



**mineral resources**

Department:  
Mineral Resources  
REPUBLIC OF SOUTH AFRICA

NAME OF APPLICANT: NCBM Explorations (Pty) Ltd.

REFERENCE NUMBER: NC 30/5/1/1/2/10793PR

## **ENVIRONMENTAL MANAGEMENT PLAN**

**SUBMITTED  
IN TERMS OF SECTION 39 AND OF REGULATION  
52 OF THE MINER  
AL AND PETROLEUM RESOURCES DEVELOPMENT  
ACT, 2002,  
(ACT NO. 28 OF 2002) (the Act)**

## **STANDARD DIRECTIVE**

Applicants for prospecting rights or mining permits, are herewith, in terms of the provisions of Section 29 (a) and in terms of section 39 (5) of the Mineral and Petroleum Resources Development Act, directed to submit an Environmental Management Plan strictly in accordance with the subject headings herein, and to compile the content according to all the sub items to the said subject headings referred to in the guideline published on the Departments website, within 60 days of notification by the Regional Manager of the acceptance of such application. This document comprises the standard format provided by the Department in terms of Regulation 52 (2), and the standard environmental management plan which was in use prior to the year 2011, will no longer be accepted.

**IDENTIFICATION OF THE APPLICATION IN RESPECT OF WHICH THE ENVIRONMENTAL MANAGEMENT PLAN IS SUBMITTED.**

ITEM	COMPANY CONTACT DETAILS
Name	NCBM Explorations (Pty) Ltd. Nicolaas Johan Jacob Janse van Rensburg
Tel no	083 455 0479
Fax no:	086 5589 678
Cellular no	083 455 0479
E-mail address	office@equimin.co.za
Postal address	P.O. Box 11313 Hatfield, 0028 Suite 2A, Eerste Vloer, Waterkloof Rand Centre, Cnr Rigel Avenue & Buffelsdrift Street, 0181

ITEM	CONSULTANT CONTACT DETAILS (If applicable)
Name	NA
Tel no	
Fax no:	
Cellular no	
E-mail address	
Postal address	

**1 REGULATION 52 (2): Description of the environment likely to be affected by the proposed prospecting or mining operation**

1.1 The environment on site relative to the environment in the surrounding area.

Status of the cultural environment that may be affected

The Namaqualand copper mines and their associated infrastructure and cultural landscape reflect the beginnings of the mining industry in South Africa in all the myriad ways in which that industry influenced and continues to influence society through the movement and housing of people, the development of transport and other infrastructure and industries and in the development of technological and scientific endeavour.

It also reflects the very close links between the development of the Southern African mining industry and mining technology pioneered in Britain, particularly in the counties of Cornwall and Devon, and the landscapes and social structures that went with them.

In its socio-cultural aspects, the Namaqualand copper mines saw the development of the first company towns of the industrial era in South Africa and the movement of people from various parts of the Cape Colony to Namaqualand to provide labour and to serve the trade that developed here. As importantly, the development of the copper mines was undertaken using British technology developed on the mines of Cornwall and West Devon and in fact the development of the mines around O'okiep contributed significantly to the demise of copper mining in south-west of England,

with the resulting transfer not only of technology and skills, but also of numbers of Cornishmen to Namaqualand and other parts of the world. There is and remains a strong historical connection between these two great former copper producing regions of the world. As such it is anticipated that the Namaqualand Copper Mining Landscape will be nominated as an extension of the Cornwall and West Devon Mining Landscape World Heritage Site along with similar sites that share the same connection in Mexico, Australia, Brazil and India.

Any form of mining or prospecting will therefore be a continuation of the socio-cultural aspects of the area.

#### Status of any heritage environment that may be affected

With regard to sites of archaeological interest the proposed prospecting operation will mainly consist of non-invasive activities with limited drilling. The possibility to unearth any fossils or artefacts is therefore zero and given the high cost of a visit to this site, no first phase paleontological assessment is deemed necessary. No other heritage resources such as built structures over 60 years old, sites of cultural significance associated with oral histories, burial grounds and graves of victims of conflict, and cultural landscapes or views are present on the prospecting area applied for.

#### Status of any current land uses and the socio-economic environment that may be directly affected

Approximately 90% of the region is used for livestock grazing and production, with the remainder comprising of agriculture and urban development. Tourism is a seasonal but rapidly growing feature – with visitors to the region arriving almost exclusively between July and October in order to take in the world renowned yearly flower display. Urban development is not a major feature of the landscape, and is not expected to increase much in the coming years.

Prospecting will only be a temporary land use where after land use will revert back to the pre-mining land use grazing. Productivity of the land with regard to land use is very low and prospecting will have no impact on the productivity of the area.

#### Status of any infrastructure that may be affected

No infrastructure will be affected as only limited drilling will take place. Existing roads and tracks will be used and in the case of new tracks to be developed it will be addressed at final closure and rehabilitation.

#### Status of the biophysical environment that may be affected

##### **Topography**

Namaqualand is a unique and diverse environment – owing in large part to the presence of four distinct biogeographically regions within its boundaries. The Orange River valley lies to the north and is characterized by very dry desert conditions. In the west the area is composed of coastal plains – which transition into granite hills that straddle the escarpment, before transforming into low lying Bushmanland plains to the East of Springbok.

The area is characterized by an expansive, undulating landscape. The area is dominated by a plain of dry grasslands with scattered ancient rocky outcrops, named Inselbergs.

## Soil

The sands and calcrete are of Quarternary sediments. The area is mostly representing the Af land type, with deep red sands predominant. Rainfall is low, 70-110 mm per annum, mostly falling in late summer to autumn. Average minimum and maximum temperatures in the area are 15°C to 38°C in summer and 0°C to 18°C in winter. The days in the summer are long (sunrise at around 6:00am, sunset close to 8:00pm), and short in the winters (sunrise after 07:30am, sunset before 6:00pm). The soils in a regional context are reddish, moderately shallow, sandy, and often overlay layers of calcrete of varying depths and thickness. The soils are typically weakly structured with low organic content. These soils drain freely which results in a soil surface susceptible to erosion, especially wind erosion when the vegetation cover is sparse and gully erosion in areas where storm-water is allowed to concentrate. The soils in the area are generally not suitable for dry land crop production and the only area where intensive crop cultivation is feasible is along the Orange River where irrigation is possible therefore the pre-prospecting land capacity is categorized as Class III grazing land. The productivity of the area is very low at 8Ha/SSU.

