometric survey contracted by Lakota 2003





Figure 8: Summary of historical soil sampling and anomalies defined by Lakota 1999-2004





Figure 9: Summary of historical RAB drilling anomalies defined by Lakota 2002-2008



MINERAL CORPORATION ADVISORS TO THE MINERAL BUSINESS



Figure 10: Summary of historical drilling and DD hole anomalies defined by Lakota 2002-2008





Figure 11: Historical gold mineralized zones and targets for follow up defined by Lakota 2008



22

the MINERAL CORPORATION ADVISORS TO THE MINERAL BUSINESS



Figure 12: Tembo's exploration targets determined in 2011





Figure 13: LIDAR survey elevation contours (mamsl)





Figure 14: LIDAR survey derived DEM shaded from the northeast, illustrating artisanal activity





Figure 15: LIDAR survey ortho-rectified figure





Figure 16: LIDAR survey interpretation





Figure 17: Area of reinterpreted airborne geophysics





Figure 18: Relationship of artisanal mining areas, and interpreted magnetic trends





Figure 19: Gold targets determined from reinterpretation of Fugro airborne survey




Figure 20: Field mapping and ground magnetic traverses overlain on aeromagnetic data





Figure 21: Locality plan of positions of artisanal shafts sampling



### **10.8 Database Management**

All Tembo drilling data is maintained in a Sable database on the server at the Tembo field office. Hard copies of primary data for each borehole, including drilling, lithology, alteration, mineralization, structure, relative density, sampling and core recovery are stored in the field office. A discussion on the sampling methodology used during the exploration programme is included in Section 14.

At the date of this report, the exploration status is:

## Diamond Core Drilling

- 43 completed holes
- 12,723.20 m drilled
- 5,646 samples submitted
- 5,066 assays received

## Reverse Circulation Drilling

- 84 completed holes
- 15,041 m drilled
- 7,851 samples submitted
- 6,768 assays received

MicroMine and ArcView are used together as a GIS system for analysing, interpreting and plotting exploration results and other interpreted data elements.

## **11 DRILLING** (ITEM 10)

A phased drilling programme was designed for the Project (Figure 22) comprising approximately 115 diamond holes (27,500 m) and 470 reverse circulation holes (60,000 m). Drilling commenced on Ngula 1 in January 2012, and at the time of this report, holes had been drilled on all of the proposed targets.

Hall Core Drilling Pty Ltd ("Hall Core") and Layne Drilling Tanzania Ltd ("Layne") were contracted to provide five diamond and three reverse circulation rigs.

Intercepts are currently provided as zones containing greater than 0.5 g/t Au, while an "inclusive higher grade" zone includes zones of greater than 2.0 g/t Au intercepts.

The authors consider the representative results in this report to accurately and reliably represent the drilling, recovery, sampling and assays on the Project.





Figure 22: Planned phase 1 drilling programme overview



### 11.1 Ngula 1

Ngula 1 (Figure 23) comprises an extensive area of artisanal mining activity including some hard rock mining through deep shafts and adjacent exploitation of colluvial material. A secondary target area some 400 m to the north was historically defined by anomalous gold in soil/RAB samples. The area is potentially underlain by several east-west trending magnetic anomalies. Approximately 40 diamond and 99 reverse circulation holes were planned for this target.

Some holes were planned to intersect mineralization under both the northern and the southern artisanal workings at a shallow vertical depth of approximately 50-75 m and 100–150 m. Further holes were planned along strike to determine the lateral extent of the mineralization. All of these holes are drilled to approximately 300 m or drill refusal.

Three fence lines to determine the presence of structures between these two areas of artisanal workings will be drilled. These holes are heel-toe to the north at -60° approximately 40 m apart with a length of approximately 100 m each.

At the date of this report, 23 diamond and 30 reverse circulation holes have been completed on Ngula 1 for aggregate metreage of 6,556.60 m and 6,774.00 m respectively.

Highlights of the drill results at Ngula 1 include:

TDD0004:	3.13 g/t Au over 25.89 m including 8.87 g/t Au over 3.89 m;
TDD0005:	10.76 g/t Au over 4.00 m including 93.3 g/t Au over 0.38 m
TDD0012:	8.6 g/t Au over 0.98 m from 171.92 m;
TRC0013:	17.23 g/t Au over 4.00 m including 48.8 g/t Au over 1.00 m
	from 19.00 m and 13.00 g/t Au over 1.00 m from 104 m;
TRC0014:	19.80 g/t Au over 1.00 m from 114.00 m and 10.00 g/t over
	1.00 m from 122.00 m;

TDD0054: 8.90 g/t over 9.00 m from 116.95 m

\*Intersection widths denote core length and true widths have not been determined.

Interpreted structures appear to be steep and variable in dip, and holes were drilled both to the north and south. The drilling lines are spaced 100 m apart or 50 m where the complexity of the geology warrants it.

The Ngula 1 target consists of at least two dominant sub-parallel east-west structures with northeast and northwest secondary cross-over structures appearing to interconnect the two.

The drilling has delineated gold along a strike length of more than 500 m with grades varying along strike and dip but displaying structural continuity. The current and future drill holes are aimed at extending the range of known mineralization and improving grade and structural correlation across drill holes, particularly targeting potentially plunging high-grade zones.



### 11.2 Ngula 2

Surface geological mapping and a review of the artisanal mining indicates the possibility of more than one mineralized trend. To test this possibility, four diamond holes were oriented to drill from the same location (Figure 24) in the middle of the artisanal workings for an aggregate metreage of 1,200.78 m approximately orthogonal to potential mineralized trends. An additional 30 diamond holes were tentatively planned on northwest trending lines.

Approximately 26 reverse circulation holes will be drilled to test continuity along strike. These holes will be drilled towards 210° at -60° with a proposed length of 150 m each.

## 11.3 Nyakagwe East

Extensive artisanal mining with numerous shafts in excess of 20 m depth characterizes Nyakagwe East. Historic diamond and reverse circulation drilling returned significant gold intersections from two sub-parallel northwest-southeast trending mineralized zones.

