

# IMPALA PLATINUM LIMITED



## Closure Costing Report for Proposed 16 Shaft Waste Rock Dump Expansion



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## LIST OF TERMS AND ABBREVIATIONS USED

TERMS & ABBREVIATIONS	DESCRIPTION
Care and maintenance	This involves the maintaining and corrective action as requires as well as conducting the required inspection and monitoring to demonstrate achievement of success of the implemented measures
Closure	This involves the application for closure certificate and initiation of transfer of on-going care and maintenance to third parties
Contingencies	This allows for making reasonable allowance for possible oversights/omissions and possible work not foreseen at the time of compilation of the closure costs. Allowance of between 10 percent and 20 percent would usually be made based on the accuracy of the estimations. The South African Department of Minerals and Energy Guideline (January 2005) requires an allowance of 10 percent
Decommissioning	This relates to the situation after cessation of operations involving the deconstruction/removal and/or transfer of surface infrastructure and the initiation of general site reclamation
DMR	Department of Mineral Resources
E-TEK	E-TEK Consulting
Impala	Impala Platinum Limited (Rustenburg Operations)
Post-closure	The period after mine closure
Preliminary and Generals (P&Gs)	This is a key cost item which is directly related to whether third party contractors have applied for site reclamation. This cost item comprises both fixed and time-related charges. The former makes allowance for establishment (and de-establishment) of contractors on site, as well as covering their operational requirements for their offices (electricity/water/communications), latrines, etc. Time-related items make allowance for the running costs of the fixed charged items for the contract period
Reclamation	The re-instatement of a disturbed area into a usable state (not necessarily its pre-mining state) as defined by broad land use and related performance objectives
Rehabilitation	The return of a disturbed area to its original state, or as close as possible to this state
Remediation	To assist in the reclamation process by enhancing the quality of an area through specific actions to improve especially bio-physical site conditions
Scheduled closure	Closure that happens at the planned date and/or time horizon
Site relinquishment	Receipt of closure certificate and handover to third parties for on-going care and maintenance, if required
Un-scheduled closure	Immediate closure of a site, representing decommissioning and reclamation of the site in its present state
EMPR	Environmental Management Program Report
WRD	Waste Rock Dump

## 1 INTRODUCTION

E-TEK Consulting (E-TEK) was requested by Impala Platinum Limited (Impala) to assist with the preliminary closure costing of the proposed 16 Shaft Waste Rock Dump (WRD) expansion project for their Rustenburg Operations. The existing WRD at 16 Shaft Complex was constructed in accordance with the relevant approved EIA/EMP amendment report for 16 Shaft. Impala is however proposing the 16 Shaft WRD expansion projects, which requires the construction of a new WRD at the shaft.

The project is located within Impala's surface use area at its Rustenburg operations. This area falls within the Rustenburg Local Municipality and Bojanala Platinum District Municipality in the North West Province.

These closure costs were determined to form part of an authorisation process with the Department of Mineral Resources (DMR) for the proposed new project and are aligned to the DMR guideline document for new EIA/EMP applications. Closure cost estimates were calculated for the first ten years of operations and scheduled closure.

**Closure costing is categorised according to the DMR guideline:**

- Infrastructural areas;
- Mining areas;
- General surface reclamation;
- Water management;
- Post closure aspects; and
- Additional allowances.

The closure cost estimates quantities were taken from available plans and information provided by Impala and SLR. Rates used were obtained from E-TEK's existing database and in consultation with demolition and earthworks contractors.

The closure cost estimates for the Proposed 16 Shaft Waste Rock Dump Expansion at their Impala Rustenburg Operations for Unscheduled Closure (1-10 Year forecast) and Scheduled Closure is indicated in the table below:

16 Shaft Waste Rock Dump Expansion Project	
Forecast	Closure Cost Estimates
Year 1	R 787 286.68
Year 2	R 1 050 486.10
Year 3	R 1 135 843.87
Year 4	R 1 204 205.34
Year 5	R 1 986 083.18
Year 6	R 1 694 302.01
Year 7	R 1 713 593.61
Year 8	R 1 732 885.21
Year 9	R 1 752 176.81
Year 10	R 1 771 468.41
Scheduled Closure	R 2 421 089.61

## 2 APPROACH TO COST DETERMINATION

The approach followed with the determination of the closure costs could be summarised as follows:

- Sourcing and review of project information from Impala to determine the nature and extent of the proposed expansion project;
- Agreement that no site visit was required as operation of the proposed new project has not commenced. Furthermore, E-TEK has a good understanding of the general site conditions and nature of operations at Impala due to the involvement in the closure costing for the whole of Impala’s current Rustenburg Operations;
- Determination of the various components of rehabilitation of the specified area;
- Compilation of a Bill of Quantities capturing the quantities of the proposed new project;
- Unit rates used were obtained from E-TEK’s existing data base and in consultation with demolition and earthworks contractors;
- Application of the above unit rates and associated quantities in pre-determined spreadsheets to determine the latest closure cost estimates;
- Forecast the first ten years of operations to reflect the fluctuating closure costs of the proposed new expansion project; and
- A closure report to summarize the approach, assumptions and findings of the closure costing.