The prospecting area has been classified into the following classes of land capability:

Arable land:	0 %
Grazing land:	100%
Wetland:	0 %
Wilderness land:	0 %
Urban and mining	0%

## Natural vegetation / plant life

The prospecting area is situated within the Nama-Karoo Biome. The vegetation consist of Bushmanland Arid Grassland vegetation type covering an area of 45478.96 Ha that is rated as least threatened with little of the area transformed less than 0.6%. Erosion is very low (60%) and low (33%). Altitude varies mostly from 600–1 200 m

The dominant vegetation is sparse open grassland, with *Stipagrostis* species prominent, together with scattered, drought resistant dwarf shrubs. Prominent species are as follow:

Dwarf shrubs

<i>Aridaria noctiflora</i>	<i>Eriocephalus microphyllus</i>	<i>Galenia fruticosa</i>
<i>Lycium bosciifolium</i>	<i>Pentzia spinescens</i>	<i>Plinthus karroicus</i>
<i>Pteronia mucronata</i>	<i>Rhigozum trichotomum</i>	<i>Rosenia humilis</i>
<i>Sarcostemma viminalale</i>	<i>Tetragonia arbuscula</i>	

Grasses

<i>Aristida adscensionis</i>	<i>Aristida congesta</i>	<i>Centropodia glauca</i>
<i>Enneapogon desvauxii</i>	<i>Schmidtia kalahariensis</i>	<i>Stipagrostis brevifolia</i>
<i>Stipagrostis ciliate</i>	<i>Stipagrostis obtusa</i>	

Forbs

<i>Barleria rigida</i>	<i>Berkheya spinosissima</i>	<i>Crassula muscosa</i>
<i>Dicoma capensis</i>	<i>Gazania lichtensteinii</i>	<i>Grielum humifusum</i>
<i>Hermannia spinosa</i>	<i>Hirpicium echinus</i>	<i>Manulea nervosa</i>
<i>Monechma incanum</i>	<i>Peliostomum leucorrhizum</i>	<i>Requienia</i>
<i>sphaerosperma</i>	<i>Ruschia robusta</i>	<i>Salsola tuberculata</i>
<i>Senecio cotyledonis</i>	<i>Sesamum capense</i>	<i>Tribulus zeyheri</i>
<i>Zygophyllum flexuosum</i>	<i>Zygophyllum microphyllum</i>	

**Animal Life**

Various small mammals and reptiles occur. Larger herbivore species are absent due to the conflicting land use. The habitat is well represented in the surrounding area.

**Surface Water**

No drainage channels occur within the prospecting area and there is no dendritic system which could be disturbed. Surface water only accumulates in the drainage channels after exceptional good rains. Given the variability of semi-arid rainfall, the calculation of the mean annual runoff (MAR) would be of no use. The MAR is in any event very low given the low rainfall less than 200 mm per year occurring mainly in the summer months, high evaporation rates, and shallow grade of the slope toward the drainage channels and the permeability of the soils

The surface water quality (when available) is suitable for animal consumption but not for potable water.

**Groundwater**

The majority of towns and farms rely on groundwater resources for potable water. Thus, the higher rainfall areas are key recharge zones for these groundwater resources. Consequently, land use management of these catchment areas is critical for the maintenance of the quality and quantity of water sourced from each area. For example, water courses and wetlands that have been cleared for agricultural purposes, or overgrazed, will not only cause soil erosion, but most importantly cause increased water runoff, thus reducing the amount of water that feeds back into the water table for consumption.

The average water level measured at 'rest' in the region is about 120m depending on the season. No water will however be used during the prospecting operation and if this change water will be obtained from one of the land owners.

**Air Quality**

The air background quality in the area is very good due to low industrial activity and very low population density. Given the surrounding extent of semi-desert, dust generation is high under windy conditions (dust storm) however under normal conditions no extreme dust conditions are noted on site.

**Noise**

Background noise level is the same as for other small settlements and at present such noise levels are low, below 55dBA.

- 1.2 The specific environmental features on the site applied for which may require protection, remediation, management or avoidance.

**Description of potential impacts identified on the cultural heritage environment**

Prospecting will mainly consist of non-invasive work with limited drilling and soil sampling therefore no phase 1 archaeological study is deemed necessary.

The area has very little potential to contain microfossils and as the rocks have been highly metamorphosed there is very little chance of fossils being preserved in these rocks. Should any fossils be discovered or unearthed in the process of prospecting, the prospecting right holder will contact a South African Museum or University which employs palaeontologists so that the necessary paleontological salvage operations can take place. No other heritage resources such as built structures over 60 years

old, sites of cultural significance associated with oral histories, burial grounds and graves, graves of victims of conflict, and cultural landscapes or viewscapes are present on the mining area.

#### Description of potential impacts identified on the socio- economic conditions

The only other land use in the area is small stock grazing and due to the small extends of the prospecting operation there will be no impact on productivity. Any mining operation developed as a result of prospecting operations will however have a positive impact on the socio-economic environment in the form of skills development and job creation.

#### Description of potential impacts identified on: employment opportunities, community health, and community proximity

The prospecting operation itself will not create many employment opportunities but if economic viable ore bodies are discovered the spinoffs due to the larger mining operation will contribute to employment and skills development.

#### Description of potential impacts identified on the biophysical environment

This impact assessment only deals with significant impacts and as prospecting will mainly consist of non-invasive field work with limited drilling and soil-sampling less than 5 Kg per sampling site the overall impact on the biophysical environment will be insignificant. The implementation of the mitigating and management measures prescribed in the EMP will address all the existing impacts and after implementation of the mitigating measures most impacts can be classified as insignificant especially when looking at the current state of the environment

#### **Geology**

Significance/Magnitude	Duration	Probability	Timing
------------------------	----------	-------------	--------

Low	Permanent	Certain	Activity
-----	-----------	---------	----------

Drilling will have an insignificant impact on the geology as borehole collars will remain. No backfilling will take place therefore mixing of the geological sequence of sediment will not occur.

#### **Topography**

Significance/Magnitude	Duration	Probability	Timing
------------------------	----------	-------------	--------

Low	Long term	Certain	Activity
-----	-----------	---------	----------

The small volume of soil and stream sampling less than 5Kg per site without the possibility of backfilling will have an insignificant negative impact on the visual aspect of the topography.

#### **Ground water**

Significance/Magnitude	Duration	Probability	Timing
------------------------	----------	-------------	--------

Medium	Point	Unlikely	Activity
--------	-------	----------	----------

Due to the shallow nature of operations the impact on the groundwater is considered insignificant. The absence of a waste handling program can however have a significant impact through oil and fuel spills and soil contamination. No process water will be used during prospecting operations or will be purchased from one of the landowners if needed.