The planned drilling programme (Figure 25) included approximately 37 diamond holes to be drilled towards 030° and 060° at a dip of -50 to- 60° to intersect these sub-parallel mineralized zones. The planned programme also included six fence lines comprising 122 reverse circulation holes to intersect potential continuation along strike. These fence lines are heel-toe towards 030°, the holes are 150 m in length at a dip of -60°. A further five reverse circulation holes were planned to be drilled towards 030° under the southern mineralized zone to complement the diamond holes.

Eleven diamond (3,664.22 m) and 39 reverse circulation (4,828.00 m) holes have been completed at the date of this report.

This drilling included heel-toe profiles to locate hidden mineralized structures and potential extensions, specifically targeting the north-western and southeastern extensions of the potential zones of mineralization at Nyakagwe East. As all holes along strike of the known structures consistently intersected gold mineralization, the zones are considered to be open along strike and down dip and warrant further follow-up drilling.

Current drilling highlights on Nyakagwe East include:

TDD0019:	4.69 g/t gold over 1.67 m from 67.35 m
TDD0029:	61.80 g/t gold over 0.68 m from 277.24 m
TDD0030:	2.62 g/t gold over 3.29 m from 48.21 m
TDD0104:	4.72 g/t gold over 2.11 m from 66.80 m
TRC0233:	5.66 g/t gold over 1.00 m from 84.00 m
TRC0234:	5.46 g/t gold over 2.00 m from 109.00 m
TRC0347:	6.48 g/t gold over 2.00 m from 8.00 m

Historical 2008 drilling highlights include:

DD001:	10.25 g/t gold over 3.50 m from 38.50 m
DD004:	2.45 g/t gold over 4.72 m from 87.03 m
DD005:	9.73 g/t gold over 3.40 m from 81.94 m
DD008:	2.65 g/t gold over 3.60 m from 84.00 m
	••••



36

DD009:	2.07 g/t gold over 3.26 m from 142.19 m
DD011:	10.4 g/t gold over 1.50 m from 45.10 m and 2.05 g/t gold
	over 2.50 m from 57.95 m
RC056:	36.70 g/t gold over 1.00 m
*Widtha ronroant	down hole care lengths and two widths are walknown at this time.

\*Widths represent down-hole core lengths and true widths are unknown at this time.

Drilling has confirmed that two distinct parallel northwest-trending zones of artisanal workings, separated by a dolerite dyke (some 6 m thick) characterize the Nyakagwe East Project. The mineralized zones are associated with shearing within mafic to intermediate meta-volcanic host rocks, strong quartz veining and semi-massive, stringers and disseminations of pyrite. Higher grades are distinctly correlated with quartz veining and abundant sulphide. The zones strike northwest and are interpreted to dip at 60° to the southwest.

Artisanal mining, plus historical and current drilling activities defined an area of robust gold mineralization with a strike length of 1,000 m across multiple structures. The boreholes were oriented to establish the strike length of the structure with intercepts intersecting the zone 50 m to 100 m below surface. These boreholes confirmed the structures, orientation and gold-bearing potential of the zone. In addition to the shallower target structure, gold mineralization was intersected confirming the presence of additional parallel structures at depth.

Current and future drilling will focus on establishing the continuity of the structures, intersecting at progressively greater depths and along strike. Holes will be extended to depth beneath the target structures to test for the additional parallel structures in the footwall. Drill programs and individual borehole planning may change based on results and priorities.

### **11.4 Nyakagwe Village**

Fifteen diamond holes were planned to investigate the open pit exploited by artisanal miners (Figure 26).

Five diamond holes have been completed for an aggregate metreage of 1,301.60 m at the date of this report.

The results at Nyakagwe East confirm and validate the historic drill results demonstrating a significant and robust area of gold mineralization with multiple structures. The next phase of drilling will be conducted to build on the current mineralized areas at depth and along strike.

### 11.5 Mgusu

Mgusu encompasses the southern slopes of Nyakagwe Hill and a number of dispersed artisanal workings. Measurements taken of mineralized veins in these workings are either north-south or east-west. The moderate to steep dips of the veins show little consistency in dip direction.

Four reverse circulation fence lines (123 holes) were planned through these areas of artisanal workings to identify trends interpreted from the airborne geophysics (Figure 27). These 150 m long holes were planned heel-toe 40 m apart towards 330°.



Seven reverse circulation holes have been completed at the date of this report for an aggregate metreage of 1,046.00 m.

## 11.6 Iyenze/Bulyanhulu

This area was historically defined by elevated gold grades in soil sampling and reverse circulation drilling. Abandoned artisanal workings are present within the target area. Several northwest-southeast trending magnetic lineaments were interpreted from the 2003 airborne magnetic survey. In addition this target is on the boundary of the Bulyanhulu Gold Mine licence area and may be an extension of the prospective geology.

A reverse circulation drilling programme (112 holes) consisting of four lines of two to four holes each was planned to intersect the interpreted geophysical trends. Four further lines of fence holes to identify further mineralized structures would complete the reverse circulation drilling programme (Figure 28). These heel-toe reverse circulation holes were planned at 210° approximately 40 m apart.

## **12 DEPOSIT TYPES** (ITEM 8)

Structurally controlled gold mineralization is the primary exploration focus on the Project. Potential for other deposit types such as volcanic hosted massive sulphides rare element pegmatite deposits or kimberlite diamond deposits may also exist.

Gold mineralization occurs in a number of settings on the Project:

- in alluvial deposits found along streams or rivers;
- in elluvial deposits derived from the weathering of gold mineralized zones and found at the overburden/bedrock interface;
- in shear zones; and
- in extensional quartz-filled veins.

At the adjacent Bulyanhulu Gold Mine gold occurs in a set of parallel to sub-parallel quartz-sulphide shear controlled veins within the Archaean SGB. These structures strike northwest and dip at about 80° northeast. Further information about the Bulyanhulu Gold Mine is provided in Section 23: Adjacent Properties.





