

ENVIRONMENTAL AUDIT REPORT OKORUSU FLUORSPAR (PTY) LTD

MINING LICENCE (ML) 90



Okorusu Mine village, tailings (15.02.2022)

PERIOD:

SEPTEMBER 2019 TO JUNE 2022

Submitted to: The Executive Director
Ministry of Environment, Forestry and Tourism
Private Bag 13306
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ENVIRONMENTAL AUDIT REPORT FOR OKORUSU FLUORSPAR (PTY) LTD: ACTIVITIES ON MINING LICENCE (ML) 90

1. SUMMARY

The Okorusu Mine is situated approximately 50 km north of Otjiwarongo in the Otjozondjupa region. The mining operations at Okorusu consist of:

- Mining Fluorspar, Magnetite and Aggregate Rock within ML90
- Reclamation of old tailings for Metspar and Phosphate recovery within ML90
- Processing of graphite ore within ML90 that is from ML196
- Deposition of waste rock and tailings from the mining and processing operations
- Storage and dispensing of fuel
- Abstraction of groundwater for mine processes

This audit report is submitted in partial fulfilment of the requirements of Environmental Clearance Certificate (ECC) renewal application for ML90. The company was granted an ECC on the 27th of September 2019 valid for a period of three (3) years until the 27th of September 2022. This document reviews the activities that took place during the reporting period from 2019 to 2022. Currently the mine is under Care and Maintenance already in November 2018; neither mining nor mineral processing occurred during the reporting period.

2. CONTACT DETAILS

Table 1. Details of ML / EPL holder

ML 90 and EPL 5046	Licence Holder Details
Name of Holder	Okorusu Fluorspar (Pty) Ltd.
Chief Operations Officer	Mr Michael Gibson, presently Morne du Toit, director
Contact Details	Tel: 067 - 305 404 Fax: 067 - 305 403 E-mail Address: morne.dutoit@gecko.na
Postal / Registered Address	Okorusu Fluorspar (Pty) Ltd, P.O. Box 1236, Otjiwarongo

3. PROGRESS REPORT ON CURRENT ACTIVITIES

3.1 Metallurgical Research and Development

Metallurgical Research & Development (R & D) continues as follows:

Otjitanga Rare Earth Element Project:

A pilot plant for testing the processes for concentrating bastnaesite rare earths mineralisation from Gecko Namibia's Otjitanga project has been established during 2020. The plant comprises crushing, screening and a magnetic separation. Only limited test work on the material has been conducted to date.

3.2 Construction Materials, Industrial Minerals and Exploration

Magnetite:

After detailed exploration work with pitting and RC Drilling during 2018 and 2019, no magnetite exploration work was carried out during the reporting period. No magnetite was extracted or processed during this period. Magnetite stocks remain as per figures reported in the end of 2019. Please refer to Figure 1 below.

Aggregates:

Okorusu has repaired and re-commissioned the static crushing plant on top of the mountain. Fenite waste rock from the rock dumps is used for crushing and screening to produce aggregate material. (See Figure 1 below). During the reporting period no production of aggregate has taken place.

Fluorspar:

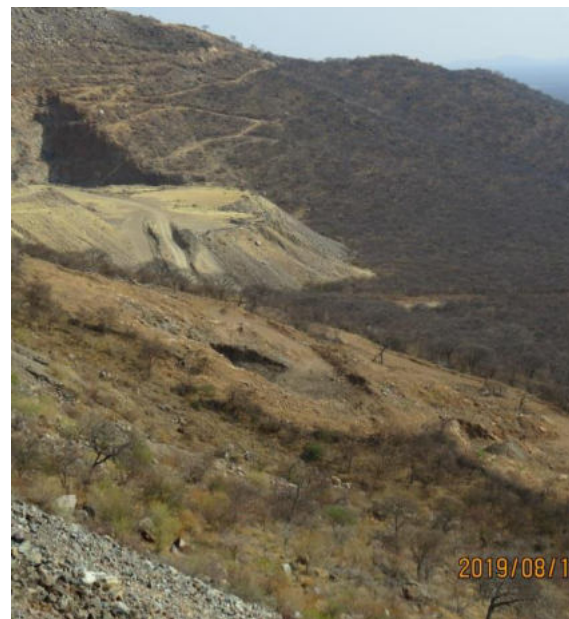
The exploration, mining and processing of fluorspar (including metspar) has still not resumed at the site.

Graphite:

The Imerys Gecko joint venture company, which in May 2022 was taken over by Northern Graphite, a Canadian company listed on the TSX, attends to the "care and maintenance" status of the processing plant on site. The care and maintenance of the graphite operations commenced in December 2018. Okanjande Graphite has registered an amendment application to separate the processing of the graphite from the mining which is still pending approval.



Aggregate laydown area (15.02.2022)



Aggregate source – old waste rock alongside Pit A Magnetite mining area in foreground

Figure 1. Images the aggregate and magnetite sources and stockpiling.

3.3 Environmental Impact Assessment (EIA) Report & Environmental Management Plan (EMP)

Okorusu mine holds Environmental Clearance Certificates in terms of the Environmental Management Act (No. 7 of 2007) (EMA) for its mining licence (ML-90) and exclusive prospecting licence (EPL-5046). An amended ECC for Okorusu was issued on 26 September 2016 for the mining and additional activities that have intermittently started at the mine. Additional aspects are the processing of other minerals and also the extraction of iron ore within the Mining Licence. The re-issued certificate for this scope of activities is valid until 27th September 2022.

The ECC for EPL5046 was issued during the first semester of 2021 and it is valid until the 22nd of June 2024.

As part of the company's responsibility in taking care of the environment includes the requirements to watch over the 14 management programmes are contained in the EMP. Each programme covers a different aspect of the natural and manmade environment. In addition to this the EMP describes how the various environmental aspects must be monitored, impacts analysed, and results reported on. Each management programme is considered later in the report.

3.4 Monitoring & Auditing

Borehole water monitoring is ongoing on a monthly basis, and water sampling is planned for the next period for hydro chemical analyses. This is done to monitor the water quality and water supplies to offices, houses, and processing plant. The water monitoring procedures were updated to align with the draft regulations of the DWA. The latest borehole level monitoring was conducted on the 30th of May 2022.

Dust monitoring points were established during the 1st semester 2018 to monitor the air pollution alongside the gravel road D2463 due to increased transportation to the Okorusu mine and back, while some dust buckets have been placed within the resettlement farm, due to complaints from the farmers. Mitigative measures and improvements on the road have been established.

Air quality monitoring was done monthly up to the end of December 2018. Thereafter the monitoring was carried out every quarter until 31st March 2019. Due to the care and maintenance status with no activities the dust monitoring has been stopped for the time being.

3.5 Maintenance

Regular housekeeping is done which involves routine checks of the utilities and infrastructure on the site.



Figure 2. Image showing some sites of Okorusu Fluorspar infrastructures.

3.6 Baseline Studies

Baseline studies were completed prior to the construction activities for the new processing plant and infrastructure.

3.7 Mining

Magnetite mining activities were on hold since 2019 as no orders were received from the cement factories (Cheetah Cement and Ohorongo Cement).

3.8 Processing Activities

Graphite

The processing of graphite ore at Okorusu was put on hold at the end of 2018. The last crushing of graphite ore took place on the 18th of November 2018. Both the Okanjande mine and the processing plant at Okorusu mine site were put under care and maintenance since the 2nd semester 2018 reporting period.

3.9 New Graphite Tailings Storage Facility

An audit by Knight Piesold and an independent consultant was carried out in 2018. Recommendations were made to ensure the integrity of the wall and subsequent increase in height will be maintained. The image in Figure 3 renders the level of the graphite tailings on 10th August 2019 and on 15th February 2022. Since December 2018 no additional tailings have been added.

Knight Piesold has been appointed for a new study, including environmental impact assessment for the design and operation of an additional tailings' storage facility.



Figure 3. The graphite tailings facility – no additional material has been added since December 2018

3.10 Infrastructure Development

No new infrastructure was established during the reporting period.

4. ENVIRONMENTAL PROGRAMMES

4.1 Stakeholder Consultation / Communication Management Programme

The stakeholder management committee will need to be re-established once mining operations at the mine resume.

Joint Venture Company

A joint venture had been established between Gecko Namibia (Pty) Ltd (i.e., the 51% shareholder/owner of the Okorusu Mine) and Imerys Graphite & Carbon (a publicly listed company on the European stock exchange). The company has recently been taken over by Northern Graphite, a company listed on the Toronto Stock Exchange in Canada and will be renamed in due course.

There are outlined division areas of the different works areas and the processing plan of graphite at the Okorusu Mine Site. The Joint Venture (JV) company, hereafter referred to as the JV in this report. The map below shows how the different accessory works areas within the mine site are either shared between the JV partners (Okorusu & JV) or dedicated to Okorusu's own use or reserved for use by the JV.

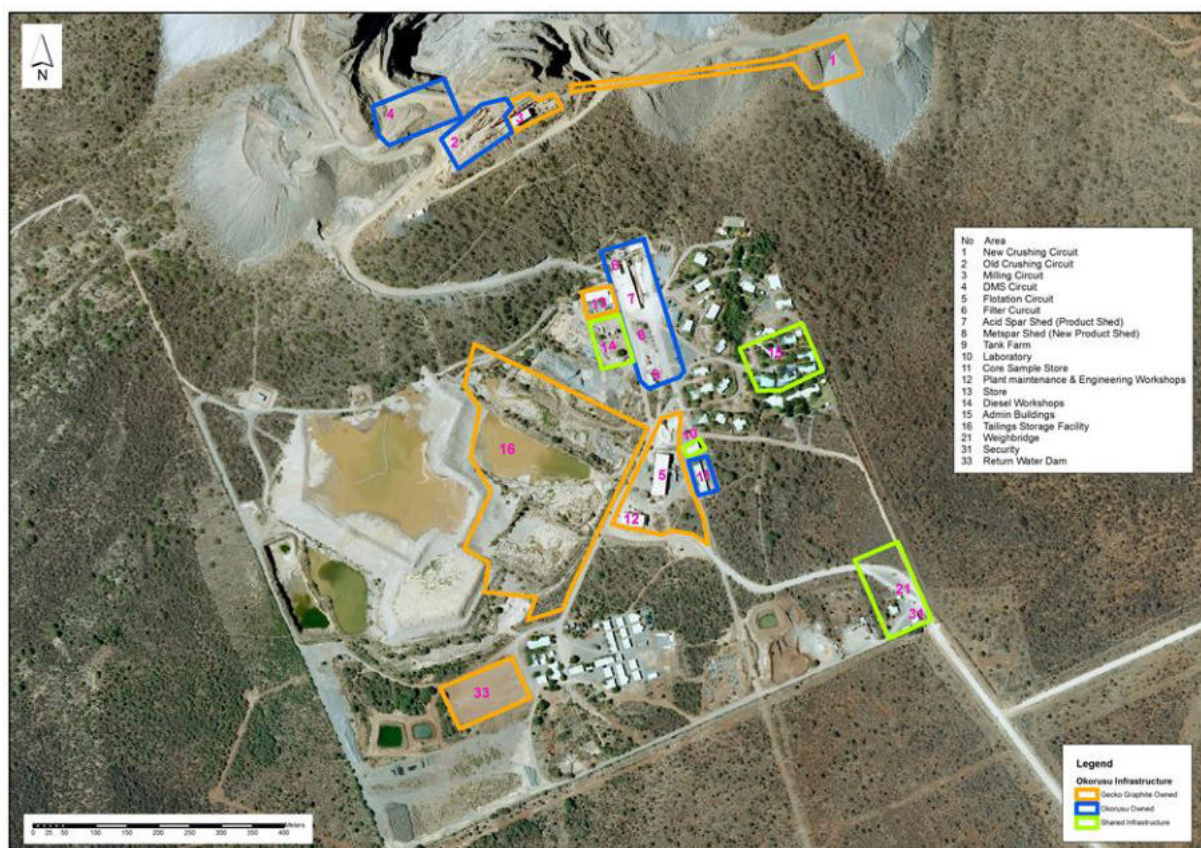


Figure 4. Division of areas for dedicated use by the JV (referred to here as Gecko Graphite), Okorusu, and shared infrastructure

4.2 Safety & Security Management Programme

During the ongoing Care and Maintenance period the HSE committee for the Graphite JV has been taken over by an external group. Nonetheless the project team employed on the ground continues, ensuring that the care and maintenance staff do carry out their activities in accordance with national and company policies.