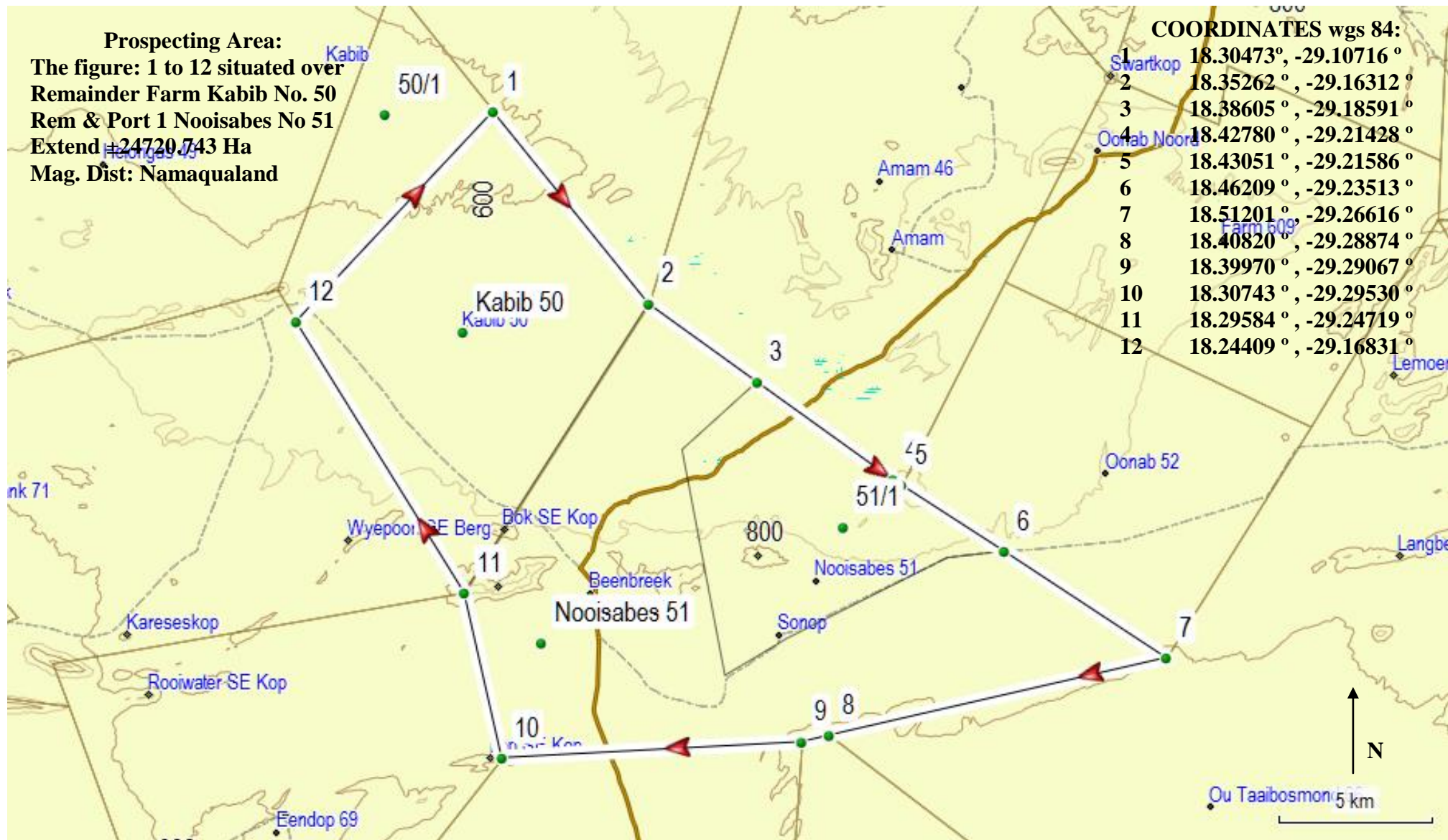
1.3 Map showing the spatial locality of all environmental, cultural/heritage and current land use features identified on site.

**Diagram 1: Locality plan** (contemplated in regulation 2(2) read with regulation 2(3) of the MPRD Act, 2002 (Act No. 30 of 2002)





**Diagram 2: Layout – Prospecting Blocks** (contemplated in regulation 2(2) of the MPRD Act, 2002 (Act No. 30 of 2002))



- 1.4 Confirmation that the description of the environment has been compiled with the participation of the community, the landowner and interested and affected parties,

The scoping report was made available to the landowners and all other interested parties for comment. All comments received were addressed in this EMPR.

## **2 REGULATION 52 (2) (b): Assessment of the potential impacts of the proposed prospecting or mining operation on the environment, socio-economic conditions and cultural heritage.**

- 2.1 Description of the proposed prospecting operation.

### 2.1.1 Plan of the main activities with dimensions

The plan submitted under paragraph 1.3 show the main land uses on the proposed prospecting area and as can be seen the complete area is zoned as agricultural or unspecified land use. With regard to the proposed prospecting activities no additional infrastructure including roads will be constructed that needs to be indicated on the plan.

This application employs a phased approach, where the work program is divided into several sequential sections. At the end of each section there will be a brief period of compiling and evaluating results. These results will not only determine whether the project proceeds, but also the manner in which it will go forward. Essentially, the Company will only action the next stage once satisfied with the results obtained. In addition, smaller, non-core parts of the work program will be undertaken if warranted. The plans as contemplated in regulation 2.2, of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) will be updated on an annual basis with regard to the actual progress of the establishment of surface infrastructure, prospecting operations and rehabilitation together with an Performance assessment report as contemplated in regulation 55(1) (c) on the implementation of the Environmental Management Plan.

### 2.1.2 Description of construction, operational, and decommissioning phases

#### **Construction phase**

No infrastructure or roads will be constructed due to the small scale of operations that will only include field investigations and limited drilling as described in the operational phase below. No processing or bulk sampling will take place that need infrastructure to be constructed.

## Operational phase

Essentially the program can be summarized as follow:

Phase	Activity	Timeframe
Phase 1	Aerial surveys	2 years
	Geological Mapping	
	Geochemical Survey	
	Data Compilation	
Phase 2	Reconnaissance and follow-up Drilling	2 years
	Data Processing	
Phase 3	Pre-feasibility report and resource statement Application for Mining Right or Rehabilitation and closure	1 year

### NON-INVASIVE ACTIVITIES:

#### Desk-top Studies

Available historic prospecting data will be scrutinized, and a working plan of the area on a suitable scale (1:5 000 or 1:10 000) compiled.

From the study of aerial photographic images available on the Internet (Google Earth) contrasting lithologies will be traced out.