### 3 INFORMATION

Closure costing was based on the following information supplied by Impala:

Description	Person	Date
EMPR for 16 Shaft	SLR (Caitlin Pringle)	05/09/2012
Scoping Report for 16 Shaft	SLR (Caitlin Pringle)	05/09/2012
Detail layout drawings (Pdf and DWG)	SLR (Siduduzo Dladla)	20/11/2012
Rehabilitation Criteria	SLR (Siduduzo Dladla)	19/11/2012

### 4 CLOSURE CRITERIA

The following general and site specific assumptions and qualifications for each of the closure components listed in section 2 and 3 for Impala are described below:

#### 4.1 General assumptions

- The closure cost estimate is aligned to the Guideline Document for the Evaluation of the Quantum of Closure Related Financial Provision Provided by a Mine, by the DMR (January, 2005);
- The closure costs for the site could comprise a number of cost components. This report only addresses the decommissioning and reclamation costs, equating to an outside (third party) contractor establishing on-site and conducting reclamation-related work. Other components such as staffing of the site after decommissioning, the infrastructure and support services (e.g. power

supply, etc.) for this staff as well as workforce matters such as separation packages, re- training /re-skilling, etc. are outside the scope of this report;

- Based on the above, dedicated contractors would be commissioned to conduct the demolition and reclamation work on the site. This would inter alia require establishment costs for the contractors and hence, the allowance for preliminary and general (P&Gs) in the cost estimate;
- Allowance has also been made for third party contractors and consultants to conduct post-closure care and maintenance work as well as compliance monitoring;
- Closure costs have been determined for both the scheduled and un-scheduled 1-10 year forecast closure situations. Specifically, scheduled closure takes place at a planned date and/or within a time horizon, in accordance with overall mine planning. Un-scheduled closure entails immediate closure of a site, representing decommissioning and reclamation of the site in its present state;
- In accordance with the DMR guideline, no cost off-sets due to possible salvage values were considered and gross reclamation costs are reported; and
- Fixed percentages for P&Gs and contingencies as per the DMR guideline have been applied.

#### 4.2 Site specific assumptions

- The proposed position of the site is located on farm land and vacant veld and is currently not disturbed by mining operations;
- The liability estimates for this facility needs to be incorporated into the greater 16 Shaft Complex in the next liability update of Y2013;
- The expansion project of the waste rock dump forms part of the greater 16 Shaft Complex;
- The project will commence in Y2013 when final approval has been received;
- The life of mine for this project and 16 shaft is currently estimated at 30 years;
- The total volume for the waste rock dump is an estimated 3 861 639m<sup>3</sup> at life of mine and 128 721m<sup>3</sup> per annum;
- The toe of the waste rock dump will move an estimated 20m per annum;
- Final height of the waste rock dump will be 40m with the side slopes at normal angle of repose;
- The side slopes of the waste rock dump will be graded down to the required 18 degrees by means of cut to fill dozing;
- Concurrent rehabilitation as per Impala's standard guideline will be implemented and it was assumed that a 20m strip will require rehabilitation in the event of unscheduled closure;
- The side slopes of the waste rock dump will be graded down to the required 18 degrees with a cut to fill method;
- Allowance was made for the disposal of general waste (including building rubble) at a permitted waste disposal site within a 30km radius; and
- Impala is not the land owner but has a surface use agreement with the Royal Bafokeng as well as other Independent Minerals Owners (IMO).

## 5 CLOSURE COSTING

Detailed spreadsheets for the closure cost estimates for this report are included in Appendix A. The following sub-headings describe all criteria and assumptions used for closure costing.



## 5.1 Infrastructural areas

The closure criteria for the following closure cost components are the same for un-scheduled and scheduled closure.

- General
  - All infrastructure used for Stormwater interception will be left in position until such time that rehabilitation of the waste rock dump is completed and water quality is of acceptable standards;
  - A earth lined v-drain will be constructed around the perimeter of the waste rock dump and will not require rehabilitation afterwards;
  - A sump will be constructed to collect dirty water intercepted by the earth lined v-drain including pumps and pipeline to the nearest pollution control dam; and
  - An overland conveyor will be used as the main disposal method of waste rock and will be lengthened as the waste rock dump increases in size.
- Closure Criteria
  - All infrastructures will be completely removed to 1m below natural ground level. No beneficial reuse has been allowed for any of the surface infrastructure;
  - Allowance was made for the demolition cost of all steel type structures. This includes a removal fee for a 30km load and hauls to an authorised facility to be sold or auctioned off. However as per DMR requirement, the salvage value of steel was not used to offset demolitions costs;
  - Allowance was made for the disposal of other non-demolition waste (general waste) at a permitted disposal site within a 30 km radius;
  - A 2.5 % allowance was made for the sorting and screening of waste; and
  - General surface rehabilitation will be implemented on footprint areas where disturbance has taken place.

