Prieska Zinc Copper Project (Repli and Vardocube Sections)

Conceptual Closure Plan and Closure Cost Estimate - January 2019

ABS Africa
Sustainability Advisors

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

Project No: 115-001
Report No: R1

Date: 10 January 2019

PRIESKA ZINC COPPER PROJECT (REPLI AND VARDOCUBE SECTIONS)

CONCEPTUAL CLOSURE PLAN AND CLOSURE COST ESTIMATE -

DISCLAIMER

Advisory on Business and Sustainability Africa (Pty) Ltd. (ABS Africa) has prepared this report specifically for Repli Trading No. 27 Pty Ltd (Repli) and Vardocube (Pty) Ltd. (Vardocube)

The findings, conclusions and opinions of ABS Africa are based on the scope of services as defined within the contractual undertakings between Repli, Vardocube and ABS Africa.

The contents of this report are specific to the intended development at the proposed site. The report shall not be used nor relied upon neither by any other party nor for any other purpose without the written consent of ABS Africa. ABS Africa accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

The comments, recommendations and opinions expressed in this report reflect the best judgement of ABS Africa in light of the information available at the time of preparation.

The analyses contained in this report has been developed from information provided by Repli and Vardocube as well as other parties. This information is not within the control of ABS Africa and ABS Africa has not audited such information and makes no representations as to the validity or accuracy thereof.

LIST OF ACRONYMS AND ABBREVIATIONS

AQSR	Air Quality Sensitive Receptor
BFS	Bankable Feasibility Study
CBA	Critical Biodiversity Area
CRR	Comment and Response Register
Cu	Copper
D&F	Drift and Fill
DEA	Department of Environmental Affairs
DMR	Department of Mineral Resources
DSR	Draft Scoping Report
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EMPr	Environmental Management Programme
ESA	Ecological Support Area
FSR	Final Scoping Report
I&APs	Interested and Affected Parties
IDP	Integrated Development Plan
IWULA	Integrated Water Use Licence Application
IWWMP	Integrated Water and Wastewater Management Plan
Kl	Kilolitre
Ktpa	Kilotons per annum
Ktpm	Kilotons per month
L	Litre
LHOS	Long Hole Open Stoping
LOM	Life of Mine
M	Metre
mamsl	Metres above mean sea level
Mm	Millimetre
MPRDA	Minerals and Petroleum Resources Development Act
MR	Mining Right
MRA	Mining Right Application
Mtpa	Million tons per annum
NEMA	National Environmental Management Act
NEM:AQA	National Environmental Management: Air Quality Act
NEM:BA	National Environmental Management: Biodiversity Act
NEM:WA	National Environmental Management: Waste Act
NHRA	National Heritage Resources Act
NSR	Noise Sensitive Receptor
NWA	National Water Act

p.a.	Per annum
PCM	Prieska Copper Mine
PCML	Prieska Copper Mine Limited
PLC	Programmable Logic Control
PR	Prospecting Right
PRA	Prospecting Right Application
RWD	Return Water Dam
S&EIR	Scoping and Environmental Impact Reporting
SAHRA	South African Heritage Resource Agency
SDF	Spatial Development Framework
SLM	Siyathemba Local Municipality
WML	Waste Management Licence
Zn	Zinc

1 INTRODUCTION AND BACKGROUND

The historical Prieska Copper Mine (PCM) mine is situated approximately 3 km south of Copperton and 60 km south-west of the town of Prieska in the Northern Cape Province. The mine falls within the authority of the Siyathemba Local Municipality (Appendix 4 Map 1). The site is accessed via the R357 from Prieska. The mine was owned and operated by Prieska Copper Mine Limited (PCML), a subsidiary of Anglo-Transvaal Consolidated Investment Company Limited (Anglovaal), between 1971 and 1991. The mine operations ceased in 1991 and rehabilitation and closure of the mine was undertaken in accordance with agreements reached with the Department of Mineral and Energy Affairs. A closure certificate was issued by the latter on 19 October 1995. No mining activities have taken place at PCM since 1991.

Repli Trading No. 27 Pty Ltd (hereafter referred to as "Repli") is seeking to establish mining operations centred at the PCM, whereby the remaining copper and zinc-rich Prieska Zn-Cu Deposit is mined by surface and underground mining techniques.

The proposed Mining Rights Application (MRA) boundary comprises of the following properties:

- Portions 25 and 26 of the Farm Vogelstruisbult 104; and
- Portion 0 of the Farm Slimes Dam 154.

The location of the proposed Tailings Storage Facility (TSF) is on Portion 1 of the Farm Vogelstruisbult 104.

Orion Minerals (Orion), through its subsidiary company of Vardocube (Pty) Ltd. ("Vardocube"), is also the holder of a prospecting right on the Remaining Extent of Portion 1 of the Farm Vogelstruisbult 104, immediately adjacent to the Repli Mining Right Application Area. The applicant (Vardocube) is applying for a Mining Right for the Prieska Zinc Copper Project (Vardocube Section). The activity being applied for is exclusively for underground mining with no requirement for any surface area disturbance within the proposed mining right area. The property affected by the Mining Right Application is the Remaining Extent of Portion 1 of the Farm Vogelstruisbult 104.

The proposed Vardocube mining right area is adjacent to the Repli Trading No. 27 (Pty) Ltd. (Repli) mining right area. Repli is also a subsidiary of Orion and a Mining Right Application (DMR Reference No: NC30/5/1/2/3/2/1/10138 MR) for Repli was submitted in April 2018 and is expected to be finalised by the first quarter of 2019. The Copperton Deposit extends across the Repli and Vardocube prospecting right areas. Through its subsidiary company Vardocube, Orion therefore intends to access and mine the full extent of the deposit of interest including the Vardocube mining area via the refurbished existing Hutchings Shaft, situated on Portion 25 of the Farm Vogelstruisbult 104, within the proposed Repli mining right area. The Vardocube Section could not be included in the Repli Mining Right Application as the two companies (Vardocube and Repli), have different ownership structures.

A commercial agreement will be entered into between Repli and Vardocube so that relevant infrastructure and facilities established to support the proposed Repli surface and underground mining will also be used for the underground mining of the Vardocube Section of the deposit.

The infrastructure and facilities to be established by Repli have been designed with sufficient capacity to accommodate the additional ore and tailings that will be generated from the Vardocube underground mining. No further infrastructure requirements are required on the Vardocube MRA area.

The Project requires environmental authorisation in terms of the National Environmental Management Act (Act No. 107 of 1998) (NEMA) and will follow a Scoping and Environmental Impact Report (S&EIR) process in terms of the EIA Regulations, 2014 (as amended).

The NEMA Regulations Pertaining to the Financial Provision for Prospecting, Exploration, Mining or Production Operations (GNR 1147) requires that a rehabilitation, decommissioning and mine closure plan is developed which includes the determination of financial provision to guarantee the availability of sufficient funds to undertake rehabilitation and remediation of the adverse environmental impacts of mining. In addition, the EIA Regulations, 2014 (as amended) require the inclusion of a closure plan.

This document presents the rehabilitation, decommissioning and mine closure plan for the proposed development, which includes the Repli as well as the Vardocube application areas.

Ongoing maintenance and rehabilitation of the existing TSF, WRD and other structure associated with the historical mining is being undertaken by Orion in accordance with the conditions of the closure certificate and is therefore not addressed in this assessment.

The document therefore only describes the closure activities associated with the Repli and Vardocube mining right applications.

2 FRAMEWORK FOR REHABILITATION AND CLOSURE PLANNING

In the planning and implementation stages of the mining project, the focus of reclamation and closure planning is to ensure that:

- The proposed post-closure land use(s) for the site are defined and agreed with the regulatory authorities and local communities.
- The cost of the works required to return the site to a condition consistent with the requirements of the post-closure land use(s) are defined and understood.
- The necessary financial provisions are made for closure in the prescribed manner and that these are included in the assessment of the project's economic viability.
- A plan is developed for the implementation of the rehabilitation and closure works to ensure that rehabilitation and restoration proceeds concurrently with mining operations wherever possible.
- The accrual in reclamation and closure liabilities over the life of mine is limited through appropriate mine planning and concurrent rehabilitation to mitigate as far as possible the impacts of premature or unplanned closure.

The framework within which the conceptual reclamation and closure plan has been developed is described below in terms of the expected life of mine, post closure land use objectives, legislative requirements and policy guidelines.