#### Geochemical Surveys

##### 1. Stream Sediment Sampling.

The prospecting area is mountainous, drained by numerous gullies, which makes stream sediment sampling an efficient reconnaissance method of exploration. A farm track, follows the northern foot of the mountains, approximately parallel to the regional structure (along strike) for a distance of some 21 kilometres, downstream of the zone connecting the historic drill sites.

1.1. The first phase of stream sediment sampling will entail the sampling of mountain gullies crossed by the farm track. These will be analyzed for copper, nickel and cobalt, which are suitable 'pathfinders' for the sought mineral assemblage. Perhaps 50 samples may be collected during this phase.

1.2. Follow-up stream sediment sampling upstream of sample sites with anomalous values. This phase may be split up into multiple phases to zoom in on mineralized occurrences. Perhaps 150 additional samples may be collected during this phase.

##### 2. Soil Sampling.

Soil sampling will be conducted to investigate stream sample anomalies. The number of soil samples collected will be dependent on the degree of success of the stream sediment sampling program, but is expected to be in the 300-500 range.

2.1. The initial phase of soil sampling will consist of reconnaissance traverses conducted along the banks of gullies adjacent to the peak stream sample values.

2.2. Soil sample anomalies will be investigated by follow-up soil sampling traverses, progressively further away from the banks of gullies, to outline any geochemical anomalies.

2.3. Infill soil sampling at reduced sampling intervals along previous traverses will enable the definition of drilling targets.

#### Geological Mapping

As all stream and soil sampling will be conducted by me, a well-trained and highly experienced geologist, any indications of outcropping or near-surface mineralization will be observed during phases 1 and 2. Geological mapping of areas of interest, identified from the geochemical surveys, will be on a scale suitable for the observed geological variability.

### Geophysical Surveys

Geophysical data from previous surveys, airborne and on surface, are available to this author, and will be integrated with geophysical and geological data.

### Compilation of Data and Modeling

This will follow after completion of the non-invasive phase, and before the planning of the first drilling phase, and will be updated after completion of successive drilling programs.

## INVASIVE ACTIVITIES:

### Drilling

Although two different types of drilling are to be applied to the concession, they both have some common operations. In all instances drilling would be:

- Under close supervision of an experienced geologist
- Conducted along best practice guidelines
- Minimize environmental disturbance

In this area, most of the drilling targets are expected to be close to surface and hence drill holes should be short; in the range of 50-100 m.

#### Reverse Circulation Drilling.

1. Drilling targets generated during the non-invasive phase will be tested by fairly widely spaced shallow boreholes (average 50 meters/borehole). The number of drilling targets to be tested is yet unknown, but expected to be perhaps 10 (total drilling 500 meters).

2. Further investigation of those drilling targets, where the initial drilling results are encouraging. The borehole depths during this phase will be relatively shallow as well: along strike follow-up boreholes to approximately 50 meters, and a few down-dip boreholes to some 100 meters depth. (Say) 20 boreholes totalling 1200 meters.

Cuttings (approaching 100% recovery) will be collected by cyclone in standard elongated plastic bags in 1m samples, from which representative samples for assay purposes (500 gram) will be separated by a standard sampling method. The remaining cuttings (20-25 kg/metre) will be stored for metallurgical tests at a later stage. All samples with visible mineralization will be assayed. Trace constituents will only be determined for selected samples with proven ore grades. Routine assaying will be conducted at regular intervals along portions of boreholes where no visible mineralization is observed. Logging of boreholes will be conducted on the entire boreholes before being sampled for assaying.

#### Diamond Drilling

One borehole will be drilled for each ore-body defined by R.C.-drilling for petrological studies, to identify the minerals present and the size range of mineral grains, which needs to be known for metallurgical purposes.

These boreholes will be split and quartered where assaying is warranted. One quarter will be dispatched to the assay lab, one quarter kept for a permanent record, and the halves utilized for petrological studies.

Borehole collars will be covered by numbered slabs, and the position measured by GPS. No down-hole surveys will be necessary, as the deviation of boreholes would be negligible at the planned shallow depths of drilling.

### **Metallurgical Sampling**

R.C.-sampling generates 20-25 kg/metre drilled (10cm diameter boreholes), of which only a small fraction is needed for assaying. The mineralized portions of boreholes, as indicated by assay results, should provide sufficient material for metallurgical purposes. If necessary, more borehole cuttings can be obtained by drilling additional R.C.-boreholes.

### **Rehabilitation and Environmental Aspects**

Early phases of prospecting will have no impact on the environment and hence no rehabilitation should be necessary. Fortuitously, this area is duplicated by large tracts of land on all sides which offer the same habitat to fauna and flora. It is also partly covered by sand and the prospecting is of such a nature that for the initial work there will be minimal change to the original land surface. Consequently there are no foreseen major environmental issues and no expectation of longer term impacts in phase 1.

Phase 2 will only be invasive on a relatively small extent and the impact will be minimized through proper supervision. Drill rigs would mostly utilize existing roads and strong control exercised over oil usage and sump pools (the latter not applicable to R.C.-drilling). Impervious sheeting underneath the rig and sump areas (only applicable to the limited number of diamond boreholes foreseen) to catch any spills and the contaminated ground removed to an approved dump site. Original soils would finally be spread over drill locations. Overall the disturbance to the land surface would be minimal. Any rehabilitation will be guided by and comply with the recommendations of the EMPR as per the Prospecting Right regulations.

## **DESCRIPTION OF PRE-/FEASIBILITY STUDIES**

### **Completion Studies and Pre-feasibility**

Any program such as this culminates with an overall completion study and in this case the objective would be to provide a pre-feasibility study at a suitably detailed level for planning and to enable the commencement of financing and funding.

During the fifth and final year all data needs to be compiled, interpreted, summarized and evaluated in a final report. Several additional studies will need to be completed in order for an informed decision to be made on whether or not to proceed with development. Aside from all the information already discussed, expert input is frequently required in geohydrology, rock mechanics, statistical grade distribution, pyro- or hydro-metallurgy and other specialized fields. In addition, extra specialized studies have been allowed for to cover provision of services (power, water, labour), logistics, consumables, and all other items necessary in a pre-feasibility study.

Consequently while others costs decline in the final year, the cost of consultants is increased as much of the work is traditionally outsourced – both as an independent verification and because few companies can keep so many specialist talents on their books.

A direct follow on from the report is the ability to start looking at various funding alternatives, be they private, public or listed. In mine development it is normal because of the amounts of money involved that the latter two sources of finance predominate. These avenues often require separate reporting and the creation of relationships with key financial advisors, stockbrokers and fund managers. It is envisaged that the company would most likely follow a stock exchange listing route but the detail of this can only be determined later.