## 5.2 Mining areas

### Rehabilitation of processing waste deposits and evaporation ponds (polluting potential)

#### Waste Rock dump

- General
  - Project development will commence in Y2013 once approval has been received;
  - Concurrent rehabilitation will be implemented at operational phase; and
  - A 20m face will require rehabilitated at any given time during the operational phase.
- Closure Criteria
  - Allowance was made to reshape the side slopes of the waste rock dump to 18 degrees using a cut and fill method by means of dozing;
  - Allowance was made to place a mix of waste rock, clay and topsoil mixture layer of 500mm over the reshaped area at a load and haul distance of 1km;
  - Additional allowance was made to spread the material over the reshaped slopes by means of dozers or graders;
  - Allowance was also made to create stormwater berms on the side slopes as per detail designs; and
  - Allowance was also made for the establishment of vegetation.

## 5.3 General surface reclamation

- General



- Rehabilitation of disturbed footprint areas;
- Closure Criteria
  - Disturbed area will be reshaped and levelled filling all voids and making area free draining;
  - Allowance was made to rip the disturbed area to a depth of 500mm to alleviate compaction;
  - Allowance was made to import 250mm topsoil from the local stockpile onto the levelled surface; and
  - Additional allowance was made to establish vegetation which includes soil amelioration cultivation and seeding actions with indigenous grass seed mixture.

## 5.4 Water management

Assumed no provision is required.

## 5.5 Post closure aspects

### 5.5.1 Surface water monitoring

- No allowance was made, currently forms part of the greater 16 Shaft Complex closure cost.

### 5.5.2 Ground water monitoring

- No allowance was made, currently forms part of the greater 16 Shaft Complex closure cost.

### 5.5.3 Reclamation monitoring

- An allowance has been included for the reclamation monitoring of reclaimed areas for a five year period.
- No allowance was made, currently forms part of the greater 16 Shaft Complex closure cost.

### 5.5.4 Care and maintenance

- Care and maintenance of the reclaimed areas, over a five year period, has been assumed.
- No allowance was made, currently forms part of the greater 16 Shaft Complex closure cost.

## 5.6 Additional allowances

The closure criteria for the following closure cost components are the same for un-scheduled and scheduled closure:

### 5.6.1 Preliminary and general

- Additional allowance of six percent of the total for infrastructural and related aspects (sub-total 1 on summary costing table) has been made, which is aligned to the DMR guideline.

### 5.6.2 Contingencies

- Additional allowance of ten percent of the total for infrastructure and related aspects (sub-total 1 on summary costing table), which is aligned to the DMR guidelines.

## 6 CONCLUSION AND WAY FORWARD

### 6.1 CONCLUSION

The closure costs as reflected in this report have been based on information obtained from Impala and SLR. In those cases where the required information was not available, estimates were made based on

experience and benchmarked against similar facilities. Unit rates for the costing were obtained from E-TEK's existing data base and/or through previous experience and consultation with demolition, earthworks contractors and rehabilitation practitioners. Where required, these were adapted to reflect site-specific conditions.

Notwithstanding the above, if the closure measures are implemented as envisaged, the reflected costs provide a good indication of the costs for the closure situations as calculated and should provide a good basis for making the required financial provision. The ten year forecast of closure costs is based on the assumption that the project will start in Y2013 after the approval has been obtained from the authorities.

## **6.2 WAY FORWARD**

The liability estimates for this project needs to be included in the next annual update of Y2013 for the greater 16 Shaft Complex. Certain assumptions regarding concurrent rehabilitation at operational level were made; these assumptions need to be investigated when the facility is operational to make sure all assumptions are in line with the current closure criteria.

## 7 DOCUMENT LIMITATIONS

This Document has been provided by E-TEK Consulting (“E-TEK”) subject to the following limitations:

i) This Document has been prepared for the particular purpose outlined in E-TEK’s proposal and no responsibility is accepted for the use of this Document, in whole or in part, in other contexts or for any other purpose.

ii) The scope and the period of E-TEK’s Services are as described in E-TEK’s proposal, and are subject to restrictions and limitations. E-TEK did not perform a complete assessment of all possible conditions or circumstances that may exist at the site referenced in the Document. If a service is not expressly indicated, do not assume it has been provided. If a matter is not addressed, do not assume that any determination has been made by E-TEK in regards to it.

iii) Conditions may exist which were undetectable given the limited nature of the enquiry E-TEK was retained to undertake with respect to the site. Variations in conditions may occur between investigatory locations, and there may be special conditions pertaining to the site which have not been revealed by the investigation and which have not therefore been taken into account in the Document. Accordingly, additional studies and actions may be required.

iv) In addition, it is recognised that the passage of time affects the information and assessment provided in this Document. E-TEK’s opinions are based upon information that existed at the time of the production of the Document. It is understood that the Services provided allowed E-TEK to form no more than an opinion of the actual conditions of the site at the time the site was visited and cannot be used to assess the effect of any subsequent changes in the quality of the site, or its surroundings, or any laws or regulations.

v) Any assessments made in this Document are based on the conditions indicated from published sources and the investigation described. No warranty is included; and either expresses or implies that the actual conditions will conform exactly to the assessments contained in this Document.

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**Appendix A:** Detailed costing spreadsheet.