4.3 Surface Water Management Programme

There are spill management procedures set up including the clean-up of hydro-carbon spills. The oil water separator continues to function (see up to date photo below). All fuel storage facilities are maintained to SANS requirements.

The storm water flow and drainage have been rectified to mitigate the risks of flooding and ground movement. The site of the return water dam was shifted to another older and revitalised dam adjacent to the current one. The current dam will not be used until this facility has been upgraded.

The storm water channel around the new tailings storage facility (NTSF) was completed (see image below) already during H2 2019.



Oil water separator below the wash bay



Storm water channel around NTSF

Figure 5. Images of surface water containment and diversion.

4.4 Groundwater Management Programme

Priority aspects under this programme are the implementation and maintenance of proper handling and control measurements of containment of all the substances that could be potentially harmful to groundwater resources.

Waste from the graphite processing plant was regularly released into the NTSF. A comprehensive tailings storage facility (TSF) design and subsequent ground preparation was initiated during the 1st semester 2016. The facility has been filled up to the height of the toe wall as of the end of 2018. No tailings material has been added since.

Main priorities still remain the prevention of groundwater contamination from the construction activities. All materials, fuels and chemicals are stored in specific and secured areas to prevent pollution from spillages and leakages. Chemical storage areas are sufficiently contained, and the use of chemicals is being controlled.

Sewage waste is currently being looked over for possible water reclamation procedures and safe disposal. The water monitoring procedure was drafted according to the DWA requirements.

All groundwater related permits are in place from the Department of Water Affairs.

4.5 Air Quality Management Programme.

Due to the much-reduced operations at Okorusu presently no air quality monitoring is presently conducted. The baseline of air-borne particulates was established during 2016 and 2017.

4.6 Noise & Vibration Management Programme

Standard noise and vibration mitigation measures are to be implemented throughout, ensuring that all personnel involved are made aware of the potential environmental impacts on an individual and the importance of noise control measures.

Human exposure to vibrations and noise over a long period of time has potential to have severe health effects. No issues of concern have been recorded for this reporting period.

4.7 Biodiversity Management Programme

No issues of concern were presented. The old mine sites managed, and re-establishment of vegetation takes place naturally over all the old sites.



Figure 6. Turtle at Okorusu site

4.8 Visual Management Programme

Due to much reduced traffic from and to the Okorusu Mine the application of the dust suppression palliative that was applied to the haulage road has been discontinued for the care and maintenance period. No complaints concerning any aspects of visual impact was received.

Conditions on the haulage road are very good currently as few trucks travel on the road and hauling of graphite ore to the plant has been discontinued.

4.9 Archaeology Management Programme

This plan follows the chance (heritage) find procedure. The objective is to ensure that the correct actions are taken to preserve or document chance archaeological finds. No high priority tasks have been identified at this stage. No chance finds occurred during this reporting period.

4.10 Traffic Management Programme

Very few vehicles use the haul and access road to Okorusu mine. Most mine staff stay on site except for some care and maintenance staff who travel back and forth from Otjiwarongo.

4.11 Social & Economic Management Programme

Unfortunately, the graphite processing operations have been affected by factors beyond the companies control and therefore the plant had to be placed under care and maintenance. As a result, many personnel were made redundant and retrenched in the end of 2018.

4.12 Resource Management Programme

The new borehole pipeline was constructed and was used to capacity for a few months till the end of October 2018. Thereafter, the production and water abstraction has been reduced markedly.

Water monitoring continued throughout this period. Figure 7 renders images of the water boreholes and 1 monitoring points.



New borehole at the Okorusu Farm wellfield with fencing around it.



Observation boreholes at Okorusu farm wellfield.



Old borehole alongside the new hole.



Dip level device for borehole monitoring

Figure 7. Images of water supply and monitoring points at Okorusu wellfield.

4.13 Soil Management Programme

Topsoil that had been stripped is stored at a designated area.

4.14 Waste Management Programme

Waste separation programmes have been implemented on site. Plans are ongoing to attempt separating any waste generated from the JV operations from the Gecko waste. The aim is to allow for smooth waste management and disposal control.

Specific and short training courses on of waste separation were conducted for the staff. There are several waste bins around the site with sorting labels. A strict plan and guidelines on the separation and safety disposal of hazardous waste will be implemented once production is resumed at the mine site.

The nearest landfill site in Otjiwarongo does not separate their waste for recycling.

Rehabilitation of the old domestic waste site has taken place.



global environmental solutions

Okorusu Fluorspar Mine

Environmental Management Plan for the Okorusu Fluorspar Mine

SLR Project No.: 734.15002.00004

Report No.: 1

September 2013



Okorusu Fluorspar Mine

Environmental Management Plan for the Okorusu Fluorspar Mine

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September 2013



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ENVIRONMENTAL MANAGEMENT PLAN FOR THE OKORUSU FLUORSPAR MINE

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ACRONYMS AND ABBREVIATIONS

Below a list of acronyms and abbreviations used in this report.

Acronyms / Abbreviations	Definition
DWA	Department of Water Affairs and Forestry
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EMS	Environmental Management System
EPL	Exclusive Prospecting License
Ha	Hectare
ISO	International Standard Organisation
LoM	Life of Mine
MAWF	Ministry of Agriculture Water and Forestry
MC	Mining Commissioner
MET	Ministry of Environment and Tourism
MME	Ministry of Mines and Energy
MS	Method Statement
MP	Management Programme
NSD	Noise Sensitive Development
PM10	Particular Matter less than 10 micrometre
RoM	Run of Mine
SANS	South African National Standards
SHE	Safety Health and Environment
SME	Small-Medium Enterprise
STP	Sewerage Treatment Plant
Tpa	Tons per annum
TSF	Tailings Storage Facility
WRD	Waste Rock Dump

ENVIRONMENTAL MANAGEMENT PLAN FOR THE OKORUSU FLUORSPAR MINE

1 INTRODUCTION

This Environmental Management Plan (EMP) documents a series of individual management programmes (MPs) which are designed to meet legal requirements and avoid or minimise the impacts associated with the Okorusu Fluorspar Mine (Okorusu).

An EIA Scoping process, which included the assessment of a proposed mine expansion and the re-assessment of cumulative impacts associated with the Okorusu Mine, was conducted in 2013. This EMP takes the management and mitigation requirements from the original (approved) EMP into consideration as well as the findings of the 2013 EIA. It therefore supersedes the previously approved EMP.

The MPs have therefore been compiled based on the existing EMP requirements as well as the EIA Report for the proposed expansion of the Okorusu Fluorspar Mine (SLR, 2013).

TABLE 1.1: SUMMARY OF ISSUES IDENTIFIED IN THE EMP AND CORRESPONDING MANAGEMENT PROGRAMMES

Environmental component (reference to the Scoping Assessment Report)	Issue (reference to the Scoping Assessment Report)	Relevant MP (reference to Section 6 of the EMP)
Topography (7.2)	Surface excavations and infrastructure (7.2)	MP7.1 – Stakeholder consultation MP7.2 – Safety & Security
Soils and land capability (7.2)	Loss of soil resources from soil pollution (7.2)	MP7.14 – Waste management
	Loss of soils resource through physical disturbance (7.2)	MP 13 – Soil management
Biodiversity – Natural vegetation and animal life (7.2 & 8.3)	Physical impacts on biodiversity (7.2 & 8.3.1)	MP7.7 – Biodiversity
	Reduction of water resources as an ecological driver (7.2 & 8.3.2)	MP7.7 – Biodiversity MP7.3 – Surface Water MP7.4 – Groundwater
	General disturbance of biodiversity (7.2 & 8.3.3)	MP7.7 – Biodiversity MP7.14 – Waste management
Surface water (7.2 & 8.5.1)	Altering drainage patterns (7.2 & 8.5.1)	MP7.3 – Surface Water

Environmental component (reference to the Scoping Assessment Report)	Issue (reference to the Scoping Assessment Report)	Relevant MP (reference to Section 6 of the EMP)
8.5)	Impacts on surface water quality (7.2 & 8.5.2)	MP7.3 – Surface Water MP7.14 – Waste Management
Groundwater (7.2 & 8.6)	Dewatering and groundwater abstraction (7.2 & 8.6.1)	MP7.4 – Groundwater MP7.11 – Socio-Economic
	Impacts on groundwater quality (7.2 & 8.6.2)	MP7.4 – Groundwater MP7.14 – Waste management
Air quality (7.2 & 8.1)	Air pollution (7.2 & 8.1.1)	MP7.5 – Air quality
Noise and Vibration (7.2)	Noise pollution and vibration (Section 7.2)	MP7.6 – Noise & Vibrations
Blasting (7.2)	Blasting (Section 7.2)	MP7.2 – Safety & Security MP7.6 – Noise & Vibrations
Archaeology (7.2 & 8.4)	Impacts on archaeological resources (7.2 & 8.4.1)	MP7.9 – Archaeology
Visual (7.2)	Visual impact (7.2 & 8.2)	MP7.8 – Visual
Socio-economic (7.2)	Economic (income and employment) impact due to change of land use (7.2)	MP7.1 – Stakeholder consultation
	Impact on surrounding land users (7.2)	MP7.2 – Safety & Security
	Employment and skills development (7.2)	MP7.11 – Socio-Economic
	Community health, safety and security (7.2)	
Traffic (7.2)	Traffic Impact (7.2)	MP7.10 - Traffic

1.1 KEEPING EMPs UP TO DATE

It is the intention that this EMP should be seen as a “living document” which will be amended during the operation, as the activities might change or new ones be introduced.