**Decommissioning phase**

Regulations 56 to 62 outline the entire process of mine closure, both as a guide to the process to be followed for mine closure, and also to address the legal responsibility with regard to the proper closure of operations. In terms of Section 37 of the Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002), the holder of a right is liable for any and all environmental damage or degradation emanating from his operation, until a closure certificate is issued in terms of Section 43 of the Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002).

"An application for a closure certificate must be accompanied by an environmental risk report which must include-

- (a) the undertaking of a screening level environmental risk assessment where-
- (b) the undertaking of a second level risk assessment on issues classified as
- (c) assessing whether issues classified as posing potential significant risks are acceptable without further mitigation;
- (d) issues classified as uncertain risks be re-evaluated and re-classified as either posing potential significant risks or insignificant risks;
- (e) documenting the status of insignificant risks and agree with interested and affected persons;
- (f) identifying alternative risk prevention or management strategies for potential significant risks which have been identified, quantified and qualified in the second level risk assessment;
- (g) agreeing on management measures to be implemented for the potential significant risks which must include-

<b>Phase</b>	<b>Activity</b> <small>(what are the activities that are planned to achieve optimal prospecting)</small>	<b>Skill(s) required</b> <small>(refers to the competent personnel that will be employed to achieve the required results)</small>	<b>Timeframe</b> <small>(in months) for the activity)</small>	<b>Outcome</b> <small>(What is the expected deliverable, e.g. Geological report, analytical results, feasibility study, etc.)</small>	<b>Timeframe for outcome</b> <small>(deadline for the expected outcome to be delivered)</small>	<b>What technical expert will sign off on the outcome?</b> <small>(e.g. geologist, mining engineer, surveyor, economist, etc)</small>
<b>Phase 1</b>	<b>NON – INVASIVE (2 years)</b>					
	Desk-to survey	geologist	12 months	All past information & results. Initial report	Months 12	Geologist
	Geological mapping	Samplers, geologist	2 months	Geological map of area	Months 18	Geologist
	Geochemical survey	Geologist	6 months	Geochemical map and targets	Months 24	Geologist
	Interpretation	Geologist	3 months	Sections, plans and report	Months 24	Geologist
	Drilling plans	Geologist	1 months	Exact locations, orientations, contract	Months 24	Contracted driller Site manager
<b>Phase 2</b>	<b>INVASIVE PROSPECTING (2 years)</b>					
	Scout drilling	Foreman, driller, labour, geologist	6 months	Drill samples, assay	Months 36	Geologist & compliance officer
	Infill drilling	Labour, driller, geologist	12 months	Foreman, labour, driller, geologist	Months 36	Contractor and site manager
	Specialist core studies	Several specialists	2 months	Mineralogy, rock mechanics	Months 48	Mineralogist
	Metallurgical testwork	Consulting metallurgist	3 months	Information on crushing, milling, recovery and equipment	Months 48	Metallurgist
	Interpretation of results	Geologist	1 months	Technical reports	Months 48	Geologist, mining engineer

<b>Phase 3</b>	<b>NON INVASIVE (1 year)</b>					
	Completion of all site work	Labour, Environmentalist	3 months	Restoration of site	Months 60	Geologist, environmentalist
	Additional studies	Specialized inputs	3 months	Modeling, ore resources	Months 60	IT & Resource specialists
	Valuation	Mineral economist	2 months	Financial analysis, funding options	Months 60	Mineral economist
	Completion Report	All disciplines	2 months	Pre-feasibility report and resource statement	Months 60	Geologist, mineral economist. Senior manager
	Preparation of mining right or decommissioning and closure	Specialized inputs	2 months	Mining Right or closed operation	Months 60	Geologist, environmentalist



### 2.1.3 Listed activities (in terms of the NEMA EIA regulations)

None of the activities listed above is a listed activity in terms of the Environmental Impact Assessment Regulations published in terms of Chapter 5 the National Environmental Management Act (Act No. 107 of 1998).

## 2.2 Identification of potential impacts

### 2.2.1 Potential impacts per activity and listed activities

This impact assessment only deals with significant impacts and as prospecting will mainly consist of non-invasive field work with limited drilling and soil-sampling less than 5 Kg per sampling site the overall impact on the biophysical environment will be insignificant. The implementation of the mitigating and management measures in paragraph 3.2 will address all impacts and after implementation of the mitigating measures most impacts can be classified as insignificant.

#### **Drilling**

Drilling will have an insignificant impact on the geology as borehole collars will remain. No backfilling will take place therefore mixing of the geological sequence of sediment will not occur.

Due to the shallow nature of operations the impact on the groundwater is considered insignificant. The absence of a waste handling program can however have a significant impact through oil and fuel spills and soil contamination. No process water will be used during prospecting operations or will be obtained from one of the landowners.

#### **Metallurgical Sampling**

The small volume of soil and stream sampling less than 5Kg per site without the possibility of backfilling will have an insignificant negative impact on the visual aspect of the topography.

### 2.2.2 Potential cumulative impacts

The only identified land use is small stock grazing and due to the temporarily nature of change in land use and small scale of the operation prospecting will not have any impact and the land will revert back to its former use grazing with no impact on production.

### 2.2.3 Potential impact on heritage resources

Prospecting will mainly consist of non-invasive work with limited drilling and soil sampling and no phase 1 archaeological study is deemed necessary.

The area has very little potential to contain microfossils and as the rocks have been highly metamorphosed there is very little chance of fossils being preserved in these rocks. Should any fossils be discovered or unearthed in the process of prospecting, the prospecting right holder will contact a South African Museum or University which employs palaeontologists so that the necessary palaeontological salvage operations can take place. No other heritage resources such as built structures over 60 years old, sites of cultural significance associated with oral histories, burial grounds and graves, graves of victims of conflict, and cultural landscapes or viewsapes are present on the mining area.

#### 2.2.4 Potential impacts on communities, individuals or competing land uses in close proximity

The only identified land use is small stock grazing and due to the temporarily nature of change in land use and small scale of the operation prospecting will not have any impact and the land will revert back to its former use grazing with no impact on production. The area is farmland that is not close to any settlement therefore no land development projects are in progress.

#### 2.2.5 Confirmation that the list of potential impacts has been compiled with the participation of the landowner and interested and affected parties

No proposals were received during the consultation process due to the non-invasive nature of the prospecting operation.

#### 2.2.6 Confirmation of specialist report appended.

No specialist reports are deemed necessary as no sensitive areas are included in the proposed area and due to the non-invasive nature of the proposed project.