2.1 LIFE OF MINE PLAN

2.1.1 HISTORICAL LIABILITIES

PCM closed in 1991 and received a conditional closure certificate in 1995. The closure certificate was issued under the Minerals Act 50 of 1991 and remains in force and is valid under the provisions of the Interpretation Act of 1957. All mine closure obligations were discharged with the issuance of this certificate.

The closure certificate states that the measures taken by PCML on the PCM adequately comply with the relevant provisions of the Act. The cover letter to the closure certificate states that the certificate is issued subject to the Prieska Copper Mines Nature Conservation Trust's ("the Trust") acceptance of the financing of any post-closure environmental management or maintenance obligation which might arise in the future. PCML established the Trust in order to hold funds to discharge the environmental liabilities relating to the closure of the mine.

The historical TSF poses the greatest financial obligation due to practical difficulties of controlling dust and water borne erosion over the long term. In view of this fact, construction work was carried out in 1991 on closure of the dam so that dispersion of the tailings through air and water borne erosion would be minimised. Measures implemented at the time included:

- Spraying of the crests of the tailings dam and the division walls with bitumen over a 3 m width;
- Construction of a diversion trench up-contour of the dam to lead uncontaminated surface water away from the tailings dam into the nearest water course;
- Sealing delivery pipes and points of structural weakness on the tailings dam and evaporation dams;
- Construction of berm penstocks and re-grading of the berms to slope inwards and towards the berm penstocks.

Over time, due to the high percentage of pyrites in the tailings dam, oxidation has taken place, resulting in a hard, protective coating forming over the whole surface area of the dam. Erosion of the top surface has thus not

occurred, except in a limited area of failure on the south side of the tailings dam. In addition, the hard, protective coating has resulted in the mitigation of windblown dust off the facility.

2.1.2 PROPOSED DEVELOPMENT ASSOCIATED WITH THE REPLI AND VARDOCUBE MRAS

This conceptual mine closure plan addresses the closure liabilities arising from the proposed mining activities associated with the Repli and Vardocube Mining Right Applications.

The proposed Repli Mining Right Application (MRA) boundary comprises of the following properties:

- Portion 25 and 26 of the Farm Vogelstruisbult 104; and
- Portion 0 of the Farm Slimes Dam 154.

Mine support infrastructure and structures are proposed to be located primarily on Portions 25 and 26 of the Farm Vogelstruisbult 104.

The proposed Vardocube MRA boundary comprises of the Remaining Extent of Portion 1 of the Farm Vogelstruisbult 104, immediately adjacent to the Repli Mining Right Application Area.

Based on the mine planning studies completed to date, the following is proposed:

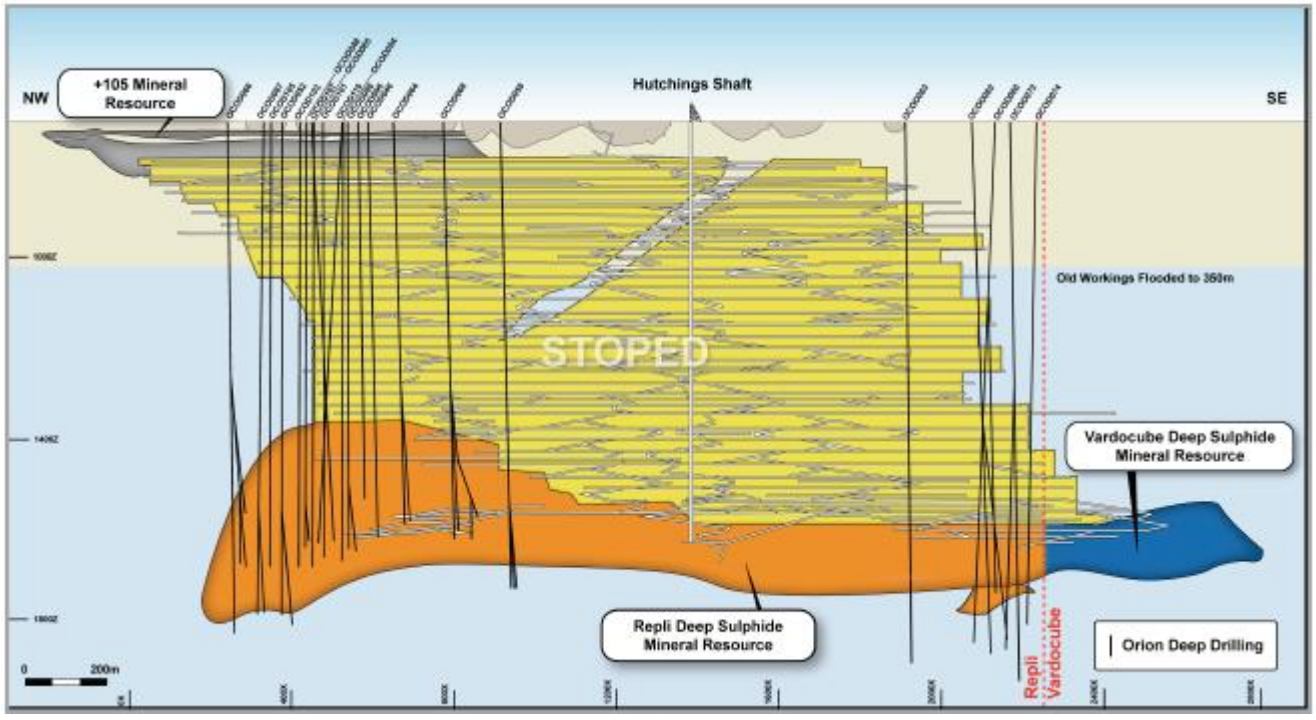
- Underground mining of the deeper portions of the Prieska Zn-Cu Deposit;
- Ore will be processed on the Repli site, including ore stockpiling, crushing and screening, milling, flotation, filtration as well as tailings and waste rock deposition;
- Dewatering of the mine. The estimated volume to be dewatered is approximately 8.5 million m^3;
- Establishment of various ancillary mine support infrastructure on Repli such as power supply and water supply infrastructure to site, as well as explosives storage, mine offices, ventilation fans, change houses, and winder house;
- Development and upgrading of internal road and power infrastructure on Repli;
- Construction of new wastewater treatment infrastructure for sewage on Repli; and
- Establishment by Repli of housing at Prieska and Copperton.

No surface infrastructure will be required on the Vardocube Mining Right Area. An agreement is in place between the two companies that provides for Repli to purchase the mined ore from Vardocube at an agreed price based on prevailing metal prices, the recovered grade and includes mining, processing and marketing costs to sell the copper and zinc concentrates which will be produced from the Repli processing plant. Repli will carry out all the development, mining, processing and marketing activities for the Repli and Vardocube sections of the Mineral Resource. Repli will also provide the staff to manage the day to day running of the operation and will manage all required safety, health and regulatory issues; and. No residual impacts that would require rehabilitation or post-closure mitigation were identified for the Vardocube area in the ESIA.

Reportable Mineral Resources and Ore Reserves (MRE) will be delineated as part of the ongoing feasibility studies.

TABLE 2-1: MINERAL RESOURCES INVENTORY[1]

DESCRIPTION	CLASSIFICATION	TONNES	ZN	CU	AG	AU
			METAL TONNES	METAL TONNES	METAL TONNES	METAL OUNCES
Deep Sulphide Repli	Inferred	22 600 000	839,000	266 000	6 904 000	153 000
Deep Sulphide Vardocube	Inferred	5 200 000	253,000	67 000	1 627 000	35 000
+105 Supergene Repli	Indicated	1 200 000	32,000	30 000	348 000	9 000
+105 Oxide Repli	Inferred	300 000	2,000	2 000	17 000	1 000
TOTALS		**29 400 000**	**1 126 000**	**365 000**	**8 896 000**	**198 000**



Source: Vardocube Mine Works Programme (2018)

FIGURE 2-1: SECTION VIEW OF THE DEEPS SULPHIDE MINERAL RESOURCE

[1] (ASX/JSE Press Release 5 Feb 2018)

2.1.3 SURFACE MINING

The current conceptual closure plan does not address surface mining. It is understood that surface mining may be undertaken towards the end of Life of Mine. Should this be confirmed, the closure plan will need to be updated accordingly. .

2.1.4 UNDERGROUND MINING

Historic underground mining successfully extracted 46 Mt of sulphide ore from steep dipping, continuous open stopes, down to a depth of 900 m at a mining rate of 250 ktpm of ore. Excavations that were established to access production areas and transport ore back to the underground crusher are expected to still be in useable condition. This pre-existing network of excavations will provide the initial access and support ventilation for the planned mining until expanded upon.