This is in accordance with Section 50 (g) of the Minerals (Mining and Prospecting) Act, 33 of 1992, which states that the holder of a mining licence shall undertake the periodic review of the EMP(s) should circumstances change.

Should a listed activity(s) as defined in the Environmental Impact Assessment Regulations: Environmental Management Act, 2007 (Government Gazette No. 4878) be triggered (as a result of future modifications/changes at the mine), this EMP will be updated as a result of another EIA process as stipulated in the regulations.

Taking the above mentioned requirements into consideration, the existing EMP was updated as a result of the proposed Okorusu Mine expansion and the resulting (2013) EIA process.

1.2 DETAILS OF THE PERSONS WHO PREPARED THIS EMP

SLR Namibia (Pty) Ltd (SLR), the independent firm of consultants who undertook the EIAs has also compiled this EMP.

Simon Charter, with the assistance of Werner Petrick, who are both Environmental Practitioners from SLR, prepared this EMP. Simon Charter, the EIA project manager, has 7 years of experience of EIA preparation, compilation of EMPs, conducting audits and reviewing relevant reports. Werner Petrick has over sixteen years of relevant experience in conducting/managing EIAs, compiling EMPs and implementing EMPs and Environmental Management Systems.

2 SCOPE OF EMP

The components of the EMP are included in table 2.1 below.

TABLE 2.1: CONTENT OF THE EMP

EIA Regulation requirement	Reference in the EMP
Details of the persons who prepared the EMP and the expertise of those persons to prepare an environmental management plan.	Section 1.2
Information on any proposed management or mitigation measures to address the environmental impacts that have been identified in a report contemplated by these regulations, including environmental impacts or objectives in respect of – <ul style="list-style-type: none"> i. Planning and design ii. Construction activities iii. Operation or undertaking of the activity iv. Rehabilitation of the environment v. Closure, where relevant 	Section 7
A detailed description of the aspects of the activity that are covered by the EMP.	Sections 4 & 5
An identification of the persons to be responsible for the implementation of the mitigation measures.	Sections 5 & 8
Where appropriate, time frames within which the measures contemplated in the EMP must be implemented.	Section 8
Proposed mechanisms for monitoring compliance with the EMP and reporting on it.	Sections 7 & 9

3 ENVIRONMENTAL LEGISLATION

3.1 INTRODUCTION

Okorusu complies with all Namibian legislation, and where legislation is lacking will comply with international best practice procedures.

Table 3.1 provides a summary list of the relevant legislation.

TABLE 3.1: LIST OF LEGISLATION RELEVANT TO MINING IN NAMIBIA

Year	Name
Current Namibian legislation & Bills	
1990	Petroleum Products and Energy Act No. 13 of 1990, as amended
1990	The Constitution of the Republic of Namibia of 1990
1992	The Labour Act, No. 6 of 1992
1992	The Minerals (Prospecting and Mining) Act No. 13 of 1992
1997	Regulations relating to the Health and Safety of Employees at Work (promulgated in terms of Section 101 of the Labour Act, No. 6 of 1992 (GN156, GG 1617 of 1 August 1997)
1998	Affirmative Action (Employment) Act No. 29 of 1998
1997	Namibian Water Corporation Act, No. 12 of 1997
1998	The Health Act No. 21 of 1998
1999	Road Traffic and Transport Act No. 22 of 1999
2000	Petroleum Products regulations
2000	Electricity Act No. 2 of 2000
2000	Explosives Act of 2000
2001	The Forestry Act No. 12 of 2001
2003	Pollution control and waste management bill, 2004
2004	Water Resources Management Act, 2004
2004	National Heritage Act No. 27 of 2004
2007	Labour Act No. 11 of 2007
2005	Atomic Energy and Radiation Protection Act No. 5 of 2005
2007	Electricity Act, No. 4 of 2007
2007	Environmental Management Act No. 7 of 2007
Former South African and SWA legislation still applicable in Namibia	
1919	Public Health Act No. 36 of 1919
1956	Water Act No. 54 of 1956
1956	Explosives Act No. 26 of 1956

Year	Name
	Regulations promulgated in terms of the Explosives Act No. 26 of 1956
1968	Regulations made under the provisions of the Mines, Works and Minerals ordinance, 1968 (Ordinance 20 of 1968)
1969	Soil Conservation Act No. 76 of 1969
1974	Hazardous Substances Ordinance No. 14 of 1974
1975	Nature Conservation Ordinance No. 14 of 1975
1976	Atmospheric Pollution Prevention Ordinance No. 11 of 1976
Namibian policy	
1994	Policy for the Conservation of Biotic Diversity and Habitat Protection
1995	Namibia's Environmental Assessment Policy for Sustainable Development and Environmental Conservation
1998	Draft White Paper on the Energy Policy of Namibia
1999	Policy for Prospecting and Mining in Protected Areas and National Monuments
2000	National Water Policy White Paper
2004	Minerals Policy for Namibia
International law to which Namibia is a signatory	
1985	Vienna Convention for the Protection of the Ozone Layer
1987	Montreal Protocol on substances that deplete the Ozone Layer
1989	The Basel Convention on the Control of Trans-boundary Movements of Hazardous Wastes and their Disposal
1989	The Rotterdam convention on the Prior Informed Consent Procedure for Certain Hazardous chemicals and Pesticides in International Trade
1992	The Rio de Janeiro Convention on Biological Diversity
1992	United Nations Framework Convention on Climate Change

3.2 PERMITS

Okorusu holds an exclusive prospecting licence (EPL) (EPL No. 2724), which they wish to convert to a Mining Licence (ML), and a Mining Licence for the current Okorusu Mine area (ML 90). Table 3.2 summarises the notification, registration, approval and permits relating to environmental aspects. Table 3.3 identifies the permits and certificates that Okorusu may be required to apply for in due course.

TABLE 3.2: NOTIFICATION, REGISTRATION, APPROVAL AND PERMITS

Issue	Act/Section	Type of requirement/Ministry
Mining licence	Section 91(f)	Approval of EIA and

Issue	Act/Section	Type of requirement/Ministry
		EMP/MME and MET
Written permission of the MC to erect any accessory works	Section 90 (2) (a)	Written permission from MC/MME
Permission to sell, discharge, etc. Minerals won	Section 102 (1)	Permission from MC/MME
Permit to store and handle explosives on site	Explosives Act No. 26 of 1956	Permit
Stipulates the use of public water for industrial purposes	Water Act, No 54 of 1956 Section 11 (1) – (7)	Permit
Sets out the requirements to obtain a permit to use public water for industrial purposes	Section 12 (1) – (9)	Permit
Water Abstraction permit – WA002	Section 13 (2)	Permit
Stipulates the purification of waste water and discharge	Section 21 (1) (2) (3) (4) (5) & 22	Permit for industrial waste water and effluent disposal/ water abstraction/ Directorate of Water Affairs in MAWF
Picking and transport of protected plants	Nature Conservation Ordinance, No. 4 of 1975 Section 73	Plant removal permit/Approval of landowner/Directorate of Parks and Wildlife in MET or NBRI
Picking, removal of protected plants	Section 73	Permit/DPW in MET
Sale, donation, export and removal of protected plants	Section 74	Plant export permit /MET
Cultivation of protected plants in nursery (if required)	Section 75	Permit/MET
Scheduled processes in controlled area	Atmospheric Pollution Prevention Ordinance, No. 11 of 1976 Section 5(1)	Air pollution control certification/Ministry of Health and Social Service (MHSS)
Registration, selling, operating, installing of infrastructure related to Group I and III hazardous substances	Hazardous Substance Ordinance, No. 14 of 1974 Section 5 (1)(a)(b)(c)	Licences required for the sale, use and storage of “hazardous substances”, which are specified in certain groups.

Issue	Act/Section	Type of requirement/Ministry
		MET and MHSS
Disturbing or destroying of national heritage sites (archaeological/paleontological sites)	National Heritage Act, 2004 Section 48 – 52 and 55	Requirement to obtain consent in terms of section 55 before altering or developing any land in which an archaeological object or paleontological site is believed to be located. National Heritage Council
Consumer installation certificate	Petroleum Product Regulations, 2000 Section 18 (5)	Certificate/licence MME, Department of Energy
Actions to be taken after a spill has occurred (major petroleum spill means 200 l per spill)	Section 49(1)(4)	Notification/MME, Department of Energy
Storage and use of explosives	Explosive Act, 1956 Section 22	Permit/MME
30-days notification prior to commencement of construction	Labour Act, 1992, Regulations for Labour Act 1992 Section 20	Notification/Ministry of Labour (MoL)
30-days notification prior to commencement of mining operation	Section 21	Notification/MoL
Transport/operating licence to transport goods on public roads	Roads Traffic and Transport Act, 1999 Section 60	Licence/Ministry of Works, Transport and Communication
Approval to work on Sundays, public holidays and continuous operation	Section 33	Approval/Ministry of Labour
Company must inform Chief Inspector (Ministry of Health and Social Services) before commencing building or construction work on the mine	Regulations concerning the Health and Safety of Employees at Work, 1997 (Government Notice 156 of 1997)	Ministry of Health and Social Services and Notification to MME
VAT registration	Value Added Tax Act, 2000	Certification
Tax registration	Income Tax Act, 1981	Certification
Social Security	Social Security Act, 1994	Registration

Issue	Act/Section	Type of requirement/Ministry
	Section 20	
Valid Affirmative Action compliance certificate	Affirmative Action Act, 1998 Section 42	Certification

TABLE 3.3: LIST OF PERMITS OR CERTIFICATES THAT ARE REQUIRED

Permit name	Regulator
Mining licence	MME
Environmental clearance for EIA and EMP	MET
Consumer installation certificate (Fuel farm)	MME
Water abstraction and discharge (NamWater)	Ministry of Agriculture, Water and Forestry (MAWF)
Disposal of domestic and industrial water/solid waste	MET/MAWF
Disposal of domestic and industrial effluent	MET/MAWF
Licence for explosives magazine	MME
Explosive burning permit	MME
Registration certificate for scheduled process	MME

4 PROJECT OVERVIEW

4.1 INTRODUCTION

The E-Ore body has always been known to exist from mapping done by P. Van Zijl in the 1950's. In the mid 1950's, IMEX, a subsidiary of ISCOR, conducted limited exploration at the E-Ore body, which included trenching and diamond drilling but no data is available. It was not until 2010 that, with the knowledge of the capabilities of DMS technology on Okorusu ores, Okorusu pursued an objective of doing follow up work and extensive exploration at E-Ore body.

Mineral rights on the farms Okorusu 88 and Brandenburg 87 are held by Okorusu Fluorspar (Pty) Ltd under Mining Licence 90 and Exclusive Prospecting Licence 2724.