### **3 REGULATION 52 (2) (c): Summary of the assessment of the significance of the potential impacts and the proposed mitigation measures to minimise adverse impacts.**

#### 3.1 Assessment of the significance of the potential impacts

Early phases of prospecting will have minimal impact on the environment and hence little rehabilitation should be necessary. Fortuitously, this area is duplicated by large tracts of land on all sides which offer the same habitat to fauna and flora. It is also partly covered by sand and the prospecting is of such a nature that for the initial work there will be minimal change to the original land surface. Consequently there are no foreseen major environmental issues and no expectation of longer term impacts in phase 1.

Phase 2 would be more invasive but still only to a relative small extent and the impact would be minimized through proper supervision. Drill rigs would utilize existing roads and strong control exercised over oil usage and sump pools. Impervious sheeting would be laid underneath the rig and sump areas to catch any spills and the contaminated ground removed to an approved dump site. Original soils would finally be spread over each drill location. Overall the disturbance to the land surface would be minimal and the drilling itself only removes a very small amount of ground for sampling and assay.

##### 3.1.1 Criteria of assigning significance to potential impacts

All surface disturbances are rated high

Dust is rated low if only minimal dust is expected to accumulate over the prospecting period, medium if it is expected to require dust suppression such as watering, and high if there is a risk that it will migrate beyond the prospecting area.

Noise is rated low if no machinery is to be used, medium if machinery is to be used, and high if there is a potential for complaints from public and neighbours.

All drainage is rated high

All blasting is rated high

All dust and noise from loading, hauling and transport is rated high

Drainage from ablution facilities are rated high.

### 3.1.2 Potential impact of each main activity in each phase, and corresponding significance assessment

#### **Construction phase**

No construction activities therefore no potential impact.

No infrastructure or roads will be constructed due to the small scale of operations that will only include field investigations and limited drilling as described in the operational phase below. No processing or bulk sampling will take place that need infrastructure to be constructed.

#### **Operational phase**

Initial prospecting will consist of non-invasive activities that will have no impact on the environment. Initial prospecting will include Aerial surveys, Geological Mapping, Geochemical Survey, Geophysical Surveys and Data Compilation

The latter part of the operation will include limited invasive activities in the form of drilling and metallurgical sampling.

##### Geology

Significance/Magnitude	Duration	Probability	Timing
Low	Permanent	Certain	Activity

Drilling will have an insignificant impact on the geology if borehole collars and sumps will remain. No backfilling will take place therefore mixing of the geological sequence of sediment will not occur.

##### Ground water

Significance/Magnitude	Duration	Probability	Timing
Medium	Point	Unlikely	Activity

Due to the shallow nature of operations the impact on the groundwater is considered insignificant. The absence of a waste handling program can however have a significant impact through oil and fuel spills and soil contamination. No process water will be used during prospecting operations or will be purchased from the local authority if needed.

##### Topography

Significance/Magnitude	Duration	Probability	Timing
Low	Long term	Certain	Activity

The small volume of soil and stream sampling less than 25Kg per site without the possibility of backfilling will have an insignificant negative impact on the visual aspect of the topography.

##### Decommissioning phase

Successful implementation of the Environmental Management Program during the life of the mine will cover all the significant aspects affecting the environment.

### 3.1.3 Assessment of potential cumulative impacts.

The only identified land use is small stock grazing and due to the temporarily nature of change in land use and small scale of the operation prospecting will not have any impact and the land will revert back to its former use grazing with no impact on production.

### 3.2 Proposed mitigation measures to minimise adverse impacts.

#### 3.2.1 List of actions, activities, or processes that have sufficiently significant impacts to require mitigation.

Possible risk factor	Qualitative impact level	If Insignificant, Why?
<i>Geology:</i>	None	No excavations will be done
<i>Topography (Safety):</i>	Potential significant impact	Borehole sumps remaining on site of about 25m <sup>2</sup> each will require mitigation
<i>Land Capability:</i>	Insignificant	In the overall scheme of the surrounding landscape, any remaining sumps of 25m <sup>2</sup> per sump is minor and the remaining impact in this regard is insignificant
<i>Soil:</i>	Insignificant	Soil erosion will pose no risk
<i>Vegetation:</i>	Insignificant	Due to the low rainfall the establishment of invader species and other exotic plants poses no risk.
<i>Fauna.</i>	Insignificant	Minimal risk given the low density of fauna and the fact that the habitat is well represented in the adjacent area for dispersal.
<i>Surface water.</i>	Insignificant	No surface water present on the site. The hydrological integrity of drainage channels will not be altered by attenuating or diverting any of the natural flow.
<i>Groundwater:</i>	Insignificant	Only shallow boreholes will be drilled and no groundwater will be used on site.
<i>Air Quality:</i>	Insignificant	Isolation of site and small scale of operation precludes any impact in this regard No FRD will be created on site and no loading and hauling will take place.
<i>Noise</i>	None	No activities except for the drilling operation that will be within the norm.
<i>Archaeology:</i>	None	No excavations will take place
<i>Visual Impact:</i>	Potential significant impact	Borehole sumps remaining on site of about 25m <sup>2</sup> each will require mitigation

#### 3.2.2 Concomitant list of appropriate technical or management options

The goal of rehabilitation with respect to the area is to leave the area level and even, and in a natural state containing no foreign debris or other materials.

All scrap and other foreign materials will be removed and disposed of as in the case of other refuse whether these accrue directly from the prospecting operation or are brought on to the site from outside.

Assuming that 100 boreholes will be present at any given time, 100 sumps will be rehabilitated. At 25m<sup>2</sup> per sump the total surface disturbance will be 2 500m<sup>2</sup> (0.25 hectares). As stipulated in drilling contracts the drilling contractor is obliged to rehabilitate each site immediately after the completion of each borehole.

Percussion drilling does not require sumps, as it is a dry operation. The samples are collected completely in large bags attached to the cyclone. From past experience in this region rain and wind eliminates all signs of prospecting activities within one season, except the drill collars, which are protected by cement markers until the end of the prospecting period.

Drilling equipment will only be used during the second phase depending on the outcome and results of phase 2. This machinery will not be extensively repaired in any place other than in the workshop available in nearby major towns. No infrastructure will be constructed during prospecting.

Bore hole sites are GPS located and pegged with a steel dropper. The site is inspected and photographed prior to any disturbance. A drill pad is then cleared, keeping disturbance to the native vegetation to an absolute minimum. Any topsoil removed is stored separately for later reuse. Plastic lining to prevent oil spillage is used under the rig. The area is cordoned off. After the drilling operation is complete, each borehole collar is surveyed and the site is rehabilitated and photographed. The retained topsoil is used to fill any sumps. Any spoils or drilling material is transported off site and disposed of in an approved area.