Underground mining will focus on exploiting what remains of the Deep Sulphide Exploration Target. Ore production will come from stoping areas below the -900m Level.

Access to some of these deeper stoping areas was already established as part of the trial mining that was undertaken before mining operations ceased in 1991.

Underground mining of the Vardocube Section of the ore deposit will be an extension of the same mining method used for the adjacent Repli Section of the ore deposit.

Waste rock will remain underground at designated worked-out stope ends for future use as backfill wherever possible. Access to the underground mine will be via the refurbished existing Hutchings Shaft and rehabilitated decline ramp.

Mine production will be achieved using a combination of two mining methods:

- The continuation of longhole sub-level open stoping (LHOS), supplemented with pastefill and waste rock, where the orebody is steep enough for longhole stoping; and
- The introduction of drift-and-fill, where the orebody dip becomes too flat to allow gravitational flow of ore from the stopes.

A general layout map of the mine and associated infrastructure is presented in FIGURE 2-2.

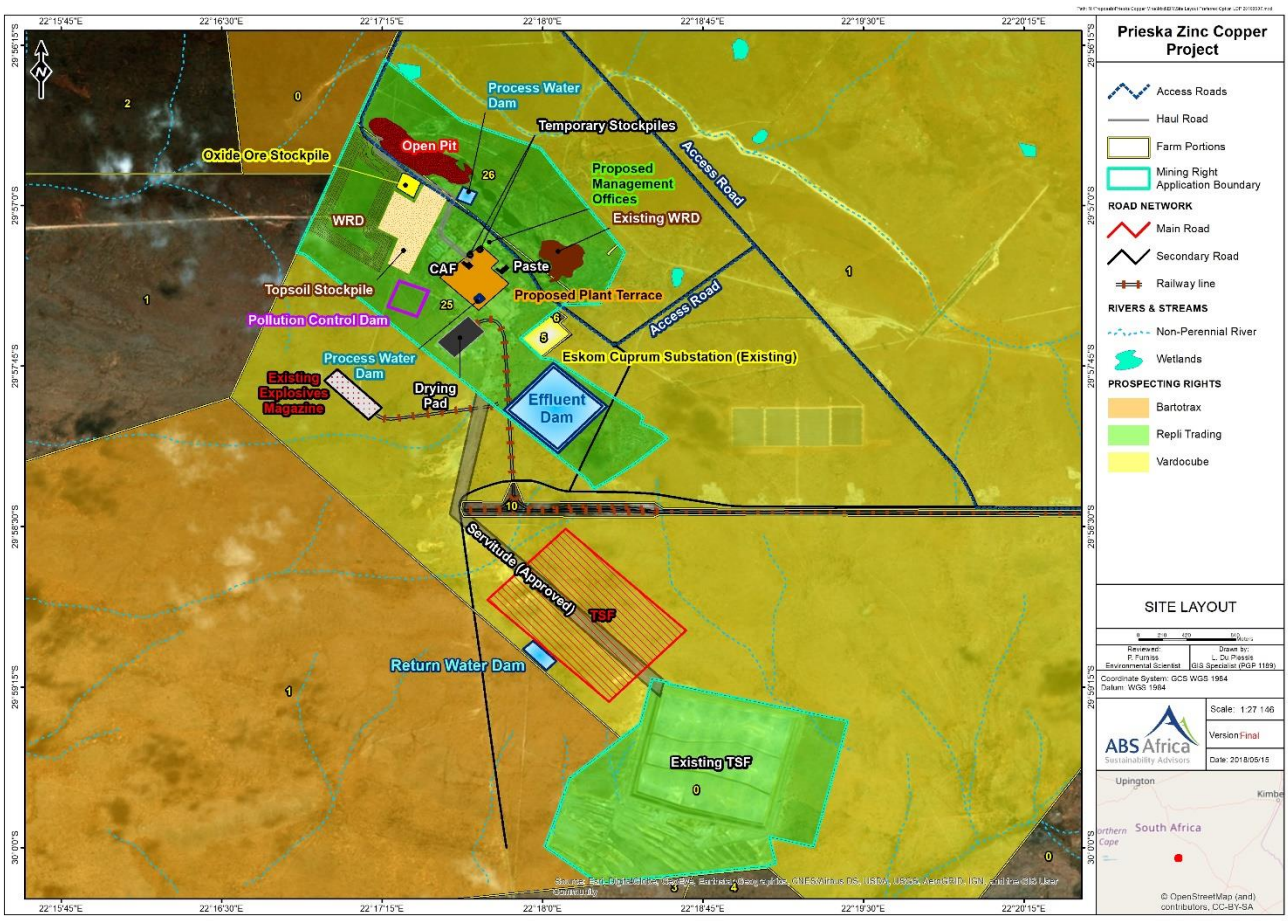


FIGURE 2-2: GENERAL SURFACE INFRASTRUCTURE LAYOUT MAP – REPLI AND VARDOCUBE COMBINED

2.2 POLICY GUIDELINES AND LEGISLATIVE REQUIREMENTS

Historically, financial provision was regulated under the Mineral and Petroleum Resources Development Act, 2002 (MPRDA), and the Mineral and Petroleum Resources Development Regulations. This system has been repealed and replaced through amendments to the MPRDA and the National Environmental Management Act, 1998 (NEMA), and through the publication of Financial Provisioning Regulations under NEMA in 2015 (the 2015 FP Regulations).

Section 24R of the NEMA deals with mine closure and includes references to section 24P of NEMA, which covers the financial provision required for mine closure. Section 24R (3) of the NEMA requires the holder of a mining right to plan, manage and implement such procedures and measures in respect of the closure of a mine as may be prescribed.

In terms of section 43 (1) of the MPRDA, the holder of a mining right remains responsible for any environmental liability until the Minister has issued a closure certificate in terms of the MPRDA to the holder of the right.

Legislation require inter alia that an applicant or holder of right or permit must make financial provision for:

- rehabilitation and remediation;
- decommissioning and closure activities at the end of prospecting, exploration, mining or production operations; and

- remediation and management of latent or residual environmental impacts which may become known in future, including the pumping and treatment of polluted or extraneous water.

An applicant must determine the financial provision through a detailed itemisation of all activities and costs, calculated based on the actual costs of implementation of the measures required for:

- annual rehabilitation, as reflected in an annual rehabilitation plan;
- final rehabilitation, decommissioning and closure of the prospecting, exploration, mining or production operations at the end of the life of operations, as reflected in a final rehabilitation, decommissioning and mine closure plan; and
- remediation of latent or residual environmental impacts which may become known in the future, including the pumping and treatment of polluted or extraneous water, as reflected in an environmental risk assessment report.

The closure planning process has been developed to conform to the requirements of best practice guidelines which requires that the concurrent and decommissioning rehabilitation as well as describe the unit costs and provide a detailed cost estimate. The estimates of rehabilitation, closure and aftercare costs have been structured to distinguish between rehabilitation and closure costs incurred during the life of mine and those that will be incurred at closure.

Rehabilitation funding guarantees would be provided to the regulatory authorities based on the expected extent of surface disturbances at selected stages throughout the life of mine and the success of ongoing rehabilitation and closure works. Rehabilitation activities will be designed to achieve a post-mining land use as close as possible to the level of productivity and biodiversity present at pre-mining levels.

A closure plan forms part of the environmental management programme or environmental management plan and must include:

- A description of the closure objectives and how these relate to the prospecting or mine operation and its environmental and social setting.
- A plan showing the land or area under closure.
- A summary of the regulatory requirements and conditions for closure negotiated and documented in the environmental management programme or environmental management plan.
- A summary of the results of the environmental risk report and details of identified residual and latent impacts;
- A summary of the results of progressive rehabilitation undertaken;
- A description of the methods to decommission each prospecting or mining component and the mitigation or management strategy proposed to avoid, minimize and manage residual or latent impacts;
- Details of any long-term management and maintenance expected;
- Details of a proposed closure cost and financial provision for monitoring, maintenance and post closure management;
- A sketch plan drawn on an appropriate scale describing the final and future land use proposal and arrangements for the site;
- A record of interested and affected persons consulted; and
- Technical appendices, if any.