The E and F Ore bodies are located in the state owned resettlement farm, Okorusu, and straddles the boundary of Mining Licence 90 and Exclusive Prospecting Licence 2724. About a quarter of the known strike length of the E-Ore deposit lies outside the current mining licence (ML 90), inside EPL 2724. The whole F-Ore body lies outside of the current mining licence (also inside EPL 2724)

Okorusu Fluorspar is in the process of applying for a new Mining Licence north of the existing Mining Licence (90) boundary, which would encompass the northern extensions of E-Ore body and the F-Ore body, allowing Okorusu to mine the full extent of both deposits. This environmental clearance application includes, amongst others the activities within the proposed new ML in support of the ML application.

The proposed crushing and screening plant will facilitate the crushing of the ore mined from the proposed new open pits. The rest of the processing and supporting infrastructure will be done using the current facilities within ML 90. Construction of facilities will take a maximum of 12 months.

The E-Ore deposit is located 4km due east of the current mining operations in farm Okorusu 88. The deposit lies at an elevation of 1540 meters above sea level at the edge of a mountain. To the north, the F-Ore deposit lies on a flat plain.

The proposed layout of the additional infrastructure is indicated in the figure below:

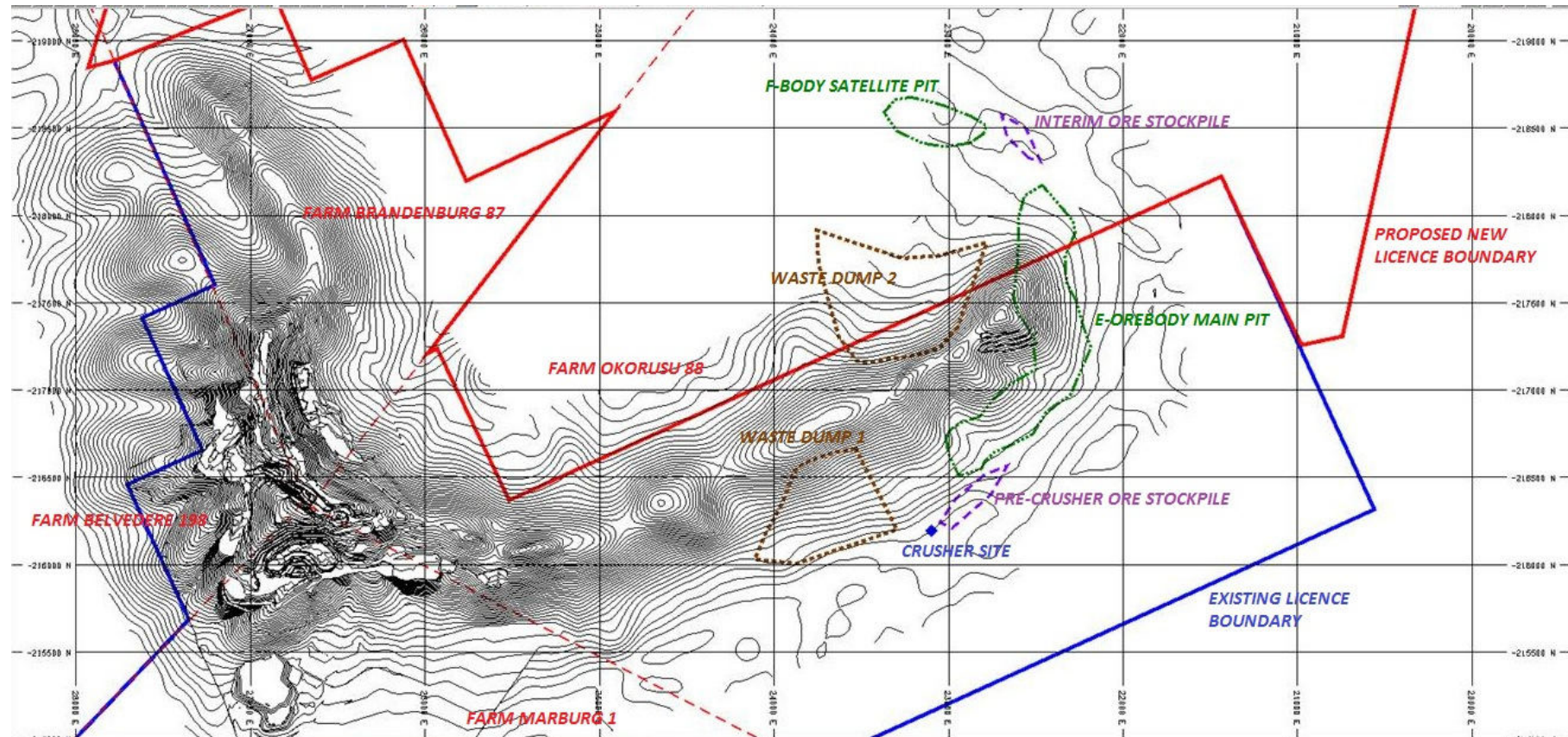


FIGURE 4.1: PROPOSED EXPANSION LAYOUT

4.1.1 CONSTRUCTION PHASE

4.1.1.1 Crushing and screening plant

The crushing and screening plant will be constructed to the south west of the E-Ore body and to the east of WRD 1 (refer to Figure 4.1). The construction of the crushing and screening plant will involve:

- Removal of vegetation
- Stripping and stockpiling topsoil
- Earthworks
- Construction of plant

4.1.1.2 Additional supporting activities on site

The location of the additional supporting activities are indicated in Figure 4.2:

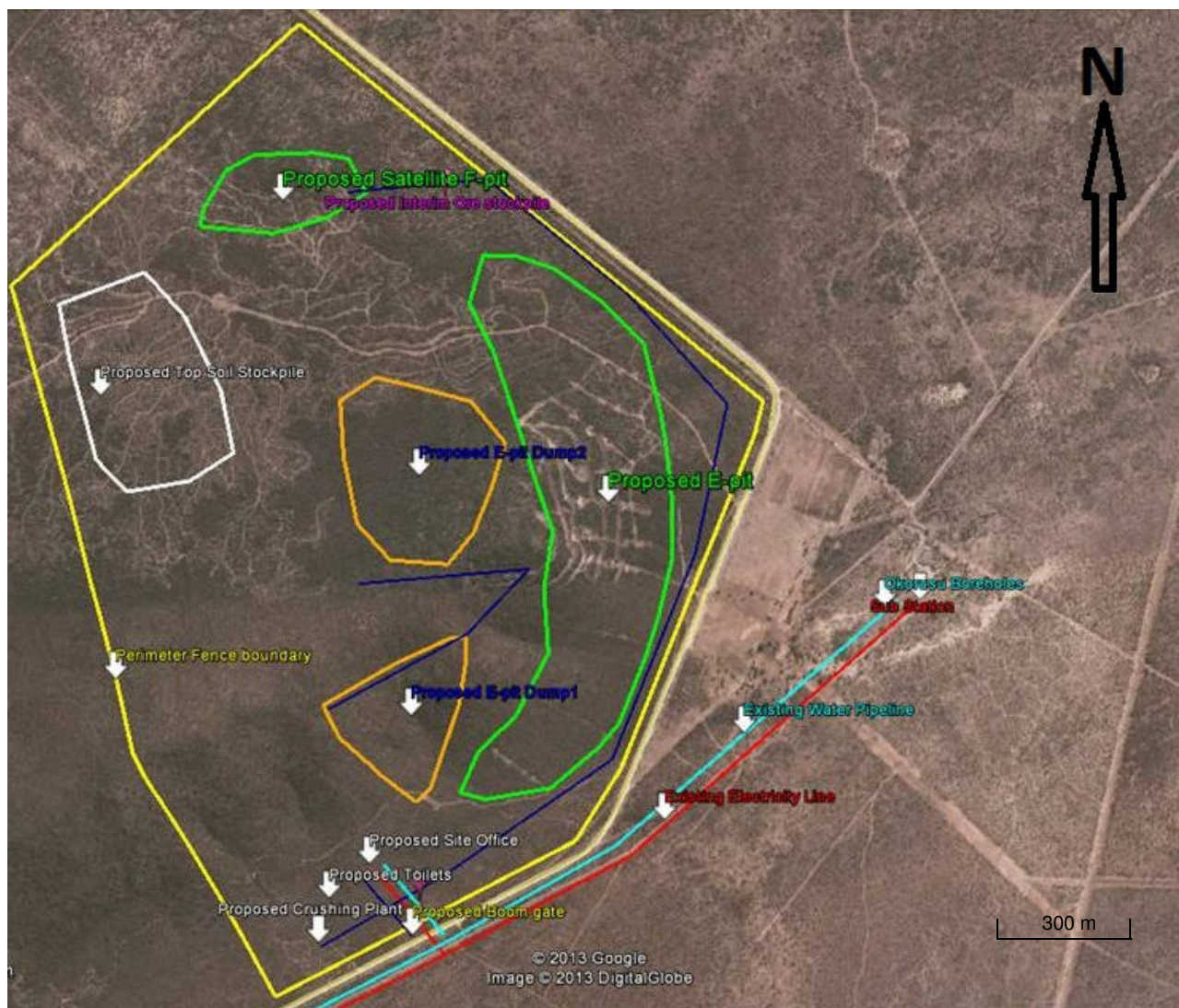


FIGURE 4.2: SUPPORTING INFRASTRUCTURE LOCATIONS

(Image source: Google Earth)

4.1.1.2.1 Ablution facilities

During construction, portable chemical toilets will be utilised.

Ablution facilities draining into septic tanks will be constructed. These septic tanks will be drained on a regular basis and the sewage will be disposed of within the existing sewerage facility on site.

4.1.1.2.2 Power and water supply infrastructure

Power will be obtained by tapping into the existing Okorusu Borehole power supply line. Water will be obtained by connecting to the primary mine water supply line from the Okorusu Boreholes. Refer to Figure 4.2 for the locations of the current power supply line and water pipeline, as well as the locations of the electrical and water tie-in points.

4.1.1.2.3 Waste collection and storage areas

Waste bins for the collection of general waste will be provided within the expansion areas. These bins will be emptied on a regular basis and the waste disposed of at the existing landfill facility within the existing mine complex.

Hazardous waste will be temporarily stored within the existing temporary storage facilities on site. This waste will be disposed of at the Kupferberg Hazardous Waste Disposal Facility along with the existing hazardous waste stream from the mine.

4.1.1.2.4 Explosives magazine

The existing accessory explosive magazines will be utilised for the proposed expansion. No additional explosive magazines will be required.

4.1.1.2.5 Refuelling area

The existing refuelling area will be utilised for the proposed expansion activities. Refuelling in the expansion area will be from mobile bowsers (over spill trays). No additional refuelling facilities will be required.

4.1.1.2.6 Access roads

No additional access roads will be required for the proposed expansion. The existing access road around the southern and western side of the Okorusu Mountain (D2463) will be utilised to haul the material from the crushing and screening plant to the existing processing plant.