Figure 23: Phase 1 planned drilling programme on Ngula 1



39



Figure 24: Phase 1 planned drilling programme on Ngula 2





Figure 25: Phase 1 planned drilling programme on Nyakagwe East





Figure 26: Phase 1 planned drilling programme on Nyakagwe Village





Figure 27: Phase 1 planned drilling programme on Mgusu





Figure 28: Phase 1 planned drilling programme on Iyenze/Bulyanhulu



## **13 GEOLOGICAL SETTING AND MINERALIZATION** (*ITEM 7*)

# 13.1 Regional Geology

The Sukumaland Greenstone Belt ("SGB") often referred to as the Lake Victoria Greenstone Belt is part of the Archaean age Tanzania Craton which extends through central Tanzania, western Kenya and south-eastern Uganda (Figure 29). The SGB is oval in shape and is defined by two intermittently exposed belts surrounding a core of granitoids and gneisses. The inner belt comprises the predominantly mafic metavolcanics of the Lower Nyanzian Group while the Upper Nyanzian is represented by the outer belt of chemical metasediments of the Kavirondian Group unconformably overlie the Upper Nyanzian rocks along the outer margin of the SGB.

The SGB is surrounded by granitoids and gneisses and the two concentric belts are separated by granodiorites and granites.

Metamorphism of the Nyanzian Group rocks is generally lower to middle greenschist facies although rare amphibolite facies metamorphic rocks are exposed in the western portions of the belt near Tulawaka Mine.

Regardless of the geological environment structural control on the emplacement of mineralization is paramount. The following structural features have proven to be important targets for gold mineralization:

- structural lineaments trending at 120°;
- flexures and splays to the 120° trend (such as at Golden Pride);
- structural lineaments at 70° (such as at Golden Ridge); and
- granite-greenstone contacts (such as at the Ushirombo and Rwamagaza Greenstone).

# 13.2 Local Geology

Drilling information indicates that the central portion of the Project is underlain by sub-vertically dipping metabasalts striking both northwest-southeast and east-west. These metabasalts are intercalated with isolated metasediments mafic-ultramafic intrusions and quartz-feldspar porphyries (Figure 30). Some of these metabasalts contain pillow lavas which can be brecciated particularly at the top of lava flows. Lavas range from massive to porphyritic with gabbroic and pyroxenitic intrusions containing phenocrysts of plagioclase feldspar and varioles.

A northwest trending package of dacites and andesites alternating with tuffs and pyroclastic rocks has been identified immediately southeast of the Project. The location of these rocks within the Project area has been interpreted from geophysics.

Quartz-feldspar porphyries occur as sills and dykes within the volcanic packages and often have sharp chill margins. These bodies were noted to predate mineralization at Bulyanhulu Mine and may be associated either with the felsic volcanic units or the granitic plutons to the west and east of the properties.





Figure 29: Regional geology (after Barth 1990)





Figure 30: Local geology (after Geological Survey of Tanzania 1999)



Dolerite dykes up to 2 m wide have been documented at Bulyanhulu Mine and have been inferred to trend east-west on the Project.

## 13.3 Project Geology, Structure, Alteration and Mineralization

Across the Project gold mineralization is generally associated with sulphide mineral assemblages in varying proportions. In some boreholes gold is found with pyrrhotite lesser chalcopyrite and pyrite while at other targets gold accompanies increased pyrite. Tembo's drilling started at Ngula 1 and Nyakagwe East and these areas are presently the best understood. For this reason these targets are discussed separately whilst the remaining targets are grouped together.

## Ngula 1

The geology (Figure 31) comprises predominantly mafic meta-volcanic rocks including metabasalts (MMB and MB1) pillow lava flows (PIL) porphyritic volcanic (SPT POL and PEA) and interpreted hyperbyssal rocks. Thin intercalated meta-sedimentary units (MS1, MS2 and MS3) are also found in the meta-volcanic pile. A zone of intermixed basalt and veining has been given a preliminary term "Variable Zone". A tentative stratigraphic column is depicted in Figure 32.

Completed drilling shows that the main east-west trends appear to be large continuous shear zones that dip steeply (80-85°) to the north. These shear zones are possibly linked by numerous cross-shears trending either northeast-southwest or northwest-southeast at varying dips (Figure 33).

The best gold mineralization to date has been in the areas close to the interpreted intersection points of these cross-shears and the main east west shear zones. Some gold mineralization also appears concentrated in shear zones hosted by pillow metabasalts and in the thick variable package of metabasalts and porphyritic meta-volcanic rocks.

The sulphide mineralization tends to be concentrated in the larger shear zones and in the altered host rocks adjacent to these structures. Small quartz veinlets can also contain appreciable amounts of sulphide away from areas where observable shearing has occurred. The margins of basaltic pillow lavas commonly host abundant pyrrhotite pyrite and chalcopyrite but these are not generally associated with gold mineralization unless shear zones are developed in the vicinity.

Pyrrhotite is the dominant sulphide with lesser pyrite and chalcopyrite. It can be finely disseminated in the more intensely deformed zones of the shear zones or can occur as blebs masses and layers associated with more siliceous and chloritised regions. Pyrrhotite associated with chalcopyrite can also be found concentrated along milky and smoky quartz vein margins or as fine stringers or replacement blebs within the veins themselves.

Alteration is predominantly chlorite-mica-amphibole plus minus feldspar and many of the highest gold values is found in shear zones associated with these alteration assemblages.





Figure 31: Interpreted local geology at Ngula 1





Figure 32: Illustrative stratigraphic column for Ngula 1





Figure 33: Interpreted north south section through Ngula 1



Figure 34 and Figure 35 show the typical nature of the mineralized shear zones; chaotic apparently multi-phase mylonitic textures often cross-cut by several distinct sets of shear veins. Sulphide stringers are common and are frequently parallel or sub-parallel to the main shear fabric.

Figure 35 shows a mylonitic zone with chlorite (green) amphibole (apple green) and mica (brown) alteration. Disseminated pyrrhotite grains occur within the mica-altered zones. Cross-cutting quartz veins with deformed branching veinlets cut through the sheared metabasalt on right of the figure. Fine siliceous stringers commonly pervade the rocks in this gold mineralized shear zone. Sample D1473 from TDD0004, a portion which is shown in Figure 35 returned 12.1 g/t Au over 50 cm.