The requirements of South Africa's legislation relating to financial provisioning for mine closure and decommissioning further require the following:

- The determination, review and assessment must be undertaken by a specialist or specialists;
- The financial provision liability associated with annual rehabilitation, final closure or latent or residual environmental impacts may not be deferred against assets at mine closure or mine infrastructure salvage value;
- The proof of making or adjusting the financial provision provided by the applicant or holder of a right or permit must identify the manner in which the financial provision will be apportioned through the use of appropriate financial vehicles;
- The proof of making or adjusting the financial provision must be accompanied by a verification of registration of the financial institution contemplated in those sub-regulations;
- Where an applicant or holder of a right or permit makes use of the financial vehicle any interest earned on the deposit shall first be used to defray bank charges in respect of that account and thereafter accumulate and form part of the financial provision;
- Where financial provision is made for remediation of latent or residual environmental impacts which may become known in the future, including the pumping and treatment of polluted or extraneous water the financial vehicle used for that purpose must, on issuance of a closure certificate in terms of the MPRDA, be ceded to the Minister responsible for mineral resources, or, if the financial vehicle contemplated in regulation 8(1)(c) is used, the trustees must authorise payment to the Minister responsible for mineral resources; and
- In addition to the above environmental legal obligations provided for in the NEMA and the MPRDA there may be other potential statutory obligations which may be relevant and include *inter alia*:
  - The Mine Health and Safety Act 29 of 1996;
  - The Regulations on use of water for mining and related activities published in terms of GN R704 under the NWA;
  - The National Heritage Resources Act 25 of 1999;
  - The National Building Regulations and Building Standards Act 103 of 1977; and
  - The Labour Relations Act 66 of 1995.

2.3 POST CLOSURE LAND USE OBJECTIVES

The objective for the rehabilitation and closure of the mine is to ensure that the site is left in a condition that is safe and stable where long-term environmental impacts are minimised and any future liability to the community and future land use restrictions are minimised. The final post-mining land use will be determined in consultation with the local communities, national, provincial and local spheres of government, including the Department of Mineral Resources, Department of Environmental Affairs, Department of Water & Sanitation as well as the Department of Agriculture. The likely land uses to be identified during this process are likely to include:

- Areas for agriculture;
- Areas livestock grazing;
- Wilderness; and
- Wildlife habitat.

For health and safety reasons as well as the protection of specific rehabilitations works, specific areas within the mine lease may be designated as exclusion zones. Natural soil covers and vegetation will as far as possible be re-established over these areas but access by humans and / or livestock will be prohibited.

The following closure objectives form part of the conceptual closure plan:

- All structures not desirable or usable post closure will be demolished and building material removed or disposed of;
- Hazardous material, equipment and contaminated soils and steel structures will be disposed of safely and in an environmentally acceptable manner;
- The process plant and other areas used for the handling and storage of hazardous materials will be decontaminated; and
- Rehabilitation of disturbed areas to a final land use capability that is practical and best suited for the final landform, taking into consideration the socio-economic activities of the receiving communities.

At the end of the mine life, the residual facilities will include open pits, waste rock dumps, a TSF, storm water diversion structures and supporting infrastructure.

The ultimate end-use of the rehabilitated areas is considered to have three major objectives:

- The re-establishment to the greatest feasible degree of vegetation on the disturbed areas within the concession;
- Re-integration of the disturbed areas outside the project footprint into the agricultural and other prevalent economies; and
- By working with and involving local people in the re-development of the disturbed land to assist them in working towards a more sustainable form of livelihood.

2.4 REHABILITATION AND CLOSURE COMPLETION CRITERIA

The objective of the rehabilitation closure process is to restore as much as possible of the area disturbed during the operation of the development and mine to a land use as close as possible to that previously practiced before mining operations. The objective would be to maintain the balance of land use and return as much of the area disturbed to productive use.

Rehabilitation and closure of disturbed areas will be considered to be complete when:

- All structures, equipment and infrastructure not consistent with the post closure land use have been decommissioned, demolished and removed from site;
- Ownership of all remaining infrastructure and services required to support the proposed post closure land use have been formally transferred to the local authorities responsible for the administration of the area;
- The area has been made safe for all post closure land users and livestock;
- All surface disturbances and remaining landforms are structurally and ecologically stable and have sustainable soil and vegetation covers where applicable;
- Surface water management structures are in place and are free of damage due to erosion; and
- All surface and groundwater discharges from the site satisfy agreed target water quality objectives.

2.5 CONCEPTUAL REHABILITATION AND CLOSURE PLAN

As various facilities reach the end of their period of use, the applicant will initiate rehabilitation activities concurrent with on-going mining operations. Rehabilitation activities will be undertaken during all phases of the project in order to restore the land back to a sustainable and stable condition. The key activities and actions are described in the sections below.

2.5.1 GENERAL RECLAMATION AND CLOSURE ACTIVITIES

2.5.1.1 Collection, Storage and Protection of Resources to be Used During Rehabilitation

During the construction phase the planning and associated construction activities will be undertaken with the purpose of ensuring the following:

- Minimise the area to be occupied by mine infrastructure, as per the EMPr.
- Ensure that construction crews restrict their activities to the planned areas, as per the requirements of the EMPr.
- Pre-stripping of topsoil and overburden material from areas earmarked for development with a view to be used during final rehabilitation. This is to be undertaken taking into consideration soil depths and soil stripping guidelines detailed in the EMPr.
- Establishing seed banks and a nursery with a view to be used during concurrent rehabilitation as well as during the decommissioning and closure phases.

2.5.1.2 Preparation and Placement of Topsoil

The following activities will be undertaken as part of the soil placement process:

- Previously disturbed areas will be graded and ripped to ensure the area is ready for the placement of overburden and topsoil material, depending on the site-specific requirements.
- Compaction will be minimised by use of appropriate equipment and replacing soils to the greatest possible thickness in single deposits.
- Soils will be moved when dry to minimise compaction. If soils must be moved when wet, shovel and truck methods should be used.
- Where multi-layer soil profiles are re-created, running over the lower layers with heavy equipment should be avoided, or minimised if avoidance is not possible.
- Minimise compaction during smoothing of replaced soils by using appropriate equipment (dozers rather than graders).
- All placed soils should be ripped to full rooting depth.
- Where natural revegetation is not possible, the soils should be tilled to produce a seed-bed suitable for the plant species selected for seeding.

2.5.1.3 Re-Vegetation

Prior to initiating the proposed rehabilitation vegetation plan, the applicant will evaluate growth media replacement depths for various exposures by conducting re-vegetation trials to determine the most suitable approach and methodology based on the local climatic conditions, soil type and biodiversity targets.

- Species selected for rehabilitation must meet the biodiversity objectives.
- Rehabilitation species selection must be based on practical considerations.

- Appropriate methods will be used for vegetation establishment.
- Planting should be done when climatic conditions are most likely to ensure success.
- Obtaining the necessary expertise that will be acquired to ensure the successful implementation of the rehabilitation plan.
- The revegetation objectives should be set to meet the post-closure land uses that have been agreed for the site. These are likely to include the re-establishment of the native vegetation, erosion control for the protection of water resources and the establishment of grazing areas.

2.5.1.4 Ore Stockpiles

It is expected that ore stockpiles will be removed by the end of mine life and stockpile areas would be reclaimed by grading and re-vegetating to blend with the natural landscape. Where not possible ore stockpiled will be reshaped and rehabilitated according to the post closure risk posed to the receiving environment.

2.5.1.5 Contaminated Soils

Contaminated soil from solvents and lubricant and other hydrocarbon sources will be removed and placed in an approved disposal facility, most likely on the lined TSF.

2.5.2 RECLAMATION AND CLOSURE ACTIVITIES APPLICABLE TO SPECIFIC INFRASTRUCTURE AREAS

2.5.2.1 Processing Plant and Associated Infrastructure

The following steps and measures apply to the closure and rehabilitation of the plant area:

- The removal of infrastructure will occur at the time of general mine closure. Special measures to protect adjacent structures which may otherwise remain operational have not been considered.
- Infrastructure will be removed to a depth of 0.3m below ground level, or if more cost-effective, foundations will be covered to a depth of 0.5m, provided this does not affect surface water runoff. Sub-surface structures will be backfilled or sealed off.
- Structures will be pushed over or dropped using explosives and then loaded for removal using mechanical equipment.
- Inert rubble will be removed to the tailings dam or disposed of in areas where fill is needed. Alternatively, the material will be disposed of in the underground workings.
- Contaminated rubble will be assessed for the degree of contamination and disposed of in the appropriate hazardous waste disposal sites such as the lined TSF.