4.1.1.2.7 Access control

The entire proposed expansion area will be fenced off in order to ensure security on site. A security controlled boom gate will be installed at the entrance to the site (refer to Figure 4.2 for the location of the boom gate and security fence).

4.1.1.2.8 Site offices

Mobile site offices will be placed on site. The site on which the mobile home will be placed will be cleared and leveled, but no further construction will be required.

4.1.1.3 Construction staff

No outside contractors will be brought in for the construction activities. Okorusu will utilise their existing workforce to carry out all construction activities.

4.1.2 OPERATION PHASE

4.1.2.1 Mining

The ore body will be mined by conventional open pit mining methods. Drill, blast, load and haul techniques will be implemented. Okorusu is currently successfully mining a similar deposit in geometry at D-Ore body.

The table below includes the top and bottom elevations of the proposed pits as an indication of pit depth.

TABLE 4.1: PROPOSED PIT TOP AND BOTTOM ELEVATIONS

PIT	Top Elevation (m)	Planned Bottom Elevation (m)	Area (M ²)
E-PIT	1535	1300	559451
F-PIT	1420	1370	83650

4.1.2.2 Mineral processing

The ore will be crushed on site within the proposed crushing and screening plant to about 13mm in size, and conveyed to the DMS plant for pre-treatment, upgrading it from about 20% to above 30%. The DMS concentrate is then milled to about 90% passing 250 microns, and further processed by flotation to produce a 97% pure acid grade filter cake.

It is important to note that there will be no changes to the current process plant and the overall throughput will remain roughly the same as it is at present. This is because the proposed expansion activities will be replacing the existing activities that have reached their end of life. There will therefore also be no changes required for the existing tailings dam which still have sufficient capacity. The overall mine throughput will remain roughly the same as it is at present.

4.1.2.3 Additional WRDs

As indicated on Figure 4.1, two additional WRDs will be required on site (one associated with each new pit).

The WRD heights are indicated in Table 4.2.

TABLE 4.2: PROPOSED WRD HEIGHTS

DUMP	Top Elevation (m)	Bottom Elevation - Toe (m)	Overall height – top to toe (m)	Area (M²)
DUMP1	1520	1410	110	109084
DUMP2	1525	1430	95	194102

4.1.2.4 Topsoil stockpiles

As mentioned previously, topsoil preservation and management is a major priority with regard to the proposed mine expansion. Topsoil will be stripped to 30cm where possible and stored at the location indicated in Figure 4.2. A Soil Management Plan is included in the Amended EMP (Section **Error! Reference source not found.**).

4.1.2.5 Additional supporting infrastructure

A description of the additional supporting infrastructure required (and therefore required during operation) is described in Section 4.1.1.2. A summary is presented below:

4.1.2.5.1 Ablution facilities

Ablution facilities draining into septic tanks will be utilised. These septic tanks will be drained on a regular basis and the sewage will be disposed of within the existing sewerage facility on site.

4.1.2.5.2 Waste collection and storage areas

Waste bins for the collection of general waste will be provided. These bins will be emptied on a regular basis and the waste disposed of at the existing landfill facility within the existing mine complex.

Hazardous waste will be temporarily stored within the existing temporary storage facilities on site. This waste will be disposed of at the Kupferberg Hazardous Waste Disposal Facility along with the existing hazardous waste stream from the mine.

4.1.2.5.3 Access control

The entire proposed expansion area will be fenced off in order to ensure security on site. A security controlled boom gate will be installed at the entrance to the site.

4.1.2.5.4 Site offices

Mobile site offices will be utilised within the proposed expansion area.

4.1.2.6 Staff and transport

No additional staff will be required for the proposed expansion activities due to the fact that they will replace the existing activities which have reached the end of life. The current workforce, and the transport thereof, will therefore remain the same as it is at present.

4.2 DECOMMISSIONING AND CLOSURE PHASE

At a conceptual level, decommissioning can be considered a reverse of the construction phase with the demolition and removal of the majority of infrastructure and activities very similar to those described with respect to the construction phase.

The mine is currently in the process of developing a Mine Closure Plan

4.2.1 CLOSURE OBJECTIVES

The overall purpose of the Mine Closure Plan for Okorusu Mine is to become an integral part of the mine's remaining life cycle to ensure that:

- future public health and safety are not compromised;
- the environment and resources are not subject to physical and chemical deterioration;
- the after-use of the site is beneficial and sustainable in the long-term;
- any adverse socio-economic impacts are minimised; and
- all socio-economic benefits are maximised.

To achieve that, the objectives of the plan are as follows:

- To minimise adverse impacts on the environment.
- To prevent potential ground-water contamination.
- To stabilise rehabilitated ground (and residue deposits).
- To minimise erosion by wind and rain.
- To minimise adverse socio-economic impacts on the affected labour force and the population in the mine's environs.
- To provide opportunities for alternative forms of land use and sustainable business development after mine closure.
- To ensure that relevant authorities are kept informed according to the regulatory requirements.

4.2.2 DECOMMISSIONING ACTIVITIES

The table below indicates the impacts identified during the mine closure plan development process as well as the expected targets following decommissioning. Please note that the mine closure planning process is still underway and the targets identified below may shift during the process.

TABLE 4.3: IDENTIFIED IMPACTS AND EXPECTED RESULTS FROM DECOMMISSIONING

Aspect	Potential impact	Decommissioning targets
Scope – Workforce		
Socio-economic	Job losses Unemployment Early retirement	Skills diversification has been achieved. Accredited training to enable labour force to enter job market with qualifications has been conducted. Assistance has been provided to employees to find employment at other mines. It has been established that pension plans are adequate.
Scope - Otjiwarongo		
Economic	Reduced rates to Municipality and Regional Council and taxes to Receiver of Revenue	Stakeholders have been informed at an early stage to enable them to plan/reset budgets.
	Reduced turnover to local businesses	Stakeholders have been informed of decommissioning progress.
	Housing used by mine staff becomes available House prices and rents may fall	Stakeholders have been informed of decommissioning progress.
Social	Town population declines as workers and their dependants leave Increased pressure to deal with unemployment, alternative job opportunities, crime	Stakeholders have been informed of decommissioning progress
Scope - Domestic and office infrastructure (buildings, roads, French drain, etc.)		
Safety	Accidents due to lack of maintenance Health risk from unrehabilitated	All unwanted infrastructure has been demolished and disposed of in a safe manner (Depending on the final option, e.g. use of existing infrastructure)

Aspect	Potential impact	Decommissioning targets
	French drain	
Visual	Deteriorated buildings (ghost-town effect)	Restoration of original scenic environment has been achieved. (Depending on the final option, e.g. use of existing infrastructure)
Economic	Cost implication for future landowner	All unwanted infrastructure has been removed to increase value of real estate. (Depending on the final option, e.g. use of existing infrastructure)
Socio-economic	Socio-economic returns to the people of the region and to Namibia	A final option that utilises existing housing and infrastructure and brings maximum socio-economic returns to the people of Namibia has been identified.
Scope - Technical mine infrastructure (workshops, HEF plant, metallurgical plant, etc.)		
Biophysical: Soil	Pollution by oil and other chemicals	All potential contamination sources have been removed
Biophysical: Water	Pollution of surface water and groundwater	All potential contamination sources have been removed
Safety	Accidents due to lack of maintenance	All infrastructure has been demolished and disposed of in a safe manner (Depending on the final option, e.g. use of existing infrastructure)
Visual	Deteriorated buildings (ghost-mine effect)	Restoration of original scenic environment has been achieved. (Depending on the final option, e.g. use of existing infrastructure)
Economic	Financial gain by selling scrap	All scrap metal has been sold and removed from site
Socio-economic	Infrastructure to remain and be used/ maintained by new owners/users	Infrastructure which will be utilized by new owners/users has been identified. (Depending on the final option, e.g. use of existing infrastructure)
Scope - Disposal facilities (pipes, trenches, return water dams)		
Safety	Accident risk caused by deteriorating pipes on steep slopes	All unwanted infrastructure has been removed. (Depending on the final option, e.g. use of existing infrastructure)
Visual	Eye sore	All unwanted infrastructure has been removed.
Economic	Financial gain by selling scrap	All scrap metal has been sold and removed from site
Scope - Water infrastructure		

Aspect	Potential impact	Decommissioning targets
Economic	Loss of groundwater source	Ensure that the borehole has been left in good condition to be utilized by the future land owner.
Scope - Waste-rock dumps		
Safety	Long-term slope stability	All slopes have been stabilized to the best know technology.
Visual	Eye sore as unnatural landscape (steep angles)	A study to look at restoration options has been initiated.
Biophysical: Soil	Erosion and potential landslides caused by rainstorm events	Long-term vegetation growth has been established. Ecosystem structure and function within reasonable limits have been achieved.
Biophysical: Water	Environmental impacts of erosion and run-off Impact on local surface and near-surface water movement	A self-managing system for water control inclusive of extreme storm events without detriment to the integrity of the WRD structure or its surface-water diversion and run-off enhancement structures has been established. It has been established that the systems operate under extreme storm events without detriment to the integrity of the WRD structure Effective rehabilitation of all external slopes and surfaces to minimise erosion has been achieved.
Economic	Waste rock utilised for ballast and sold	The option to remove waste rock to prevent subsidence has been conducted. (High risk of mismanagement, rock slides, eye sores)
Scope – Tailings Dams		
Safety	Tailings become waterlogged; surface water collects and becomes a safety issue	Measures have been implemented to ensure controlled run-off from the tailings dams.
Visual	Eye sore	The tailings dams have been landscaped to match surrounding habitat.
Biophysical: Soil	Erosion Medium-term destruction of arable land	Effective rehabilitation of all external slopes and surfaces has been carried out to minimise erosion.
Biophysical: Fauna	Danger to wildlife	Measures have been implemented to ensure that the tailings facilities are no threat to wildlife.
Economic	High phosphate content has potential use as fertilizer	A feasibility study to commercially use the tailings dams has been conducted.
Scope - Open pits		

Aspect	Potential impact	Decommissioning targets
Safety	Steep benches provide risk of falls (humans and animals) Rock falls	Structural integrity of pit walls and potential for failure has been investigated. Access has been restricted. Public health and safety can be assured.
Visual	Eye sore	It has been investigated that weathering of rock material and natural re-vegetation over decades will occur.
Social / economic	Potential use for small scale mineral rock collection	A land-use plan that brings maximum socio-economic returns to the people of Namibia has been identified.

4.2.3 CLOSURE ACTIVITIES

All mining activities and processing operations will have ceased by the closure phase of the mining project. The potential for impacts during this phase will depend on the extent of demolition and rehabilitation efforts during decommissioning and on the features which will remain, such as the open pit and mineralised waste facilities.

5 ENVIRONMENTAL MANAGEMENT PLAN (ASPECTS AND IMPACTS)

Table 6-1 provides a description of the environmental aspects that are associated with Okorusu and how they impact the biophysical and human environments.