A quartz vein in Figure 36 cuts through a shear zone hosted by a metabasalt in TDD0004. The mylonite is characterized by feldspar (cream-brown) and chlorite (green) alteration. Disseminated sulphides occur throughout this zone and are especially abundant where chocolate-brown areas of mica alteration are found.



Figure 34: Well developed shear fabric in TDD0004. Core width is 48 mm.



Figure 35: Sulphide rich metavolcanic rock with extensive chlorite mica alteration. Core width is 48 mm.





Figure 36: Typical light grey quartz vein and feldspar within meta-volcanic rock. Core width is 48 mm.

#### Nyakagwe East

Drilling has delineated a series of auriferous quartz vein structures that strike approximately northwest to southeast dipping moderately (55-60°) to the southwest (Figure 37). Two distinct parallel northwest-trending zones of artisanal workings separated by a dolerite dyke (some 6m thick) characterize the Nyakagwe East target. The mineralized zones are associated with shearing within mafic to intermediate meta-volcanic host rocks strong quartz veining and semi-massive stringers and disseminations of pyrite. Higher grades are distinctly correlated with quartz veining and abundant sulphide. The zones strike northwest and are interpreted to dip at 60° to the southwest.

Artisanal mining plus historical and current drilling activities defined an area of robust gold mineralization with a strike length of 1,000 m across multiple structures.

Mineralization is hosted by intermediate metavolcanic rocks of andesitic to dacitic composition. Minor mafic extrusive rocks and coarsely crystalline gabbros have also been intersected. A northwest-southeast striking serpentinised ultra-mafic dyke appears to traverse the target area but is probably significantly younger than the host rocks. Andesitic pillow lavas are common throughout the metavolcanic pile. Pyroclastic textures have also been observed in several boreholes.

Figure 38, summarized from TDD0025 which is the longest borehole drilled on the target, depicts an interpreted stratigraphic column for this target.

The internal fabrics of the widespread cataclasites and breccias zones at Nyakagwe East (Figure 39) suggest progressive development during a rapid transition from ductile to brittle deformation. This style of deformation is in contrast to the more ductile shearing commonly developed along major lithological contacts at Ngula 1. Extensive silicification and carbonate alteration appear to have taken place in many areas with less chlorite alteration than at other targets. In many cataclastic zones there is brown mica alteration. In some of the more massive finely crystalline volcanic rocks there are wide zones tens of meters thick with numerous cross-cutting planar carbonate (and lesser quartz) veins (0.5–15 mm).





#### Figure 37: Interpreted geology of Nyakagwe East





Figure 38: Interpreted stratigraphic column for Nyakagwe East





Figure 39: Interpreted southwest to northeast section through Nyakagwe East



56

The dominant sulphide is pyrite which commonly occurs as medium-to-coarse euhedral grains disseminated within major quartz veins associated with shear zones. The pyrite in Figure 40 occurs as euhedral gains and also laminated vein stringers across the major quartz vein.

Pyrite appears limited to the host rocks surrounding the carbonate-quartz veins with little sulphide within the veins. Pyrite grains occasionally appear as porphyroblasts within some mylonitic shear bands. Minor pyrrhotite and chalcopyrite seem confined to the pillow lava units. This is in contrast to the pyrrhotite-chalcopyrite association found throughout the gold mineralized structures at the Ngula 1 target.



Figure 40: Massive quartz vein with abundant euhedral pyrite grains. Core width is 48 mm.

The gold mineralization at Nyakagwe East appears intimately associated with smoky quartz veins as can be seen in Figure 40. TDD0029 intersected a quartz vein with abundant visible gold (Figure 41).



Figure 41: Visible gold hosted by a smoky grey quartz vein. Core width is 48 mm



## Remaining Targets

Drilling on the remaining four targets began after drilling on Ngula 1 and Nyakagwe East started and no detailed interpretations were available at the date of this report. Historical drilling by Lakota indicates the presence of auriferous quartz veins hosted in sheared mafic metavolcanics.

# 13.4 Mineralization Model

It is possible to draw broad conclusions on the nature and controls of gold mineralization on the Project at this stage of exploration. From drilling results complemented with available literature on the Sukumaland Greenstone Belt and the adjacent Bulyanhulu gold deposit it appears that the epigenetic gold mineralization known in the SGB has many orogenic lode gold characteristics.

A metamorphic devolatilisation model with possible magmatic heat fluid and metal input or modification is postulated for the formation of the gold deposits in this greenstone belt (Figure 43). Under an accretionary tectonic regime and prograde greenschist metamorphism the conversion of hydrous minerals to metamorphic mineral assemblages would have resulted in the formation of reduced low salinity  $H_2O-CO_2$ -rich fluids (Groves & Phillips 1987).

Concurrent deformation at depth in the volcano-sedimentary package would have maintained permeability under ductile conditions and would have facilitated fluid and metal sequestering throughout large volumes of the host rock at a grain-scale level. The source concentrations of metals (i.e. Fe, Cu and Au) could have been very low typically a few ppb Au is theoretically viable.

Active shear zone networks could have collected and channelled the ore fluids from the source into higher crustal levels. Most mesothermal deposits are thought to have developed in the brittle-ductile transition zone (5-10 km depths). Suitable lower-order structures most likely 'tapped' the major hydrothermal fluid conduits and further focused fluid flow. Upon reaching suitable conditions sulphides and gold mineralization could have resulted.

The mineralization is structurally controlled and developed under brittle-ductile conditions there is extensive alteration associated with many of the structures and the mineralization can be found in different host lithologies. The majority of the shear zones and vein sets are moderately-to-steeply dipping mainly to the north although a number dip to the southwest. Recent drilling indicates at least two distinct styles of mesothermal mineralization.

At Ngula 1 and 2, gold mineralization is thought to be entirely hosted by extensive relatively ductile shear zone systems that cut across the package of metabasalts, metasedimentary rocks and pillow lavas. The mineralized structures are characterized by pervasive chlorite and biotite alteration with abundant pyrrhotite-chalcopyrite assemblages.