2.5.2.2 Tailings Storage Facility and Associated Water Management Structures

At closure, the TSF will remain a permanent feature on the landscape and will blend in with the surrounding landscape. The rehabilitation and closure of the TSF will include activities that take place concurrently with its development and operation as well as those associated with its final decommissioning and closure. Rehabilitation of the side slopes will be carried out concurrently with the development of the TSF as each lift is completed.

2.5.2.3 Waste Rock Facilities

The WRD will be constructed to the specified parameters considered suitable and stable for the type of material to be deposited, taking the topography and receiving environmental into consideration. Grading will minimise potential for slope failures or rill erosion, facilitate rehabilitation activities (seeding, mulching), and provide a surface that will enhance water retention and support vegetation establishment. Rehabilitation of the side slopes will be carried out concurrently. At closure the final slopes and crest will be rehabilitated. The top of the WRD

and remaining safety benches will be graded to promote free draining runoff that prevents ponding while also limiting erosion.

2.5.2.4 Vertical and Decline and Shafts

Closure will entail the backfilling of the decline with overburden stripped ahead of mining. Once backfilling is complete a growth medium cover will be placed and vegetation will be established. Surface openings will be sealed with a steel or concrete cover that attaches to the existing concrete collar. The entrance to the main shaft will be bricked up using brick and mortar to prevent access to the shaft area.

The vertical shaft will be sealed and access to the headgear will be bricked up to prevent access to the facility.

2.5.2.5 Land Use

The infrastructure likely to remain following the closure of the mine include the Tailings Storage Facility, the Waste Rock Dumps, pits and the effluent pond. These will remain as the main features, but in a rehabilitated form.

Consultation with key stakeholders to develop and define the post mining land use options will be facilitated by the applicant. Environmental and socio-economic assessments will be undertaken to ensure the selected land use options are consistent with regulatory constraints and are sustainable into the future.

Final land uses for area will be a combination of:

- Future mining resource areas as identified through the exploration plan;
- Rehabilitated landforms with modified natural ecosystems;
- Exclusion zones with restricted access for safety; and
- Community facilities and structures.

2.5.3 REHABILITATION MONITORING, AFTERCARE AND MAINTENANCE

Provision has been made for ongoing monitoring and maintenance following the completion of the final rehabilitation and closure activities.

Provision has been made for the collection and analysis of environmental monitoring data (surface water, ground water, air quality) and the compilation of monitoring reports for a period of:

- 24 months after closure to coincide with the decommissioning and rehabilitation phase of the project; and
- Additional 3-5 years after completion of the decommissioning and closure phase.

2.6 ENVIRONMENTAL MITIGATION AND MANAGEMENT MEASURES

The key objectives of an EMPr are to set out the management and monitoring measures required to both minimise any potentially adverse environmental impacts and enhance the environmental benefits of the Project, and to ensure that responsibilities and appropriate resources are efficiently allocated to implement the plan.

The aspects which are considered to be of most importance to the development, including the respective management objectives and outcomes for the impacts associated with these aspects are provided in TABLE 2-2.

The management objectives and outcomes will be achieved through the implementation of the management actions in the EMPr.

TABLE 2-2: IMPACT MANAGEMENT OBJECTIVES AND OUTCOMES

ASPECT	MANAGEMENT OBJECTIVE	MANAGEMENT OUTCOME
Soil	• Manage suitable onsite soil resources for rehabilitation activities. • Prevent the contamination of soil resources. • Managed response to the clean-up of accidental spillages and leaks.	• Soil resources protected from contamination. • Accidental leaks and spillages responded to rapidly and all contamination remediated in accordance with legal requirements.
Air	• Surrounding land users minimally affected by mine activities. • Control and minimise particulate and dust emissions to air. • Monitor dust fall over the LOM to ensure that any changes in dust fall rates are identified and investigated	• Good stakeholder relations with community members. • Air emissions from the development managed in accordance with legal requirements.
Groundwater	• Surrounding land users unaffected by dewatering and other mine activities. • Prevent the contamination of groundwater resources. • Managed response to the clean-up of accidental spillages and leaks. • Monitor groundwater to ensure that any changes in groundwater quality and quantity are identified and investigated	• Good stakeholder relations with community members. • Groundwater resources protected from contamination. • Accidental leaks and spillages responded to rapidly and all contamination remediated in accordance with legal requirements.
Surface water	• Control the flow of storm water across the site. • Capture and treat dirty stormwater onsite prior to discharge. • Allow for clean and dirty stormwater separation. • Remain outside of the 30 m wetland buffer.	• Managed storm water flow. • Uncontrolled release of dirty stormwater or effluent from onsite activities prevented. • Wetland feature not impacted upon by mine activities.
Health and Safety	• Prevent criminal activities onsite. • Prevent occupational and community health and safety incidents.	• Secure and safe site.
Noise	• Prevent noise impacts from development activities at sensitive noise receptors. • Complaints which are received are properly investigated and responded to appropriately.	• Good stakeholder relations with community members and authorities.

Heritage	• Protection of heritage resources.	• No heritage resources damaged or destroyed during construction activities.
Traffic and Road Safety	• Prevent road safety incidents and limit disruptions to traffic flow. • Complaints which are received are properly investigated and responded to appropriately.	• Damage to road surfaces minimised. • Good stakeholder relations with community members and authorities.
Socio-Economic	• Influx is managed in a planned and peaceful manner. • Support for the development by the local community is enhanced. • Maximise the local economic development potential of the development.	• Community conflict avoided. • Employment from community. • Local procurement. • Good stakeholder relations with community members and authorities.

The EMPr will be augmented as part of the detailed closure plan to be developed, as per the closure schedule below.

2.7 PUBLIC CONSULTATION PROCESS

Consultation relating to the development of the conceptual closure plan was aligned with the consultation process followed as part of the mining right application as well as the environmental authorization required for the project. This is described in detail in the EIR. Supporting documentation relating to the consultation process is also provided in the EIR.

2.8 SCHEDULE FOR THE IMPLEMENTATION OF THE CLOSURE PLAN

The mine closure schedule addresses the timing of rehabilitation and closure activities performed during the decommissioning and post-closure phases of the project. The schedule allows for continued concurrent rehabilitation of areas available for rehabilitation during the life of mine as well as the removal of any was and scrap material during the operational phase. The schedule also allows for the rehabilitation of areas disturbed during the construction that will not be required during the operational phase of the project.

Presented below is an overview of the schedule of closure related aspects that should be undertaken either during the LoM and/or during the decommissioning phase:

- ➲ Annual review and update of Decommissioning, Rehabilitation and Mine Closure Plan as well as the closure cost estimate;
- ➲ Initiate the closure engagement process with stakeholders and employees at least five years prior to the planned decommissioning of the mine;
- ➲ The planned decommissioning phase is scheduled to take approximately 2 years to complete; and
- ➲ Implementation of the post closure monitoring and maintenance for a period of five years after the completion of the decommissioning phase.

3 CLOSURE COST ESTIMATE METHODOLOGY

The closure cost calculation has been performed in accordance with NEMA GNR 1147 financial provision regulations which have been promulgated but deferred to February 2019. The closure costs of the aspects linked with the project have been determined using the Mineral Resources (DMR) Guideline Document for the Evaluation of the Quantum of Closure-Related Financial Provisions Provided by a Mine (2005).

The approach to calculating the closure quantum as specified in the DMR Guideline is summarised as follows:

- Step 1: Determine the Mineral Mined which is Zn, Cu, Ag and Au.
- Step 2A: Determine Primary Risk Class: High Risk.
- Step 3: Determine Environmental Sensitivity has been determined by reference to Table B.4 of The DMR Guideline as "High"
- Step 4.1: Determine level of information – a rule-based approach is followed.
- Step 4.2: Determine the closure components and associated rates – TABLE 3-1 details the rates which have been escalated with the Consumer Price Index since the inception of the guidelines.