TABLE 5.1: DESCRIPTION OF ENVIRONMENTAL ASPECTS AND POTENTIAL IMPACTS ASSOCIATED WITH OKORUSU MINING OPERATIONS

Environmental aspects	Potential impact
Aspects associated with consumption of resources	
Energy use	<ul style="list-style-type: none">Energy Resource Depletion, remote impacts
Use of natural resources	<ul style="list-style-type: none">Natural Resource Depletion, loss of land (habitat), change in land-use potential, loss of future economic opportunities.
Use of manufactured materials	<ul style="list-style-type: none">Natural Resource Depletion, loss of land (habitat), change in land-use potential, loss of future economic opportunities.
Aspects associated with waste/pollution generation	
Emissions to air: -Fall-out dust -PM ₁₀ -PM _{2.5}	<ul style="list-style-type: none">Reduce visibility.Nuisance impact and Health impact.Impact on flora (cover of foliage in dust which reduces growth, health of plant, etc.)
Emission to land (solid and liquid non-hazardous waste)	<ul style="list-style-type: none">Visual pollution (e.g. littering).Pollution of water.Alteration of soil chemistry and/or composition.Safety and health.Scavenging by animals.
Emission to land (solid and liquid hazardous waste)	
Emission to water (domestic)	<ul style="list-style-type: none">Contamination of streams, dams and groundwater.Alteration of soil chemistry and/or composition.Impact on fauna and flora living in aquatic environments.Safety and health.Impact on surface water flow.
Emission to water (industrial)	
Emissions to land and water (medical waste)	
Sound or visual pollutants	
Noise	<ul style="list-style-type: none">Negative public perception – Nuisance impact.Change in animal behaviour.
Visual	<ul style="list-style-type: none">Change to the visual landscapeVisual impact (aesthetic quality of environment) - Negative public perception

Environmental aspects	Potential impact
	<ul style="list-style-type: none"> • Alteration in nocturnal activities of fauna and flora.
Blasting & Vibrations	<ul style="list-style-type: none"> • Impact on safety of third parties. • Impact on property – buildings and other infrastructure. • Impact on biodiversity.
Disturbance or alteration of ecosystems	
Disturbance of land	<ul style="list-style-type: none"> • Visual change in surroundings, scars, loss of biodiversity, damage to ecosystems, altered soil potential, change in land- use potential, loss of future economic opportunities.
Disturbance of biodiversity	<ul style="list-style-type: none"> • Impact on biodiversity (physical disturbance or general disturbance). • Reduction of water resource as an ecological driver.
Disturbance of water courses or groundwater	<ul style="list-style-type: none"> • Alteration of drainage patterns. • Surface and groundwater pollution. • Depletion in water levels in boreholes due to over pumping. • Depletion of community supply boreholes.
Disturbance or alteration of archaeology	
Disturbance of archaeological sites	<ul style="list-style-type: none"> • Damage to archaeological sites.
Socio-economic aspects	
Economic	<ul style="list-style-type: none"> • Direct contribution to Gross Namibian Income (GNI) of the mine during LoM • Reducing income inequality, increasing job creation and economic growth.
Inward migration	<ul style="list-style-type: none"> • Community health & safety and security impacts. • Stimulating the local economy and community organization • Increasing pressure on government services • Informal settlements
Change of land use	<ul style="list-style-type: none"> • Land may devalue due to mine development • Lowering of the groundwater and consequent long-term threat to sustainable farming • Loss of sense of place and subsequent loss of livelihoods from tourism during construction and operations. • Squatter camps and reduction of safety.
Traffic	<ul style="list-style-type: none"> • The high speed of the traffic using the road and the potential for road traffic accidents;

Environmental aspects	Potential impact
	<ul style="list-style-type: none">• Road deterioration due to road use by mine-related vehicles.• Loose gravel can lead to cracked windscreens; and• The presence of animals and the risk of collision.
Other (any aspect not considered to fall into the defined aspect categories)	
Emergency situation	<ul style="list-style-type: none">• There are a number of different situations which could arise, each with its own suite of impacts, e.g. fire will have an impact on air quality, health and safety, property, fauna and flora.

6 OVERALL ENVIRONMENTAL OBJECTIVES FOR THE EMP

The following overall environmental objectives have been set for the Okorusu Fluorspar Mine:

- To comply with national legislation and standards for the protection of the environment.
- To limit potential impacts on biodiversity through the minimisation of the footprint and the conservation of residual habitat within the mine area.
- To investigate and exploit measures to reduce resource and energy consumption.
- To keep surrounding communities informed of mining activities through the implementation of forums for communication and constructive dialogue.
- To limit contaminated effluent discharge into the environment through the containment, recycling or removal of contaminated water.
- To conserve soil resources by stripping, stockpiling and managing topsoil.
- To protect soils and groundwater resources through the implementation of measures for spill prevention and clean-up.
- To ensure the legal and appropriate management and disposal of general and hazardous waste, through the implementation of a strategy for the minimisation, recycling, management, temporary storage and removal of waste.
- To minimise the potential for dust emissions through the implementation of dust control measures.
- To minimise the potential for noise and vibration disturbance in surrounding areas.
- To protect cultural heritage by avoiding sites of significance, or, if this cannot be done, to ensure thorough documentation and the obtaining of necessary legal approvals thereof prior to destruction.
- To undertake rehabilitation wherever possible during the life of the mine.
- To incorporate final closure objectives in construction and mine planning.
- To develop, implement and manage monitoring systems to ensure good environmental performance in respect of the following: ground and surface water, air quality, noise and vibration, biodiversity and rehabilitation.
- To ensure the health and safety of surrounding communities through access control and a community wellness programme.
- To support and encourage environmental awareness and responsibility amongst all employees and service providers.
- To provide appropriate environmental education and training for all employees and service providers.
- Prevent and minimise pollution.
- To incorporate the relevant requirements stipulated in this EMP into the design.
- To ensure the all the contractors adhere to the construction related management commitments.
- Ensure compliance to the EMP.

7 MANAGEMENT PROGRAMMES

The management programmes (MPs), listed in the table below, are applicable to all the relevant activities and facilities of the Okorusu Mine. (The MPs follow in the subsequent sections).

TABLE 7-1: VARIOUS MPS AND NUMBERS

Number	Management programme (MP)
7.1	Stakeholder Consultation/Communication MP
7.2	Safety and Security MP
7.3	Surface water/storm water MP
7.4	Groundwater MP
7.5	Air Quality MP
7.6	Noise & Vibrations MP
7.7	Biodiversity MP
7.8	Visual MP
7.9	Archaeology MP
7.10	Traffic MP
7.11	Socio-Economic MP
7.12	Resource MP
7.13	Soil MP
7.14	Waste Management MP

7.1

Stakeholder

Consultation/Communication MP

7.1 STAKEHOLDER CONSULTATION/COMMUNICATION MANAGEMENT PROGRAMME

It is important that channels of communication are maintained over the life of the project for surrounding landowners and other relevant stakeholders. Table 7.1 shows the stakeholder communication management programme.

7.1.1 COMPONENTS

This plan is made up of the following components:

- General Stakeholder communication.

7.1.2 MANAGEMENT AND MITIGATION

7.1.2.1 General Stakeholder communication

Objectives

To ensure that ongoing feedback is provided on the relevant mining activities, together with feedback on the environmental management performance of the mine and that opportunity is provided for interested and affected parties to raise comments and concerns (complaints) on the same. Also, to ensure communication/ engagement strategies meet the needs of stakeholders.

Actions

TABLE 7.1: ACTIONS RELATING TO STAKEHOLDER COMMUNICATION

No	Issue	Management commitment
These commitments apply to <u>all phases</u> of the mining operation		
1	Understanding who the stakeholders are	Maintain and update the stakeholder register, including stakeholders' needs and expectations. Ensure that all relevant stakeholder groups are included.
2		A representative database would include government, employees, service providers, contractors, indigenous populations, local communities, NGOs, shareholders, customers, the investment sector, community-based organizations, suppliers and the media.
3		Ensure that marginalised and vulnerable groups are also considered in the stakeholder communication process.
4		Record partnerships as well as their roles, responsibilities, capacity and contribution to development.
5	Liaising with interested and affected parties at all phases in the mine life	Devise and implement a stakeholder communication and engagement strategy

No	Issue	Management commitment
6	Cooperative working relationship with stakeholders	As far as is feasible, fully inform identified stakeholders about the mine's activities.
7		Use appropriate communication channels to consult with and disseminate information to the public, and for this purpose should develop a communication procedure.
8		Communication channels could include: open days, with particular attention being paid to the accessibility of venues, newsletters for both employees and the public, national and local newspapers, television, radio, email, telecommunication (via sms) and the internet, an annual sustainable development report.
9	Managing perceptions and issues/complaints	Develop and implement a concerns/complaints (grievance) process for the public and publicise the channels through which complaints and comments can be submitted to the company. Respond immediately to all complaints and comments on receipt, introduce a "Third Party" if the grievance / complaint cannot be resolved between Okorusu and the affected party and keep complete records of complaints, responses and actions taken. Document all complaints in the external communications register. Investigate and respond to the complainant.
10	Safety of 3 rd parties	Through appropriate communication and inductions, provide information to educate third parties about the dangers associated with hazardous excavations and infrastructure.
11	Monitoring	Monitor changes in the communities of interest.
12		Develop audit criteria for monitoring the performance of its stakeholder engagement and communication strategies as well as relations between the company and its stakeholders.

7.2

Safety & Security MP

7.2 SAFETY AND SECURITY MANAGEMENT PROGRAMME

It is essential that safety and security measures are defined and implemented to adequately protect the mine site from being accessed by unauthorized people. An emergency response plan for incidents is also essential.

Note that a separate Occupational Health and Safety Plan shall have been developed for the mining activities and does not form part of this EMP.

7.2.1 COMPONENTS

This plan is made up of the following components:

- General (third party) safety and security.
- Occupational Health & Safety.

7.2.2 MANAGEMENT

7.2.2.1 General (third party) safety and security

Objectives

The objective of the management measures is to prevent physical harm to third parties and animals from potentially hazardous excavations and infrastructure.

Actions

TABLE 7.2: ACTIONS RELATING TO GENERAL (THIRD PARTY) SAFETY AND SECURITY

No	Issue	Management commitment
These commitments apply to <u>construction, operation and decommission</u> phases		
1	Access of unauthorised people	Warning signs will be erected and maintained at the site boundary and the working area of the mine will be fenced.
2		Security control points will be in place, to prevent uncontrolled vehicle access to existing and future mining, stockpile and waste facility areas during the construction, operation and decommissioning phases.
3		Any person entering the mine area (pit & plant) will only be allowed after formal induction.
4	Emergency	Develop and implement an emergency response plan for third parties falling into or off hazardous excavations and causing injury.
These commitments apply to <u>operation and decommission</u> phases		
5	Safety Risks	Permanent aboveground waste facilities and stockpiles will be rehabilitated in a manner that they present land forms that will be stable, protected from flood damage, and slopes will be re-vegetated.
6		Any mining voids that remain open will be made safe to ensure that there is no risk to the safety of people and animals.