At Nyakagwe East free gold has been observed in a discrete quartz vein stock hosted by felsic meta-volcanic rocks. Brittle fluid flow structures such as cataclasites and hydrothermal breccias tend to dominate over smaller ductile shear zones.





Figure 42: Mineralization model (Groves & Phillips 1987)

## **14 SAMPLING METHOD AND APPROACH** (ITEM11)

### 14.1 Diamond Holes

### 14.1.1 Sample Collection

A Tembo technician supervised by a Mineral Corporation geologist is on site at all times.

The core is placed in pre-labelled metal trays where the individual pieces are fitted together and inspected to verify continuity both within and between runs. Small crosses marked on the core indicate where fit cannot be established.

Drilling runs are measured and reconciled with the core-block depths to reflect the accurate depth along the core. Sample recovery is determined and zones of core loss are indicated on the core boxes.

Following the reconciliation of core-block depths and the previous rundepth marks correct metre marks are inscribed on the core using black marker pens. These marks constitute the official depths for core logging and sampling purposes.

The core trays are transported from the drill site to Tembo's core yard by Tembo staff where the core is inspected to ensure that core continuity is intact.



### 14.1.2 Core Orientation

Core is orientated by the Hall Core and Layne drilling staff using a Reflex ACT orientation instrument and an orientation line is drawn along the top length of the core.

Using this mark the orientation of structures in the core is determined by measuring the alpha and beta angles on the core and then using MicroMine or GeoCalculator software and/or stereographic projections to calculate the true geological orientation.

## 14.1.3 Sample Logging

The logging is performed by a Mineral Corporation geologist. Geological information is captured on paper logging sheets and includes recovery geological structural lithological and alteration data.

Sample intervals are determined by the geologist. The core is carefully halved lengthways with a diamond core saw. These sample intervals and numbers are then marked on both halves.

Samples are generally 1.00 m in length with adjustments where necessary for mineralized structures and lithology. The minimum sample length submitted to the laboratory is 0.30 m and the maximum is generally 1.00 m.

The half of the core to be submitted to the laboratory is immediately placed into a plastic bag with a unique sample ticket stapled to the inside lip of the bag and then securely sealed by staples. The sample bags are laid out in sequence to avoid duplications and omissions of samples in the laboratory submission orders and certified reference material (blanks and standards) inserted into the sample stream. The sample numbers are entered into a register stored at the Tembo site office.

The sample bags are placed into labelled hessian bags immediately secured with cable ties and kept in a locked shipping container until transportation to the lab.

The samples are transported to the SGS laboratory in Mwanza accompanied by a senior member of The Mineral Corporation staff.

The remaining half of the core is returned to the core box and the box is stored in a secure core shed.

## 14.1.4 Downhole and Collar Surveys

Downhole surveys are completed for all the holes after completion of drilling using a Reflex instrument.

All the diamond drill borehole collars will be accurately located by a professional surveyor at the end of the Phase 1 drilling programme. At the same time appropriate survey control points will be established across the Project to facilitate subsequent exploration. Borehole collars are assigned provisional coordinates based on GPS survey.



## 14.2 Reverse Circulation Drilling

### 14.2.1 Sample Collection

The process of sample collection is overseen by a Tembo technician who is on site at all times and supervised by a Mineral Corporation geologist.

One metre intervals are marked on the core barrels to guide drillers as to sample lengths.

Samples are collected in pre-labelled large plastic bags. A sample is collected for every 1 m of drilling from the cyclone connected to the drill head. The bag is only removed from the cyclone once blow-out is complete.

Each sample is immediately weighed to monitor for drilling recovery. On reverse circulation rigs which don't have a riffle splitter attached to the cyclone the dry reverse circulation bulk sample (~30 to 40 kg) is passed through a three-tier riffle splitter to obtain homogeneity of the sample before its first split.

The sample is passed through the three-tier riffle splitter again to produce an approximate 1.2 kg sample for assay. This portion of the riffled sample is then passed twice through a two-tier riffle splitter to obtain a nominal 300 g sample (Figure 44). The splitters are thoroughly cleaned after every sample with compressed air.

Three consecutive primary sample splits are combined into one single 3 m composite. The composite samples are immediately placed into a plastic bag with a unique sample ticket stapled to the inside lip of the bag and securely sealed by staples.

The remaining portion of the bulk sample is stored at the drill site until no longer needed and then discarded.

In order to maximise the speed of the reverse circulation drilling programme and reduce cost 3 m composites samples comprise the first pass of analysis. During logging any samples which are potentially mineralized in that they contain shearing veining or sulphide are immediately submitted for analysis as 1m samples. If any 3 m samples return anomalous gold values from the laboratory the corresponding 1m samples which made up the 3 m composite are submitted for analysis.

The sample bags are accompanied from the drill site to the office by the Tembo technician where the samples are laid out and their sequence checked. Certified reference material (blanks and standards) are inserted into the sample stream. The sample bags are sealed in large hessian bags as batches and kept in a locked shipping container until transportation to the laboratory.

The samples are transported to the SGS laboratory in Mwanza by a Mineral Corporation staff member.





Figure 43: Splitting process for reverse circulation sampling

## 14.2.2 Sample Logging

Representative samples from each borehole are laid out in rows of ten for logging. A paper log of the rock chips is completed at the drill site by the responsible geologist and includes recovery, geological, structural, lithological and alteration data.

Representative samples are collected and stored in chip trays labelled with the borehole number from and to depths. The trays are stored in a locked storage container.

### 14.2.3 Collar Surveys

All the reverse circulation borehole collars will be accurately located by a professional surveyor at the end of the Phase 1 drilling programme.

## 15 SAMPLE PREPARATION ANALYSIS AND SECURITY (ITEM11)

Reverse circulation chips and diamond core samples are submitted to the SGS laboratory in Mwanza for analytical analysis. SGS in Tanzania is an affiliate company of SGS Group. SGS Mwanza is ISO17025:2005 accredited by SANAS of RSA (number T0470) and is independent of Tembo. A visit has been paid to the laboratory by The Mineral Corporation to assess sample preparation and security.