TABLE 3-1: RATES ASSOCIATED WITH CLOSURE COMPONENTS 2018

	Rate Component	Unit CPI %	2018	
1	Dismantling of processing plant and related structures (including overland conveyors and power lines)	m3	R	15.01
2A	Demolition of steel buildings and structures	m2	R	209.06
2B	Demolition of reinforced concrete buildings and structures	m2	R	308.09
3	Rehabilitation of access roads	m2	R	37.41
4A	Demolition and rehabilitation of electrified railway lines	m	R	363.11
4B	Demolition and rehabilitation of non-electrified railway lines	m	R	198.06
5	Demolition of housing and facilities	m2	R	418.12
6	Opencast rehabilitation including final voids and ramps	ha	R	212 801.68
7	Sealing of shafts, adits and inclines	m3	R	112.23
8A	Rehabilitation of overburden and spoils	ha	R	146 122.36
8B	Rehabilitation of processing waste deposits and evaporation ponds (basic, salt-producing waste)	ha	R	181 992.75
8C	Rehabilitation of processing waste deposits and evaporation ponds (acidic, metal-rich waste)	ha	R	528 593.22
9	Rehabilitation of subsided areas	ha	R	122 355.47
10	General surface rehabilitation, including grassing of all denuded areas	ha	R	115 753.55
11	River diversions	ha	R	115 753.55
12	Fencing	m	R	132.04
13	Water management (Separating clean and dirty water, managing polluted water and managing the impact on groundwater, including treatment, when required)	ha	R	44 012.76
14	2 to 3 years of maintenance and aftercare	ha	R	15 404.47

4 ESTIMATED REHABILITATION AND CLOSURE COSTS

The conceptual rehabilitation and closure plan and associated estimate of closure costs for the Repli and Vardocube application areas have been undertaken to ensure that the conceptual completion criteria are achieved. The estimate allows for:

- Decommissioning, demolition and removal from site of all infrastructure not required or aligned with the proposed post closure land use;
- Transfer of the ownership of all remaining infrastructure and services required to support the proposed post closure land use to the local authorities responsible for the administration of the area;
- Making the area safe for all post closure land users and livestock;
- Ensuring that the remaining landforms are structurally and ecologically stable;

- The placement of sub soil and topsoil covers to the remaining landforms and areas of disturbance in preparation for vegetation establishment where the establishment of vegetated covers is considered necessary; and
- Establishment and maintenance of vegetated areas to ensure a well-established cover that is stable and sustainable.
- Rehabilitation of the WRD and TSF would be carried out concurrently with operations to reduce the financial liabilities at closure and in the event of premature or unplanned closure;
- No post closure water treatment is required; and
- All surface and groundwater discharges from the site would satisfy agreed target water quality objectives and would not require additional treatment.

The estimated costs of rehabilitation and closure have been structured so as to distinguish between concurrent rehabilitation of the mine and the works required during the decommissioning phase, closure and post closure phase. It is assumed that the rehabilitation of the mine will be carried out in conjunction with the operation of the mine and related activities by the staff employed on the mine.

The rates used in the estimates of costs have been sourced from rates for similar works carried out on other projects and are similar to those used in the estimates of capital expenditure on the Project.

A commercial agreement has been entered into between Repli and Vardocube so that relevant infrastructure and facilities established to support the proposed Repli surface and underground mining will also be used for the underground mining of the Vardocube Section of the deposit. The current agreement is that Vardocube will contribute to the quantum on a pro-rata basis using the Mineral Resource Estimate of the entire Prieska Zinc Copper Project., which is 17.68% of the total MRE for selected infrastructure that is shared, such as the TSF, shaft etc.

The financial provision cost was calculated by means of the DMR's standard method for assessment of mine closure. A summary of the calculated financial provision costs is presented in APPENDIX A. The total cost for rehabilitation and closure of the mine according to the DMR Guideline format is **R 131 118 284 (incl. VAT).** This covers both the Repli and Vardocube Mining Right Application areas.

The contribution that Vardocube would be required to make to the above total is **R 13 494 390** and relates primarily to the pro rata contribution towards rehabilitation of TSF facility as well as the shaft and other associated infrastructure.

4.1 ACCRUAL OF CLOSURE LIABILITY AND ESTIMATED VALUE OF FINANCIAL GUARANTEES REQUIRED

The estimated build-up in rehabilitation and closure liability, which would equate to the value of the financial guarantees required by the authorities at any point in time is based on:

- The estimated surface disturbance, and hence rehabilitation and closure liability, at commissioning of the mine.
- The expected rehabilitation and closure liability at cessation of operations, based on the assumption that ongoing rehabilitation takes place as specified.

The annual accrual is presented in APPENDIX B.

5 CONCLUSION AND RECOMMENDATIONS

Based on the conceptual closure plan as described, it is recommended that the implementation stages of the project focus on minimising the current and life of mine rehabilitation and closure liabilities by minimising the footprint of mining and related activities in order to reduce the amount of work required at closure.

It is envisaged that this would be achieved by:

- Concurrent rehabilitation of the WRD and TSF
- On-going removal of waste steel and other salvageable materials from the site during operations
- On-going clearing of areas affected by spillages
- The creation of designated waste disposal areas and salvage yards
- Confirmation and monitoring of the geochemistry of the tailings and waste rock materials to be left on surface at the cessation of mining activities;
- Confirmation of the geohydrology of the mined areas and also the likely quality and direction of flow of water in the workings subsequent to closure;
- Ensuring that the necessary environmental monitoring data is collected in order to enable assessment of the extent of rehabilitation works required and the design of those works; and
- Ensuring that financial provision is made both for the concurrent rehabilitation of the site and also for the final rehabilitation and closure process. The provision will be made in the prescribed manner after consultation with the DMR and other relevant authorities.

APPENDIX A: CLOSURE COST ESTIMATE SUMMARY – PCM RESOURCE AREA - REPLI AND VARDOCUBE COMBINED

No	Description	Units	Quantity	DMR Rate 2018 - adjusted for inflation	Pre-Adjusted Total	DMR Multiplication Factor	Weighing Factor 1	Weighing Factor 2	Total Amount
1.01	Dismantling of processing plant and related structures (including overland conveyors and power lines)	m3	2 600	R 15.01	R 39 021.71	1	1	1.1	**R 42 924**
1.02	Demolition of steel buildings and structures	m2	-	R 209.06	R -	1	1	1.1	**R -**
1.03	Demolition of reinforced concrete buildings and structures	m2	31 200	R 308.09	R 9 612 454.73	1	1	1.1	**R 10 573 700**
1.04	Rehabilitation of access roads	m2	23 700	R 37.41	R 886 637.00	1	1	1.1	**R 975 301**
1.05	Demolition and rehabilitation of electrified railway lines	m		R 363.11	R -	1	1	1.1	**R -**
1.06	Demolition and rehabilitation of non-electrified railway lines	m	1 500	R 198.06	R 297 086.11	1	1	1.1	**R 326 795**
1.07	Demolition of housing and facilities	m2	2 386	R 418.12	R 997 637.18	1	1	1.1	**R 1 097 401**
1.08	Opencast rehabilitation including final voids and ramps	ha		R 212 801.68	R -	1	1	1.1	**R -**
1.09	Sealing of shafts, adits and inclines	m3	880	R 112.23	R 98 764.63	1	1	1.1	**R 108 641**
1.1	Rehabilitation of overburden and spoils	ha		R 146 122.36	R -	1	1	1.1	**R -**
1.11	Rehabilitation of processing waste deposits and evaporation ponds (basic, salt-producing waste)	ha	-	R 181 992.75	R -	1	1	1.1	**R -**
1.12	Rehabilitation of processing waste deposits and evaporation ponds (acidic, metal-rich waste)	ha	129	R 528 593.22	R 68 178 302.24	1	1	1.1	**R 74 996 132**
1.13	Rehabilitation of subsided areas	ha		R 122 355.47	R -	1	1	1.1	**R -**
1.14	General surface rehabilitation, including grassing of all denuded areas	ha	70	R 115 753.55	R 8 158 514.37	1	1	1.1	**R 8 974 366**
1.15	River diversions	ha	-	R 115 753.55	R -	1	1	1.1	**R -**
1.16	Fencing	m	-	R 132.04	R -	1	1	1.1	**R -**
1.17	Water management (Separating clean and dirty water, managing polluted water and managing the impact on groundwater, including treatment, when required)	ha		R 44 012.76	R -	1	1	1.1	**R -**
1.18	2 to 3 years of maintenance and aftercare	ha	70	R 15 404.47	R 1 085 733.85	1	1	1.1	**R 1 194 307**
2	SubTotal 1				R 89 354 151.82				**R 98 289 567**
3	Preliminary and General	6%							R 5 897 374
4	Contingencies	10%							R 9 828 957
5	**SubTotal 2**								R 15 726 331
6	**SubTotal 3**								**R 114 015 898**
7	VAT @ 15%								R 17 102 385
8	**Grand Total (SubTotal 3, incl VAT)**								**R 131 118 282**