These commitments apply to <u>design, construction and operation</u> phases		
7	Safety Risks	The permanent above ground waste facilities will be designed, constructed and operated in a manner that stability is a priority, flood protection is provided and the risk of failure is limited to acceptable levels.

7.2.3 OCCUPATIONAL HEALTH & SAFETY

Occupational health and safety aspects of the proposed Okorusu Fluorspar Mine do not form part of this EMP. Okorusu will adhere to all the relevant Namibian Legislation regarding health and safety and implement a formal health and safety management system. The main components which should be included in such a management system are summarised below.

The objectives of the health and safety management system will be to ensure:

- A healthy and safe work environment.
- Safe systems of work.
- Safe plant and equipment.
- The availability of such information, instruction, and training as required for worker health and safety.

Health and safety induction will be a requirement for all employees and contractors. All visitors will be required to attend a site induction prior to accessing the mine site. Specific training sessions will be developed and provided to employees requiring specific health and safety skill sets.

Health and safety audits will be routinely scheduled. Ad hoc audits will be done more frequently to follow up on concerns and/or non-compliances. Incident reporting and management augments the audits.

All hazardous chemicals used on site will have readily available material safety datasheets (MSDSs). Chemical hazards training will be an integral part of safety training and induction. Procedures will be developed for the use and handling of all dangerous chemicals. Correct personal protective equipment will be supplied.

7.3

Surface Water MP

7.3 SURFACE WATER MANAGEMENT PROGRAMME

Water is a scarce resource in Namibia, Okorusu will undertake its operations to maximise the recycling and reuse of water.

Industrial effluent (from the plant, laboratory, wash bay and storm water drains) will be recycled into the plant if it is suitable for use in the process. The aim is to have a facility that does not discharge effluent into the environment. Treated effluent from the sewage plant and decant water from the tailings disposal facilities will also be re-used in the plant.

Domestic effluent includes grey water from the laundries, shower blocks and kitchens and sewage from the ablution facilities. During construction the sewerage from the septic tanks will be disposed of at the existing sewerage facility on site. Sewage water is collected and discharged into septic tanks followed by French drains and evaporation ponds.

Tailings Slurry is another industrial effluent and will be pumped to the TSF via slurry pipelines. TSF management is dealt with in the Groundwater section.

Hydrocarbons

Used hydrocarbons are hazardous liquid wastes and will be disposed of in compliance with Namibian legislation.

There are a number of sources in all project phases that have the potential to pollute surface water, particularly in the unmanaged scenario. In the construction and decommissioning phases these potential pollution sources are temporary in nature, usually existing for a few weeks to a few months. Although these sources may be temporary, the potential pollution may be long term. The operational phase will present more long term potential sources and the closure phase will present final land forms that may have the potential to contaminate surface water through long term seepage and/or run-off.

Refer to Section 7.3 for conceptual stormwater management requirements.

The commitments derived from the EIA Report with regards to surface water, form the basis of this MP:

7.3.1 COMPONENTS

This plan is made up of the following components:

- Altering drainage patterns.
- Pollution of surface water – general.
- Industrial effluent.
- Domestic effluent.
- Spills.

7.3.2 MANAGEMENT

7.3.2.1 Altering drainage patterns

Objectives

The objective of the management measures is to minimise mixing of clean and dirty water systems.

Actions

TABLE 7.3: ACTIONS RELATING TO THE ALTERING OF DRAINAGE PATTERNS

No	Issue	Management commitment
These commitments apply to all <u>phases</u>		
1	Natural flow of storm water (clean and dirty) flowing from surrounding areas into and around the operations.	Design all storm water interventions in such a way that storm water can bypass the major structures such as the TSF, and the WRD and low grade stockpiles. Ensure that these facilities are designed, constructed and operated that flood protection is provided.
These commitments apply to <u>construction and operation</u> only		
2	Flow of dirty storm water (rain water that falls onto and flows across the site)	Construct engineered structures to direct contaminated water from the processing areas, roads and offices areas to the return water dam circuit for storage and re-use.

7.3.2.2 Impacts on surface water quality - general

Objectives

The objective of the management measures is to prevent pollution of surface water run-off.

Actions

TABLE 7.4: ACTIONS RELATING TO THE MANAGEMENT OF SURFACE WATER – GENERAL

No	Issue	Management commitment
These commitments apply to <u>design, construction and operation</u> phases		
1	Clean & dirty water separation	Where possible, surface water management facilities will be designed, constructed and operated so that dirty water is kept separate from clean water run-off through a system of berms, channels, trenches, flood protection

No	Issue	Management commitment
		measures, erosion protection or dams. The need for long term controls around the waste rock dump will be determined as part of closure planning
These commitments apply to <u>construction, operation and decommissioning phases</u>		
2	General surface water pollution/spills	All hazardous chemicals (new and used), dirty water, mineralised wastes, concrete batching activities and non-mineralised wastes are handled in a manner that they do not contaminate surface water run-off or where this is not possible, demonstrate (through monitoring) that the potential contamination is within acceptable limits from a human health and related risk perspective.
3		Prevent pollution through infrastructure design and through education and training of workers (permanent and temporary)
4		The required steps to enable fast reaction to contain and remediate pollution incidents. In this regard the remediation options include in situ treatment or disposal of contaminated soils as hazardous waste. The former is generally considered to be the preferred option because with successful in situ remediation the soil resource will be retained in the correct place. The <i>in situ</i> options include bioremediation at the point of pollution, or removal of soils for washing and/or bio remediation at a designated area after which the soils are replaced
5		Ensure that on-site contractors have all the necessary hazardous protection equipment for people and the environment in the advent of a spill.
6		Verify fuel transport company's spill containment (emergency clean up) plan and spill clean-up agreement is in place. Ensure that fuel transporting companies adhere to the Petroleum Products and Energy Act (13 of 1990) and Regulations
7		Establish and maintain concrete bunded areas around all diesel generators, where required.
8		Maintain and implement spill management procedure, including the clean-up of hydro-carbon spills.
9		Ad hoc spills will be cleaned up/remediated immediately in line with spillage management procedure.
10		Place spill kits in all areas where hazardous substances are dispensed and stored and train staff to use it.
11		Specifications for post rehabilitation audit criteria to ascertain whether the remediation has been successful.
12	Mine infrastructure	Ensure that where mine infrastructure becomes damaged or causes surface water contamination they are adequately repaired and maintained.

No	Issue	Management commitment
13	Emergency	Major spillage incidents that contaminate flood waters will be handled in accordance with the Okorusu emergency response procedure and reported to the authorities as stipulated in the Namibian legislation.
14	Training and awareness	Induct all employees and contractors in Okorusu's spillage management procedure.
15		Train selected staff in the remediation of soils or water contaminated by hydrocarbon spills.
16	Safe disposal and rehabilitation of hydrocarbon contaminated soils and water	Develop and implement a hydrocarbon remediation procedure that explains how to deal with the treatment of contaminated environments (soil and water).
17	Monitoring of hydrocarbon spills	Ensure that checking for hydrocarbon spills is included in the daily inspections.
18		Report spillages as per the incident management procedure and Namibian legislation.

7.3.2.3 Industrial effluent

Objectives

The objective of the management measures is to prevent pollution of surface water, etc. due to industrial effluent.

Actions

TABLE 7.5: ACTIONS RELATING TO INDUSTRIAL EFFLUENT

No	Issue	Management commitment
These commitments apply to <u>operation phase only</u>		
1	Discharge	Ensure that no discharge takes place (closed system).
2	Spillage of industrial effluent	Prevent spillages of industrial effluent. Where spillage does occur, ensure it is properly contained.
3		Ensure that checking for industrial effluent spills is included in the daily inspection checklist.
4		Report spillages as per the incident management procedure and clean up spills within 24 hours of the incident occurring.
5	Pollution of soil	In the event of industrial effluent discharge into the environment, stop the

No	Issue	Management commitment
	and / or water	incident as soon as possible and then find the root cause.
6	when spillage or discharge occurs.	In the event of soil or water pollution, spills will be cleaned up/remediated immediately (within 24 hours) in line with spillage management procedure.
These commitments apply to <u>construction, operation and decommissioning</u>		
7	Prevent industrial effluent from polluting	Ensure that the various effluent streams (tailings decant, treated effluent dirty storm water, process effluent) are managed to prevent overflow of the return water dam.
8	the environment (return water dam)	Ensure that a freeboard is maintained to accommodate run-off during a 1:50 year storm event.
9		Monitor the effectiveness of the mitigation measures (e.g. liner) for damage to ensure that seepage does not occur.
10		Ensure that storage/containment facilities have sufficient capacity to cater for the various sources of water including rainfall.
11	Discharge of industrial effluent	Ensure that all the industrial effluent is discharged into the return water dam and the TSF (slurry).
12	to the return water dam and TSF	Install oil separators at all wash bays to separate hydrocarbons from the water. Send the water to the return water dam.
13		Skim separator regularly and dispose of hydrocarbons as per the waste management procedure.
14	Spillage of industrial effluent	Maintain pipes, drains, pumps, valves, etc. to minimise the likelihood of leaks.
These commitments apply to <u>construction and operation only</u>		
15	Prevent industrial effluent from polluting the environment	Recycle all process water from the process dam back into the plant as per the design specifications.
16	Storage and disposal of liquid waste (hydrocarbons)	All liquid hydrocarbon waste will be collected, safely stored in sealed drums on impermeable surfaces within bunded areas. These areas will be designed to contain 110% of the volume of one or the largest (in a multi drum setup) drum and will be equipped with traps and oil separators to contain spilled hydrocarbons. The used hydrocarbon liquid waste will be provided to third parties for recycling. Related records will be kept.

7.3.2.4 Domestic effluent

Objectives

The objective of the management measures is to prevent pollution of surface water, etc. due to domestic effluent.