Fuel for the drilling equipment will be stored in mobile tanker trailer. Accidental spills will be cleaned up immediately by removing the spillage together with the polluted soil and by disposing of them at a recognised facility. Equipment used in the prospecting process will be adequately maintained so that during operations it does not spill oil, diesel, fuel, or hydraulic fluid.

### 3.2.3 Review the significance of the identified impacts

The table below uses the potential significant impacts as identified in paragraph 3.2.1 and applies them to the proposed mitigation measures in paragraph 3.2.2.

Topography and Visual Impact:	<p>Insignificant risk (after decommissioning/rehabilitation is completed):</p> <p>Decommissioning rehabilitation entails the effective shaping of the final faces of the sump with erosion control facilities above all edges. The excavation will form an even depression that is stable and that will not be detrimental to the safety and health of humans and animals and that will not pollute the environment or lead to the degradation.</p>
-------------------------------	---

## 4 REGULATION 52 (2) (d): Financial provision.

### 4.1 Plans for quantum calculation purposes.

The main invasive prospecting activity will be drilling. It is impossible to show the spatial location and aerial extent with dimensions of any drill traverses at this stage before the initial non-invasive work has identified potential targets for drilling (also refer 2.1.1).

### 4.2 Alignment of rehabilitation with the closure objectives

The goal of rehabilitation with respect to the area where drilling will take place is to leave the area level and even, and in a natural state containing no foreign debris or other materials. All scrap and other foreign materials will be removed from the area and disposed of as in the case of other refuse, whether these accrue directly from the prospecting operation or are brought on to the site. Removal of these materials shall be done on a continuous basis and not only at the start of final rehabilitation and closure. The small amount of overburden from the drill pads will be back filled into the holes and covered with topsoil. The area will be profiled to blend in with the topography of the surrounding environment. The mitigating measures described in paragraph 3 are compatible with these closure objectives.

#### 4.3 Quantum calculations.

The area will be rehabilitated with the original land use namely small stock farming in mind and the productivity of the area after closure will be the same as before prospecting operations started. Rehabilitation cost is estimated with the proposed end-state in mind and although the applicant has his own equipment and rehabilitation will take place concurrent with prospecting the tariffs for equipment was based on local hiring tariffs in Springbok the closest town.

##### **Rehabilitation of access roads**

No access roads or infrastructure will be constructed only existing farm roads will be used.

##### **Rehabilitation of the office/camp site**

No permanent structure will be build and all operations will be run from Springbok.

##### **Rehabilitation of vehicle maintenance yard and secured storage areas**

No vehicle maintenance yard or secure storage areas will be constructed as infrastructure is available in Springbok.

##### **Rehabilitation of surface disturbance drill pads**

The goal of rehabilitation with respect to the area where drilling has taken place is to leave the area level and even containing no foreign debris or other materials.

All scrap and other foreign materials will be removed from the site and disposed of as in the case of other refuse whether these accrue directly from the prospecting operation or are brought on to the site from outside.

All drill holes will be back filled. Once the overburden have been profiled the topsoil previously stored, will be returned and the total area will be profiled with acceptable contours and erosion control measures. This estimation is based on 100 drill sumps of 25m<sup>2</sup> each. The exact number of traverses and holes will only be known after completion of initial prospecting and the layout plans and rehab estimate will be updated before commencing with invasive prospecting.

Extent:	2 500m <sup>2</sup>
Duration of rehabilitation: 2 holes per day	50 days
Equipment required:	
Manual labour @ R500.00/day for backfilling and profiling	R 25 000.00
Cost of rehabilitation:	R 25 000.00

##### **Final rehabilitation**

All equipment and other items used during the prospecting period must be removed from the site. Waste material of any description, including receptacles, scrap, rubble and tyres, must be removed entirely from the mining area and disposed of at a recognised landfill facility. It will not be buried or burned on the site.

Extent:	1Ha
Duration of rehabilitation:	5 days
Equipment required:	
Manual labor @ R500.00/day for cleanup	R 2 500.00
Cost of rehabilitation:	R 2 500.00

The applicant is willing to escalate the total estimated amount of R 27 500.00 that is needed for rehabilitation to R30000.00 that is more than is needed for the rehabilitation of damage caused by the operation, both at sudden closure during the normal operation of the project or at final, planned closure.

#### 4.4 Undertaking to provide financial provision

Financial provision required under Regulation 54 for the amount of R 30 000.00 will be furnish to DME. The quantum will be updated again within a year or at a shorter interval if there is any deviation from the prospecting work program.

### **5 REGULATION 52 (2) (e): Planned monitoring and performance assessment of the environmental management plan.**

#### 5.1 List of identified impacts requiring monitoring programmes.

None of the impacts identified required specific monitoring programs but inspections and monitoring shall be carried out on both the implementation of the program and the impact on the natural and cultural environment. Visual inspections on erosion and physical pollution shall be carried out on a regular basis together with fixed point photography.

#### 5.2 Functional requirements for monitoring programmes

Every aspect of the operation must be checked against the prescriptions given in this document and if find that certain aspects are not addressed or impacts on the environment are not mitigated properly, the identified inadequacies will be rectified immediately.

Regular monitoring of all the environmental management measures and components shall be carried out to ensure that the provisions of this program are adhered to.

Layout plans will be updated on a regular basis and updated copies will be submitted on an annual basis to the Regional Manager. The plans will also be updated before commencing with drilling and the rehabilitation quantum will also be updated.

Reports confirming compliance with various points identified in this program will be submitted to the Regional Manager on an annual basis together with an update of the rehabilitation cost. Any emergency or unforeseen impact will be reported as soon as possible. An assessment of environmental impacts that were not properly addressed or were unknown when the program was compiled shall be carried out and added as a corrective action.

#### 5.3 Roles and responsibilities for the execution of monitoring programmes

The project manager will be responsible for monitoring and Reports confirming compliance with various points identified in the environmental management program.

#### 5.4 Committed time frames for monitoring and reporting

The project manager must on a bi-monthly basis, check every aspect of the operation against the prescriptions given in this document and, if find that certain aspects are not addressed or impacts on the environment are not mitigated properly, the project manager must rectify the identified inadequacies immediately.

### **6 REGULATION 52 (2) (f): Closure and environmental objectives.**

#### 6.1 Rehabilitation plan

The main invasive prospecting activity will be. It is impossible to show the spatial location and aerial extent with dimensions of any drill traverses at this stage before the initial non-invasive work has identified potential targets for drilling (also refer 2.1.1).