APPENDIX B: ANNUAL ACCRUAL OF CLOSURE COST

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Description	Y0	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Y11	Y12	Y13	Y14
Dismantling of processing plant and related structures (including overland conveyors and power lines)	R 16 509	R 33 018	R 33 018	R 33 018	R 33 018	R 33 018	R 33 018	R 33 018	R 33 018	R 33 018	R 33 018	R 33 018	R 33 018	R 33 018	R 33 018
Dismantling of processing plant and related structures (including overland conveyors and power lines)	R 4 953	R 9 907	R 9 907	R 9 907	R 9 907	R 9 907	R 9 907	R 9 907	R 9 907	R 9 907	R 9 907	R 9 907	R 9 907	R 9 907	R 9 907
Demolition of steel buildings and structures	R -	R -	R -	R -	R -	R -	R -	R -	R -	R -	R -	R -	R -	R -	R -
Demolition of reinforced concrete buildings and structures	R 5 286 850	R 10 573 700	R 10 573 700	R 10 573 700	R 10 573 700	R 10 573 700	R 10 573 700	R 10 573 700	R 10 573 700	R 10 573 700	R 10 573 700	R 10 573 700	R 10 573 700	R 10 573 700	R 10 573 700
Rehabilitation of access roads	R -	R -	R -	R -	R -	R -	R -	R -	R -	R -	R -	R -	R -	R -	R 975 301
Demolition and rehabilitation of electrified railway lines	R -	R -	R -	R -	R -	R -	R -	R -	R -	R -	R -	R -	R -	R -	R -
Demolition and rehabilitation of non-electrified railway lines	R 326 795	R 326 795	R 326 795	R 326 795	R 326 795	R 326 795	R 326 795	R 326 795	R 326 795	R 326 795	R 326 795	R 326 795	R 326 795	R 326 795	R 326 795
Demolition of housing and facilities	R 823 051	R 1 097 401	R 384 090	R 548 700	R 548 700	R 713 311	R 713 311	R 823 051	R 823 051	R 877 921	R 877 921	R 987 661	R 987 661	R 1 097 401	R 1 097 401
Opencast rehabilitation including final voids and ramps	R -	R -	R -	R -	R -	R -	R -	R -	R -	R -	R -	R -	R -	R -	R -
Sealing of shafts, adits and inclines	R 108 641	R 108 641	R 108 641	R 108 641	R 108 641	R 108 641	R 108 641	R 108 641	R 108 641	R 108 641	R 108 641	R 108 641	R 108 641	R 108 641	R 108 641
Rehabilitation of overburden and spoils	R -	R -	R -	R -	R -	R -	R -	R -	R -	R -	R -	R -	R -	R -	R -
Rehabilitation of processing waste deposits and evaporation ponds (basic, salt-producing waste)	R -	R -	R -	R -	R -	R -	R -	R -	R -	R -	R -	R -	R -	R -	R -
Rehabilitation of processing waste deposits and evaporation ponds (acidic, metal-rich waste)	R 7 499 613	R 14 999 226	R 29 998 453	R 37 498 066	R 44 997 679	R 52 497 293	R 59 996 906	R 63 746 713	R 63 746 713	R 63 746 713	R 63 746 713	R 63 746 713	R 63 746 713	R 67 496 519	R 74 996 132
Rehabilitation of subsided areas	R -	R -	R -	R -	R -	R -	R -	R -	R -	R -	R -	R -	R -	R -	R -
General surface rehabilitation, including grassing of all denuded areas	R 3 589 746	R 5 384 619	R 7 179 493	R 8 974 366	R 8 974 366	R 8 974 366	R 8 974 366	R 8 974 366	R 8 974 366	R 8 974 366	R 8 974 366	R 8 974 366	R 8 974 366	R 8 974 366	R 8 974 366
River diversions	R -	R -	R -	R -	R -	R -	R -	R -	R -	R -	R -	R -	R -	R -	R -
Fencing	R -	R -	R -	R -	R -	R -	R -	R -	R -	R -	R -	R -	R -	R -	R -
Water management (Separating clean and dirty water, managing polluted water and managing the impact on groundwater, including treatment, when required)	R -	R -	R -	R -	R -	R -	R -	R -	R -	R -	R -	R -	R -	R -	R -
2 to 3 years of maintenance and aftercare	R -	R -	R -	R -	R -	R -	R -	R -	R -	R -	R -	R -	R 394 121	R 788 243	R 1 194 307
SubTotal 1	R 17 656 159	R 32 533 308	R 48 614 097	R 58 073 193	R 65 572 807	R 73 237 030	R 80 736 643	R 84 596 190	R 84 596 190	R 84 651 060	R 84 651 060	R 84 760 800	R 85 154 922	R 89 408 590	R 98 289 568
Preliminary and General	R 1 059 370	R 1 951 998	R 2 916 846	R 3 484 392	R 3 934 368	R 4 394 222	R 4 844 199	R 5 075 771	R 5 075 771	R 5 079 064	R 5 079 064	R 5 085 648	R 5 109 295	R 5 364 515	R 5 897 374
Contingencies	R 1 765 616	R 3 253 331	R 4 861 410	R 5 807 319	R 6 557 281	R 7 323 703	R 8 073 664	R 8 459 619	R 8 459 619	R 8 465 106	R 8 465 106	R 8 476 080	R 8 515 492	R 8 940 859	R 9 828 957
SubTotal 2	R 2 824 985	R 5 205 329	R 7 778 256	R 9 291 711	R 10 491 649	R 11 717 925	R 12 917 863	R 13 535 390	R 13 535 390	R 13 544 170	R 13 544 170	R 13 561 728	R 13 624 787	R 14 305 374	R 15 726 331
SubTotal 3	R 20 481 144	R 37 738 637	R 56 392 352	R 67 364 904	R 76 064 456	R 84 954 955	R 93 654 506	R 98 131 580	R 98 131 580	R 98 195 230	R 98 195 230	R 98 322 528	R 98 779 709	R103 713 964	R114 015 899
VAT @ 15%	R 3 072 172	R 5 660 796	R 8 458 853	R 10 104 736	R 11 409 668	R 12 743 243	R 14 048 176	R 14 719 737	R 14 719 737	R 14 729 284	R 14 729 284	R 14 748 379	R 14 816 956	R 15 557 095	R 17 102 385
Grand Total (SubTotal 3, VAT)	R 23 553 316	R 43 399 433	R 64 851 205	R 77 469 640	R 87 474 124	R 97 698 198	R107 702 682	R112 851 318	R112 851 318	R112 924 514	R112 924 514	R113 070 907	R113 596 665	R119 271 059	R131 118 284

6 HIGH RISK ASPECTS RELATING TO CLOSURE

The following aspects have been rated as the most significant potential closure risks that need to be managed during the decommissioning, closure and post closure phases of the project. Each issue generally reflects more than one of the higher rated hazards in the risk assessment matrix.

- Safety during rehabilitation and decommissioning
- Changing stakeholder expectations over life of project
- Inadequate financial provision for closure and lack of project controls
- Poor or inadequate rehabilitation designs and implementation
- Geotechnical instability of pit walls
- Erosional stability of mine waste landforms
- Geochemical stability of mine wastes
- Public access and safety