## 15.1 Sample Preparation and Security

A brief description of the sampling methodologies is as follows:

- Samples are received with accompanying submission forms at the laboratory facility and sorted for preparation;
- Samples are transferred into previously washed stainless steel trays placed on trolleys and dried at 105 °C;
- Samples are crushed with a jaw crusher and reduced in size until 75% of the sample passes through a 2 mm screen;
- A sub-sample is created for pulverising. If this requires splitting this is done using a table top Jones Riffle Splitter. Crush duplicates were retained and stored;



- 800-1,200 g of each dried sample is pulverised in a chrome steel ring and puck mill so that 85% passes through a 75 µ screen;
- The pulp is mat rolled onto a grid and random scooped portions totalling ~250 g are collected into envelopes. Pulp duplicates are retained and stored;
- Crush and pulp quality is checked by screening every 20 samples. Remedial action is taken when failure occurs;
- Compressed air is used for cleaning equipment in between samples and a barren quartzite flush is pulverised after every 20 samples; and
- Internal QA/QC includes portions of the pulverised silica cleaning material labelled as "samples preparation blanks" for every 20th sample as well as laboratory blanks and duplicated pulps. Additionally every 50th sample is taken at splitting stage and treated from that point as an individual sample as a crush duplicate.

## 15.2 Analysis

## 15.2.1 Primary Analysis

The analysis methodology followed is as follows:

- The sample is weighed to 30/50 g using a tared and regularly calibrated digital laboratory scale and captured automatically (minimising transcription input or other errors) and digitally into the laboratory information management system ("LIMS"). Standards blanks and duplicates are inserted at this stage. CuSO<sub>4</sub> is added to selected samples to ensure sequential arrangement is maintained;
- The sample is mixed with a flux in a ratio of 1:3.5 and additives added depending on the matrix of the sample;
- Fusion is carried out in a refractive crucible at 1,100 °C for 50-60 minutes;
- Slags are knocked from the lead button and placed in a pre-heated cupel;
- The button is oxidised at a temperature of ~950 °C for an hour in a cupellation furnace; and
- The "prill" is digested with aqua regia at 80 °C in a test tube with distilled water mixed for Atomic Absorption Spectrometer ("AAS") elemental determination on LIMS at which point results are automatically captured into LIMS for concentration calculations (minimising transcription input or other errors).

## 15.2.2 Quality Assurance/Control Analysis

## Methodology

The exploration team introduces certified reference material into the sampling stream according to a protocol agreed on by Tembo and The Mineral Corporation. This protocol dictates that these field blanks and standards are inserted as every 20th sample with the blank sample having an uneven number and the standard sample having an even number.

Three types of blanks are used depending on availability; sourced from a known barren granite outcrop in Mwanza obtained from Rocklabs Ltd.



("Rocklabs") of New Zealand and from African Mineral Standards of South Africa ("AMIS").

Standards are acquired from Rocklabs or AMIS and are dependent on availability.

The data used for this report is summarized in Table 3.

	reverse circulation and Diamond Drill	% of Total Samples	Comments				
Number of samples	7,544	100					
Number of Field Blanks	615	8.15					
Number of Field Standards	584	7.74					
Number of Laboratory Repeats	505	6.69	Excluding Standards assays				
Number of Field Repeats	74	0.98					
Total QC samples	1,778	23.57					

 Table 3: Summary of data used

It is the preferred method of The Mineral Corporation to analyse comparative results by error deviation percentage or mean deviation percentage charts for standard and duplicate analytical results respectively as a sense of proportion is gained from the differences.

Standards results were compared with the certified preferred values in the following formula:

% Deviation standard = 100 x (Analysed – Certified)/ Certified

where X is the element under consideration. The percentage difference was plotted against the batch number to give an estimate of the variation within individual batches.

Duplicate samples were treated in a similar way to standards. The formula used is:

% Mean Deviation = 100 x (Repeat – Sample)/((Repeat + Sample)/2)

"Sample" represents the primary sample and "Repeat" represents the repeat analysis of the primary sample pulp.

In this case the percentage difference was plotted against the concentration obtained for the first sample.

### Field Blanks

The data from the inserted blanks have been split into three parts namely the Mwanza Blank (coded BLA-G in the database) the Rocklabs AuBlank42 (coded BLA-R) and the AMIS blank (coded BLA-A in the database).





Figure 44: Mwanza blanks for different batches

The results from the Mwanza Blanks (Figure 45) show that there is a considerable variation of assayed gold abundances above the lower detection limit of 0.01 ppm for the assay method. Previous experience by The Mineral Corporation with the Mwanza Blank but at a different laboratory returned similar results and it is therefore proposed that blanks from Rocklabs and AMIS are preferably used.

Figure 46 and Figure 47 indicate that apart from three samples at 0.02 ppm and one at 0.5 ppm for AuBlank42 and 0.04 ppm and 0.11 ppm for AMIS108 the Blank levels are within acceptable limits at or near detection. The outlier value at 0.11 ppm Au may suggest either a sample swap in the laboratory or limited contamination. As this outlier is a single occurrence it is likely to represent a sample swap.



Figure 45: AuBlank42 blanks for different batches





Figure 46: AMIS 108 blanks for different batches

#### Field Standards

The assays for the standards inserted in the sample stream are shown in Figure 48 and Figure 49. Percent Error Deviations in Figure 48 is plotted against batch numbers (i.e. against time submitted to the laboratory). One major outlier at -38% for batch 123137 corresponds with Standard SK33 (Figure 49). The Mineral Corporation is of the opinion that this single outlier possibly represents a sample swap in the field or during sample preparation and it should not be a cause for concern.

Figure 49 shows that two distinct populations are recognised namely a population from the initial sample submissions to batch 122466 in which % Deviations vary between -10% and +10% and which has a mean bias of -0.3% well within industry norms. The batches following batch 122466 show a positive bias of 4.4%. A number of samples plot between +10% and +20%. Although the mean bias falls within the industry norm, SGS has been notified of the bias and remediation is expected.









Figure 48: Error Deviations plotted against certified Au concentrations of specific Standards

The overall QC data suggests that the results for the standards are within acceptable limits. Major outliers are usually the result of sample swaps either during field operations or in the laboratory. The assayed value of 0.01 ppm suggests that a blank sample had inadvertently been inserted in place of Standard SI25.