6.2 Closure objectives and their extent of alignment to the pre-mining environment  
The environment affected by the prospecting operations shall be rehabilitated, as far as is practicable, to its natural state. Land use will be the same as before prospecting with the same production with regard to grazing by livestock. The affected environment shall be maintained in a stable condition that will not be detrimental to the safety and health of humans and animals and that will not pollute the environment or lead to the degradation thereof.

The goal of rehabilitation with respect to the area where drilling will take place is to leave the area level and even, and in a natural state containing no foreign debris or other materials. All scrap and other foreign materials will be removed from the area and disposed of as in the case of other refuse, whether these accrue directly from the prospecting operation or are brought on to the site. Removal of these materials shall be done on a continuous basis and not only at the start of final rehabilitation and closure. The small amount of overburden from the drill pads will be back filled into the holes and covered with topsoil. The area will be profiled to blend in with the topography of the surrounding environment. The mitigating measures described in paragraph 3 are compatible with these closure objectives.

6.3 Confirmation of consultation

A copy of the scoping report that includes environmental objectives in relation to closure was made available to the landowner and all other interested parties. All comments received were addressed in this EMPR.

## **7 REGULATION 52 (2) (g): Record of the public participation and the results thereof.**

7.1 Identification of interested and affected parties.

7.1.1 Name the community or communities identified, or explain why no such community was identified.

The communities of Concordia and Steinkoph were identified as landowners.

7.1.2 Specifically state whether or not the Community is also the landowner.

The communities of Concordia and Steinkoph were identified as landowners.

7.1.3 State specifically whether or not a land claim is involved.

No land claim is registered against the property.

7.1.4 Name the Traditional Authority identified

No Traditional Authority only local municipality

7.1.5 List the lawful occupiers of the land concerned.

The communities of Concordia and Steinkoph were identified as landowners and the members are the only lawful occupiers

7.1.6 Explain whether or not other persons' (including on adjacent and non-adjacent properties) socio-economic conditions will be directly affected by the proposed prospecting or mining operation and if not, explain why not.

The only other land use in the area is small stock grazing and due to the small extends of the operation there will be no impact on productivity. Prospecting will



mainly consist of non-invasive activities with limited drilling, and the only impact on the socio-economic conditions will be positive through limited job creation

7.1.7 Name the Local Municipality identified by the applicant  
Nama Khoi Municipality

7.1.8 Name the relevant Government Departments, agencies and institutions responsible for the various aspects of the environment and for infrastructure which may be affected by the proposed project.

Department Environment and Conservation responsible for scrutinizing all EMP's for new developments.

No listed activity in terms of Nema will take place.

No water use that required registration or a water use license will take place.

No infrastructure is in close proximity of the prospecting operation.

7.2 The details of the engagement process.

7.2.1 Description of the information provided to the community, landowners, and interested and affected parties.

A copy of the PWP and the scoping report (consultation template) was supplied and or explained to them.

Any other I&A party by means of advertisement in local newspaper

7.2.2 Provide a list of their views raised in regard to the existing cultural, socio-economic or biophysical environment, as the case may be.

Letters of agreement and/or comments from I&A parties with regard to the content of the scoping report is attached. Concerns were addressed as part of the EMP.

7.2.3 Provide a list of their views raised on how their existing cultural, socio-economic or biophysical environment potentially will be impacted on by the proposed prospecting or mining operation.

All comments received on the content of the scoping report were included and addressed in this EMPR.

7.2.4 Provide list of any other concerns raised by the aforesaid parties.

All comments received on the content of the scoping report were included and addressed in this EMPR.

## **8 SECTION 39 (3) (c) of the Act: Environmental awareness plan.**

8.1 Employee communication process

General environmental awareness will be fostered among the project's workforce to encourage the implementation of environmentally sound practices throughout its duration. This will ensure that environmental accidents are minimized and environmental compliance maximized.

Environmental awareness will be fostered in the following manner:

- a) Induction course for all workers on site, before commencing work on site.
- b) Refresher courses as and when required

- c) Daily toolbox talks at the start of each day with all workers coming on site, where workers can be alerted to particular environmental concerns associated with their tasks for that day or the area/habitat in which they are working.
- d) Taking part in national and international environmental campaigns like National Marine Week, National Labour Day, National Wetlands Day etc.
- e) Displaying of information posters and other environmental awareness material in the general assembly points.

## 8.2 Description of solutions to risks

Specific environmental awareness performance criteria will form part of the job descriptions of employees, to ensure diligence and full responsibility at all levels of the organisational work force.

General environmental awareness will be fostered among the project's workforce to encourage the implementation of environmentally sound practices throughout its duration. This will ensure that environmental accidents are minimized and environmental compliance maximized.

## 8.3 Environmental awareness training.

The goal of training is to enable a shared understanding and common vision of the environment, the impact of a mining operation on the environment (and why this is important) and the role of mining personnel in terms of environmental management and compliance.

The induction course will compose of the following steps:

- The first step will include background discussion of the environment concept: of what it comprises and how we interact with it.
- The second step will be a description of the components and phases of the specific mining operation.
- The third step will be a general account of how the mining operation and its associated activities can affect the environment, giving rise to what we call Environmental Impacts.
- The fourth and most important step will be a discussion of what staff can do in order to help prevent the negative environmental impacts from degrading our environment. This is known as Environmental Impact Management.

## **9 SECTION 39 (4) (a) (iii) of the Act: Capacity to rehabilitate and manage negative impacts on the environment.**

9.1 The annual amount required to manage and rehabilitate the environment. Refer to section 4 that covers regulation 52 (2) (d) that handles with financial provision.

9.2 Confirmation that the stated amount correctly reflected in the Prospecting Work Programme as required.

This amount was provided for in the cost estimate for the implementation of the PWP and proof of access to the necessary funds were supplied with the prospecting work program.

**10 REGULATION 52 (2) (h): Undertaking to execute the environmental management plan.**

Herewith I, the person whose name and identity number is stated below, confirm that I am the person authorised to act as representative of the applicant in terms of the resolution submitted with the application, and confirm that the above report comprises EIA and EMP compiled in accordance with the guideline on the Departments official website and the directive in terms of sections 29 and 39 (5) in that regard, and the applicant undertakes to execute the Environmental management plan as proposed.

<b>Full Names and Surname</b>	<b>Nicolaas Johan Jacob Janse van Rensburg</b>
<b>Identity Number</b>	<b>8002265063089</b>

**-END-**