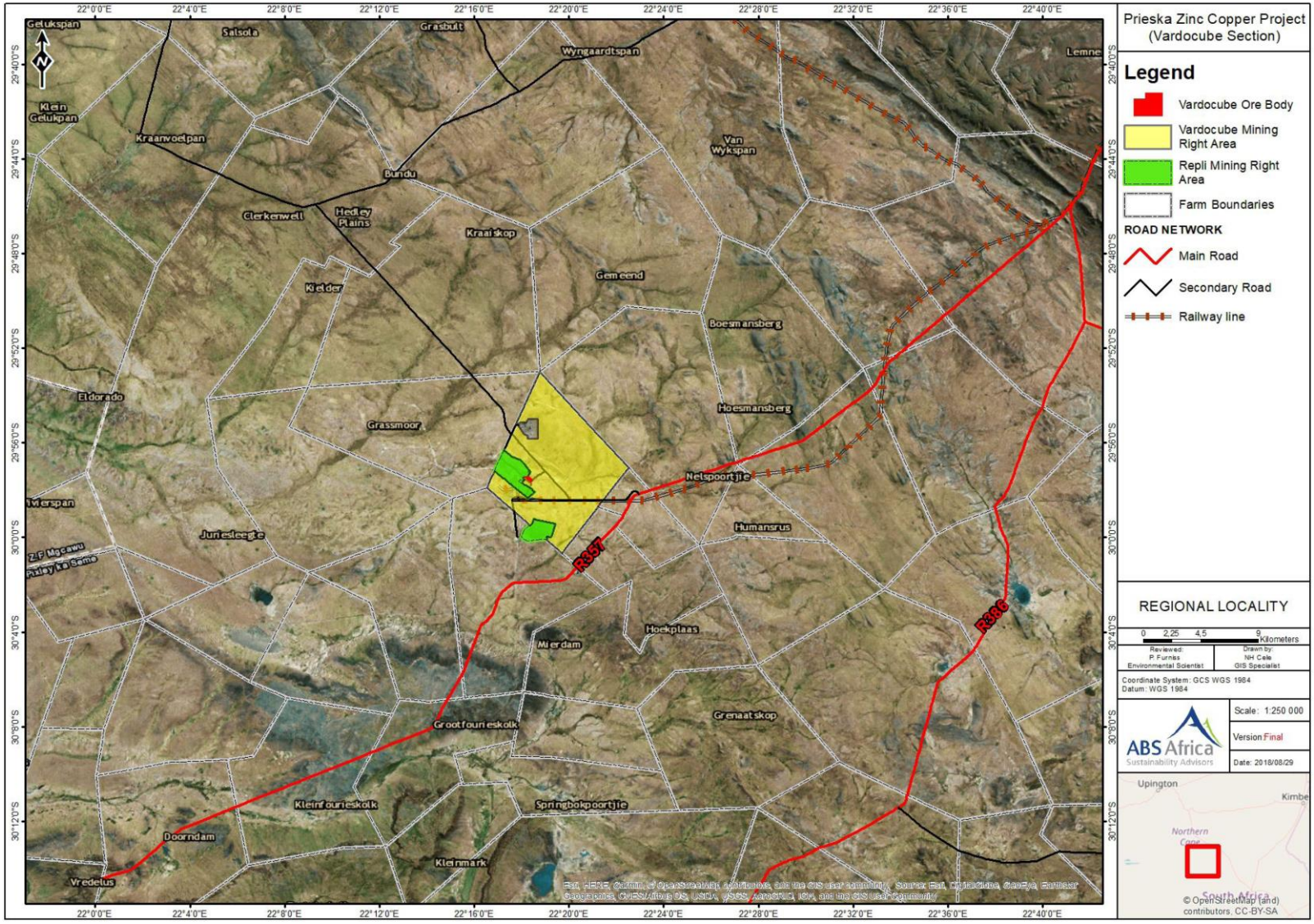
TABLE 6-1 provides an overview of the risks identified as well as the ratings of the various aspects identified, together with management measures that can be implemented to mitigate the risks.

TABLE 6-1: RISK ASSESSMENT MATRIX

Area/Aspect	Description of Risk	Potential Cause	Consequence	Control Measures	Risk Rating (pre-mitigation)	Risk Rating (post mitigation)
Demolition	Personnel injury during decommissioning and closure	Ineffective implementation of risk management and safety plans Ineffective decontamination of plant/equipment/buildings prior to dismantling/demolition activities commencing Fall from height Electrical isolation not implemented correctly	Injury or fatality Legal, financial and reputational damage	Continue to use operational safety systems during decommissioning and demolition e.g. risk assessments, Job Hazard Analysis, engineering controls etc. Use of suitable qualified and experienced demolition company with trained and experienced staff	Hight	High
Stakeholders	Unrealistic expectations or a change in expectations from originally agreed objectives	Political changes or elections Change in best practice over time	Increased closure period and costs	Ongoing consultation Regulatory approval of closure plan	High	High
Decommissioning and closure	Extended closure period or unplanned delays Underestimation of costing of closure Closure project controls not implemented	Inadequate design or implementation unable to meet closure objectives Delay in obtaining approval from regulator Unforeseen post closure conditions.	Increased closure period and costs	Conservative costing Annual Closure Provision review Trials and planning to increase certainty around closure	High	High
Mine Residue Disposal Facilities	Rehabilitation designs not suited to site materials Poor implementation of design Unsuccessful rehabilitation (active erosion, inadequate vegetation cover, weeds)	Poor quality rehabilitation materials Inadequate design or design implementation Ineffectual past rehabilitation strategies	Erosion, inadequate water control and/or poor vegetative growth Contamination Inability to meet closure criteria	Classification of rehabilitation materials Materials balance based on material classification Re-optimisation of rehabilitation design and	High	Medium

		Poor seed selection or seed collection practices	Increased costs.	deployment of materials available Robust planning including site specific appropriate designs Implementation procedures and quality control/ supervision		
Historical Open Pits	Geotechnical instability of pit walls and subsequent collapsing of benches and pit walls Uncontrolled access and fall from height	Weathering of oxidised upper rock units on high walls Pit wall changes due erosion and geotechnical changes	Risk to mining infrastructure and neighbouring land users Injury or death	Geotechnical investigation and design Proper controls during establishment and development of pit and adjustment of design if required Access control	High	Low
Shafts and declines	Uncontrolled access leading to injury or death	Poor access control or no sealing of access	Injury or death	Access control Security Sealing of shafts	High	Low
Water	Contamination of water resources	Geochemical risk of material due to AMD and metal leaching	Contamination of limited water resources	Design features to ensure risk is identified and managed	High	Low

APPENDIX D: MINING RIGHT APPLICATION AREA PLAN


Prieska Zinc Copper Project
(Vardocube Section)
Legend
Vardocube Ore Body
Vardocube Mining Right Area
Repli Mining Right Area
Farm Boundaries
ROAD NETWORK
Main Road
Secondary Road
Railway line
REGIONAL LOCALITY
0 2.25 4.5 9 Kilometers
Reviewed: P Furnas Environmental Scientist
Drawn by: NH Cele GIS Specialist
Coordinate System: GCS WGS 1984
Datum: WGS 1984
Scale: 1:250 000
Version: Final
Date: 2018/08/29
ABS Africa
Sustainability Advisors
Gelukspan
Salsola
Grasbult
Wyngaardtspan
Lemne
Klein Gelukpan
Kraanvoelpan
Van Wykspan
Bundu
Clerkenwell
Hedley Plains
Kraaiskop
Gemeend
Kielder
Boesmansberg
Eldorado
Hoesmansberg
Grassmoor
Nelspoortjie
Humansrus
Juriesleegte
R357
R386
Hoekplaas
Mierdam
Grootfourieskolk
Grenaatskop
Kleinfourieskolk
Springbokpoortjie
Doorndam
Kleinmark
Vredelus
Upington
Kimbe
Northern Cape
South Africa
© OpenStreetMap (and) contributors, CC-BY-SA

APPENDIX E: DETAILS OF THE EAP WHO PREPARED THE CLOSURE PLAN; AND THE EXPERTISE OF THAT EAP

DETAILS OF THE EAP WHO PREPARED THE REPORT

NAME OF THE PRACTITIONER:	ABS Africa (Pty) Ltd.
TEL NO.:	+27 11 805 0061 / +27 21 403 6570
POSTAL ADDRESS:	PO Box 14003, Vorna Valley, 1686
E-MAIL ADDRESS:	Fanie.coetzee@abs-africa.com

Name: Mr. Fanie Coetzee

ACADEMIC QUALIFICATIONS

- B.Sc (Geography, Environmental Studies), Potchefstroom University for CHE, SA (1995)
- B.Sc (Hons) Environmental Management, Potchefstroom University for CHE, SA (1996)

PROFESSIONAL REGISTRATION

1. Pr.Sci.Nat. Professional Natural Scientist (Environmental Science): The South African Council for Natural Scientific Professions, 2004

SUMMARY OF THE EAPS PAST EXPERIENCE

ABS Africa (Pty) Ltd is a professional environmental advisory company with a focus on the mining environment. The ABS Africa personnel included in the project team structure for the independent environmental assessment have collectively completed more than 100 EIAs across the African continent.

Much of this experience has been gained in undertaking complex and challenging EIAs involving the management of specialist teams, conducting public participation processes, aligning international standards with in-country legislation and interfacing with project engineering teams.

The EAP responsible for this submission has 18 years environmental assessment and management experience in the energy, water, mining and infrastructure sectors. His project experience includes conducting environmental assessment studies in South Africa, Mali, Guinea, Tanzania, Zambia, Botswana, Zimbabwe, and Mozambique.

Please refer to the attached section for a record of the experience of the EAP.

info@abs-africa.com

+27 11 805 0061

www.abs-africa.com

ABS Africa

Sustainability Advisors