#### Field Repeats

On completion of the assay process the laboratory returns all sample remnants and pulps to Tembo. Samples with assay values over 0.5 ppm Au are resubmitted with a different sample number to SGS as field repeats.

At the time of this report results for 74 of these repeats have been reported (Figure 49). A scatter in the Mean Deviation is observed up to approximately 4 ppm Au above which the Mean Deviations remain in the 10% to +10% ranges.







## Laboratory Repeats

Assays of all samples returning 0.5 ppm Au and higher are automatically repeated by the laboratory.

Mean Deviations for these repeats of 505 diamond samples re-assayed by the laboratory are plotted in Figure 50. The Mean Deviations show a typical spread as the lower detection limit of 0.01ppm is approached. Above 2 ppm Au the % Mean Deviation ranges between -10% and +10%. This result is typical for gold from greenstone terranes and the results are considered acceptable.

The authors consider the overall adequacy of sample preparation security and analytical procedures to be acceptable for the purpose of this report.



Figure 50: Mean deviations for repeat samples on diamond drill holes

## **16 DATA VERIFICATION** (ITEM12)

Laboratory QA/QC results are examined and flagged by SGS and if erroneous the entire batch is re-tested and the client notified of such an occurrence.

On receipt of results from the laboratory The Mineral Corporation geologist reviews and graphically checks the analytical results for all field and laboratory standards blanks and repeats. Standard results are expected to be within 3 standard deviations of the quoted value. Deviations higher than this are brought to the laboratory's attention and resolved.

The authors consider the adequacy of the data to be acceptable for the purposes of this report.

## **17 MINERAL PROCESSING AND METALLURGICAL TESTING** (ITEM13)

A gold deportment study to characterize the gold on 32 samples collected during an artisanal mining face sampling programme and to determine possible processing methods for optimum gold recovery was completed at SGS South Africa (Pty) Ltd. A 20 kg sample was taken across the width of each working face in safe and accessible



artisanal shafts. No face mapping or geological control was applied and the geological context is therefore undefined. These samples are not representative of the in-situ mineralization and the results are indicative only.

The mineralogical test work consisted of a "Modified Gold Deportment Study" which included metallurgical and mineralogical tests. The objective of the study was to gain an understanding of the nature and mode of occurrence of the gold in each composite provided by Tembo.

The study included:

- Au and S assays of 32 samples and composite creation.
- Test work to determine the amenability of the ore to gravity recovery.
- Grading analysis to determine the gold distribution across size fractions.
- Heavy Liquid Separation ("HLS") to determine the amount of free gold or gold in heavy particles such as sulphides.
- Chemical analysis to determine the compositions of the ore and metallurgical test products.
- General mineralogical characterization of the ore by XRD and QEMSCAN.
- Identification and quantification of gold minerals including native gold, goldtellurides etc. in the gravity concentrate.
- Exposure and mineral association analysis of the particulate gold grains in the gravity concentrate.
- Grain size distribution of the gold grains in the gravity concentrate.
- Test work to determine the gold recovery by direct cyanidation.
- Diagnostic leach test of the gravity tailings in order to determine the gold deportment in the gravity tails.

## Summary

Gold is well liberated and exposed. Gravity recovery plus direct cyanidation would be an effective method to recover the gold but retention time may need to be increased to fully leach coarse gold particles. Gravity recovery is moderately effective and should be used to recover coarse gold particles that are amenable to this technology. This would be followed by direct cyanidation of the gravity tails with lower retention times.

Diagnostic leach and direct cyanidation tests indicate expected CIL recovery of 86.13% 93.37% and 96.64% for the low medium and high-grade composites respectively. The tests indicate 1.21%, 2.21% and 0.13% refractory gold in the three composites.

Direct cyanidation of the head samples indicates high gold recovery in the medium and high-grade composites (94.7% and 98.9% respectively) whereas the low grade composite has a leach recovery of (87.3%. Lower gold recovery for the latter is considered to be due to gold locked in silicate minerals.

It is too early to comment on whether any processing factors or deleterious elements could have a significant effect on economic extraction.

# **18 MINERAL RESOURCE ESTIMATES** (ITEM 14)

No mineral resource estimates have been completed.



#### **19 MINERAL RESERVE ESTIMATES** (ITEM 15)

No mineral reserve estimates have been completed.

### 20 MINING METHODS (ITEM 16)

Not applicable at this stage of the exploration programme.

### 21 RECOVERY METHODS (ITEM 17)

Not applicable at this stage of the exploration programme.

### 22 MARKET STUDIES AND CONTRACTS (ITEM 19)

Not applicable at this stage of the exploration programme.

### 23 ADJACENT PROPERTIES (ITEM 23)

The Project adjoins African Barrick Gold plc's Bulyanhulu Gold Mine ("Bulyanhulu") East Africa's largest gold mine (Figure 51), which lies approximately 4 km east of the Project boundary. Information in this section is derived from publicly available information through African Barrick Gold's website (www.africanbarrickgold.com). The mine is "a narrow-vein gold mine containing gold, silver and copper mineralization in in sulphides. Mineralization of Bulyanhulu is associated with steeply-dipping reefs. A number of distinct reefs have been identified including Reef Zero, Reef One and Reef Two".

The Mineral Reserves and Mineral Resources summarized in the table below are derived from African Barrick Gold's 2011 Annual Report.

The authors note that referencing this mine in the report is not indicative of mineralization on the Project.

Classification Mine Gold Reserve	Tonnes	Grade Au (g/t)	Contained Au (oz)
Proven	1,229,684	10.789	426,557
Probable	26,959,226	11.774	10,205,349
Mine Gold Resource (r	measured and indicated, exclusiv	e of reserves)	
Measured	-	-	-
Indicated	17,765,891	5.283	3,017,771

Within the Project, Tanzanian Nationals hold Primary Mining Licences. Some of these licences and a Prospecting Licence owned by Thamani Mines have been sold to Redhill Resources (Figure 51). It is understood that an exploration programme of mapping sampling trenching and induced polarization (IP) to define drill targets is planned for 2012 by Redhill Resources.

In addition the Project is surrounded by Prospecting Licences held by third parties. The authors have not been able to verify this information and the information is not necessarily indicative or representative of the mineralization on the Project.

## 24 OTHER RELEVANT DATA AND INFORMATION (ITEM 24)

There is no other relevant data to report.



70



Figure 51: Properties adjacent to and within the Project (derived from http://www.redhill-resources.com)



### **25 INTERPRETATION AND CONCLUSIONS** (ITEM 25)

Gold mineralization as evidenced by artisanal mine workings historical exploration and current drilling exists on the Property.

The historical prospecting undertaken between 1997 and 2008 identified a number of drill targets. These historical targets were confirmed and enhanced by early stage reconnaissance mapping and sampling by Tembo during 2011.

The reverse circulation and diamond drilling at Ngula 1 target has shown the presence of significant gold mineralization in a number of structures along a strike of 600 m and at Nyakagwe East target has defined a continuous zone of mineralization 1,000 m in strike extent.

Follow up drilling at both of these targets will be aimed at providing a structural definition and the extension of these zones through in-fill drilling and drilling along strike and down dip to establish the gold grade and distribution of the mineralization with a view to defining a gold resource.

Diamond drilling will be continued on other targets beneath zones of artisanal mining to establish the presence of potentially economic gold mineralization and reverse circulation drilling will test hidden potential structures indicated by earlier exploration geophysical surveys and near surface sampling including soil geochemistry.

The authors are not aware of any significant risks that may affect the reliability of the exploration results.

## **26 RECOMMENDATIONS** (ITEM 26)

A staged exploration programme incorporating mapping, trenching and drilling is recommended for the Project.

Trenching and geological mapping should be conducted in tandem with the drill programme. Further diamond drilling will confirm structural controls and nature of mineralization, while the reverse circulation drilling will test the extent of the target areas.

The focus of the current exploration programme will remain on the Ngula 1, Nyakagwe East and Nyakagwe Village target areas for the remainder of the Phase 1 drilling programme. The Iyenze/Bulyanhulu, Mgusu and Ngula 2 will be further explored during future phases.

Towards the end of May 2012, a decision was made to focus the Phase 1 drilling programme on areas directly under surface artisanal mining operations. This however, in no way, detracts from the long term objective of testing areas between artisanal mining that may host gold mineralization which is obscured from near surface expression. Such areas have already been identified during the early stages of the Phase 1 drilling programme.

The plan for more focused drilling between 1 June and 31 August 2012 in the current programme is shown in Figure 52.



The current drilling phase is drawing to a close pending the return of the last drill results. This will provide time for a thorough review and interpretation of all results, including structural analysis, and the drilling programme has been slowed down to allow this.

Subsequent to the completion of this current programme, Phase 1 will commence with one reverse circulation and one diamond rig. This phase will comprise approximately six diamond holes on Ngula 1 and two holes on Mgusu. Eight reverse circulation holes are planned on the Bulyanhulu target, 15 on Mgusu and five holes on the Nyakagwe Village target. The exploration budget for this phase of exploration is summarized in Table 4.

	TOTAL	Buly Trend	Mgusu	Ngula 1 & 2	Nyakagwe Village	Iyenze	Nyakagwe East
				US\$			
Personnel, consultants, travel and accommodation	39,0000	35,000	105,000	150,000	100,000	-	-
Drilling and geophysical surveys	177,5000	350,000	750,000	475,000	200,000	-	-
CSR, environmental and scoping studies	155,000	20,000	30,000	75,000	30,000	-	-
Analytical costs and metallurgical test work	190,000	30,000	50,000	45,000	65,000	-	-
Operating costs and overheads	75,000	10,000	12,500	37,500	15,000	-	-
Overheads, contingency and provision for additional work	390,000	50,000	150,000	140,000	50,000	-	-
TOTAL	2,975,000	495,000	1,097,500	922,500	460,000	-	-
Work Programme by target							
Diamond Drilling, metres	2,500		750	1,750	0		-
Reverse Circulation Drilling, metres	8,500	2,500	4,500	0	1,500		

Table 4: Indicative budget estimate for Phase 1 follow up exploration programme

On the completion of the Phase 1 follow up exploration programme, which is designed to improve targeting, Tembo will continue with a further phase of exploration as summarized in Table 5.

	TOTAL	Buly Trend	Mgusu	Ngula	Nyakagwe Village	Iyenze	Nyakagwe East
		5%	15%	40%	5%	5%	30%
				US\$			
Personnel, consultants, travel and accommodation	1,417,900	70,900	212,800	567,200	70,900	70,900	425,200
Drilling and geophysical surveys	6,467,600	323,400	970,000	2,586,700	323,400	323,400	1,940,700
CSR, environmental and scoping studies	1,032,800	51,600	155,000	413,300	51,600	51,600	309,700
Analytical costs and metallurgical test work	407,100	20,400	61,000	162,800	20,400	20,400	122,100
Operating costs and overheads	274,600	13,700	41,200	110,000	13,700	13,700	82,300
TOTAL	9,600,000	480,000	1,440,000	3,840,000	480,000	480,000	2,880,000
Corporate overhead contingency, provision work	, 5,						
TOTAL	2,400,000 <b>12,000,000</b>						

#### Table 5: Indicative budget estimate for Phase 2 follow up exploration programme



Figure 52: Proposed short term drilling programme (June to August 2012)

#### 27 REFERENCES (ITEM 27)

Barrick Annual Report 2011, http://www.barrick.com/Investors/AnnualQuarterlyReports/default.aspx

Barth, H., 1990. Provisional geological map of the Lake Victoria Goldfields, Tanzania: Geologische Jarbuch, Reihe B, Heft 72.

Groves, D.I. & Neil Phillips, G., 1987. The genesis and tectonic control on Archaean gold deposits of the Western Australian Shield - a metamorphic replacement model. Ore Geology Reviews, 2, 287-322.

Verley, C.& Krynauw, J., 2011. Report on the Tembo Gold Project, SEDAR filed report for Lakota Resources Inc