Actions

TABLE 7.6: ACTIONS RELATING TO DOMESTIC EFFLUENT

No	Issue	Management commitment
These commitments apply to <u>construction, operations and decommissioning</u>		
1	Discharge of raw sewerage and grey water	Conduct regular monitoring to ensure that effluent is not being discharged into the environment.
2	Spillage of domestic and treated effluent	Report spillages as per the incident management procedure and clean up spills within 24 hours of the incident occurring in line with the spillage management procedure.
3	Pollution of soil and / or ground water when spillage occurs.	In the event of domestic effluent discharge into the environment, stop the incident as soon as possible and find the root cause.
4		In the event of soil or water pollution, decontaminate the polluted area(s) using an appropriate methodology. Once clean, rehabilitate the area.
5	Awareness and Training	Train operators to understand the legal requirements and how to achieve compliance.
6		Induct Okorusu Employees and Contractors in the use of the spill management procedure.
These commitments apply to the <u>construction</u> phase		
7	Discharge of raw sewerage and grey water into appropriate sewage treatment facilities	Ensure that portable facilities / septic tanks constructed during the construction and decommission phases are managed until such time as they are no longer used and can be decommissioned.
8	Spillage of domestic and treated effluent	Maintain portable facilities, pipes, drains, pumps, valves, etc. to minimise the likelihood of leaks.
9		Ensure that checking for domestic and treated effluent spills is included in the daily inspection checklist.
10	Ablution facilities	Ensure that portable toilets are working properly and are cleaned at least

No	Issue	Management commitment
		weekly, so they do not pollute the surrounding environment or create hygiene problems.
11		Ensure that sewerage from the portable toilets is disposed of at the nearest sewage works.
These commitments apply to <u>operation and decommissioning</u> only		
12	Treatment of sewerage	Regularly service and maintain sewerage facility to keep it in proper working condition.

7.3.2.5 Spills

Objectives

The objective of the management measures is to prevent pollution of surface water, etc. due to spillages.

Actions

TABLE 7.7: ACTIONS RELATING TO SPILLAGES

No	Issue	Management commitment
These commitments apply to <u>construction, operation and decommissioning</u>		
1	Emergency situations – very large spills	Maintain and implement the emergency response procedure to address large scale hydrocarbon or reagent spills on and off site.
2	Hydrocarbon spills	Ensure that the company is in possession of the relevant licences can provide reports that both surface and underground storage tanks are in good condition (as per legal requirements).
3		Ensure that hydrocarbon (used and new fuel and oil) tanks and drums are stored inside bunded areas on impermeable floors with traps and separators for containing spillages. These areas are designed to contain 110% of the volume of one or the largest (in a multi tank setup) tank and that pumps and pipes are maintained in good working order.
4		All wash bays will be equipped with oil traps and separators. All collected oil will be stored as above.
5		Ensure that all fuel and oil storage facilities (farms) and transport tankers have spill kits.
6		Ensure that the fuel transport company has a system in place to deal with hydrocarbon spills and subsequent clean-up thereof.
7		Contain the spill and commence with remediation within 24 hours and report as per the incident management procedure. In this regard the remediation options

No	Issue	Management commitment
		include in situ treatment or disposal of contaminated soils as hazardous waste. The former is generally considered to be the preferred option because with successful in situ remediation the soil resource will be retained in the correct place. The in situ options include bioremediation at the point of pollution, or removal of soils for washing and/or bio remediation at a designated area after which the soils are replaced.
8		If contamination of water occurs separate hydrocarbons from water and treat water before recycling and re-use.
9	Domestic and Industrial effluent	Prevent effluent spills by ensuring that treatment and storage facilities are adequate and pipes in good condition.
10		Ensure that capacities of the various facilities and pipes are not exceeded.
11		All vehicles and equipment will be serviced in workshops and wash bays with contained impermeable, floors, dirty water collection facilities and oil traps.
12		Contain the spill and as clean up within 24 hours and report as per the incident management procedure.
13		Slurry spilled on the ground is to be picked up and transported, in sealed containers, to the TSF or emergency stockpile for disposal.
14		Contain sewage and industrial effluent spills. The first management priority is to treat the pollution by means of in situ bio-remediation in consultation with an expert.
15		If <i>in situ</i> treatment is not possible or acceptable then the pollution must be excavated, classified as waste and treated as per the waste management procedure.
16	Legal Compliance – all spills	Comply with all legal requirements regarding spills and containment structures.
17		Hydrocarbon spills of 200l or more must be reported to MME in terms of Section 49 of the Petroleum Products Regulations 2000.
18	Monitoring of spills – all spills	Ensure that the monitoring of all tanks, pipelines and bunds are included in the daily inspection programme to develop an early detection system for leaks.
19		Update, maintain and implement a maintenance plan for tanks, tankers, pipelines and bunds.
20		Identify post rehabilitation audit criteria for verifying that remediation has been successful.
21		Conduct periodic audits of facilities to ensure compliance with legal and company standards.

No	Issue	Management commitment
22	Awareness and training – all spills	Induct all Okorusu employees and contractors in the Environmental Policy, spillage management and incident management procedures.
23		Train selected employees in the containment, and handling of spills and in the de-contamination and rehabilitation of affected environments.
24	Emergency situations – all large or remote spills	Major spillage incidents must be handled in accordance with the emergency response procedure.
25		Identify and contract a service provider/specialist to assist with the handling and clean-up of emergency spills off site.
26		Periodically test the emergency response.
27	Discharge of Dewatering from Mine pits causes pollution of Surface Water	The risk of dewatering discharge transporting contaminants could be minimized by dewatering from boreholes not the pit itself.
28		Ensuring that all discharges of dewatering water are contained for re-use in mine processes
29		Monitoring water quality to ensure that any discharge in the river is of acceptable quality.
30	Rainfall runoff mobilizes contamination from site and pollutes surface water	Divert clean offsite runoff water around potential contaminant sources with drainage ditches.
31		Collect runoff from potential seepage sources to containment dams for reuse within mine.
32		Design of diversion berms or channels and containment dams to deal with 1:100 year storm.
33		Rehabilitation (concurrent) of waste rock dumps with vegetation
These commitments apply to <u>operation</u> only		
34	Reagent spills	Ensure that the reagent supply and/or transportation company is in possession of the relevant licences (legal requirements) and can provide reports that transport and storage tanks are in good condition.
35		Ensure that reagent tanks are housed inside concrete bunds and that dispensing takes place on an impermeable surface.
36		Ensure that bunds are designed to contain 110% of the volume of one or the largest (in a multi tank setup) tank and that pumps and pipes are maintained in good working order.
37		Ensure that the reagent supply and/or transportation company has a system in place to deal with the variety of spills that might occur and the subsequent clean-up thereof.

No	Issue	Management commitment
38	Process solution spills (unplanned events – release of large volumes of process solution)	Ensure that bunds have been designed to capture any release of solution to the extent of 110 % of the largest tank constructed inside the bunded area.
39		As far as possible keep bunds clean and empty.
40		Ensure that pumps and pipelines are in place to pump solutions from the bunds back into the process.
41		Maintain and implement an emergency procedure for the containment and clean-up of process solutions if bunds are breached and treatment of contaminated areas.
These commitments apply to <u>operation and decommissioning</u> only		
42	Reagent spills	Contain the spill using appropriate spill kits, as far as possible clean up within 24 hours as per the MSDS specification and report as per the incident management procedure.
43		All solid reagents to be picked up and placed in the relevant reagent tank for use in the plant. If the reagent is polluted it must be disposed of in a safe disposal site.
44		Commence with remediation within 24 hours and report as per the incident management procedure. In this regard the remediation options include in situ treatment or disposal of contaminated soils as hazardous waste. The former is generally considered to be the preferred option because with successful in situ remediation the soil resource will be retained in the correct place. The in situ options include bioremediation at the point of pollution, or removal of soils for washing and/or bio remediation at a designated area after which the soils are replaced
45		If contamination of water occurs, contain the water and treat it, or direct it into the process dam for use into the process plant.
46		Identify and utilise a service provider to assist with the clean-up of very large reagent spills (emergency situations) as required.
47		All major spills (>200l) will be reported to the MAWF

7.4

Groundwater MP

7.4 GROUNDWATER MANAGEMENT PROGRAMME

Potential groundwater quality and quantity impacts are an issue during the construction and operation of the various mining activities and infrastructure unless measures are undertaken to prevent and mitigate such impacts. The purpose of this groundwater management and mitigation plan is to provide for methods to be followed to achieve such mitigation.

The commitments derived from the EIA Report with regards to Groundwater management form the basis of this MP.

7.4.1 COMPONENTS

This plan is made up of the following components:

- Water abstraction and dewatering of mine pits.
- Contamination of Groundwater.

7.4.2 MANAGEMENT

7.4.2.1 Dewatering of Mine Pit and water supply

Objectives

The objective of the management measures is to minimise the impact of the proposed water supply and prevent the loss of groundwater to other users in the area.

Actions

TABLE 7.8: ACTIONS RELATING TO WATER ABSTRACTION AND DEWATERING OF THE MINE PITS

No	Issue	Management commitment
1	Water abstraction and dewatering pit	Drill monitoring boreholes at strategic localities and institute a groundwater monitoring plan.
2		Measure water levels at regular intervals and meter all groundwater abstraction.
3		Boreholes and related equipment should be in a fenced in area in a locked pump house for protection against theft and vandalism.
4		Okorusu will make sure that only permitted abstraction rates are applied and production boreholes are not over pumped.
5		Water saving measures in mining, operational and tailings deposition processes should be implemented to further reduce the use of groundwater resources for

No	Issue	Management commitment
		make-up water.
6		If community supply boreholes are dewatered, they will be provided with an alternative water source.
7		Groundwater levels should be monitored in all pumping wells throughout the life of the mine.
8		Groundwater levels should be monitored at all monitoring boreholes
9	Legal aspects	Ensure that permits for abstraction and pit dewatering are renewed as required.
10		Conduct regular audits to ensure that the conditions of the permits are being met.

Refer to the Biodiversity MP for management requirements relating to the reduction of water resources as an ecological driver.

7.4.2.2 Impacts on Groundwater Quality

Objectives

The objective of the management measures is to prevent unacceptable groundwater pollution related impacts.

Actions

TABLE 7.9: ACTIONS RELATING TO GROUNDWATER CONTAMINATION

No	Issue	Management commitment
These commitments apply to <u>construction phase</u> only		
1	Groundwater contamination from construction activities	Adequate fuel containment facilities to be used during construction phase.
2		The use of all materials, fuels and chemicals which could potentially leach into groundwater must be controlled.
3		All materials, fuels and chemicals must be stored in a specific and secured area to prevent pollution from spillages and leakages.
4		All vehicles and machines must be maintained properly to ensure that oil spillages are kept at a minimum.
5		Spill trays must be provided if refuelling of construction vehicles are done on site.
6		Chemical storage areas should be sufficiently contained, and the use of chemicals should be controlled.
These commitments apply to the <u>operational phase</u> only		
7	Groundwater contamination from the	Line the refueling area to prevent any fuel spillages from entering the groundwater system.
8		The use of all materials, fuels and chemicals which could potentially leach into

No	Issue	Management commitment
	mining	groundwater must be controlled.
9	operation	All materials, fuels and chemicals must be stored in a bunded and secured area to prevent pollution from spillages and leakages.
10		Mine vehicles and machines must be maintained properly to ensure that oil spillages are kept at a minimum.
11		Spill trays must be provided for refuelling of mine vehicles.
12		Proper sanitary facilities must be provided for mine workers. Frequent maintenance should include the removal without spillages.
13		No uncontrolled discharges resulting in pollution of the receiving environment and aquifer shall be permitted.
14		Chemical storage areas should be sufficiently contained, and the use of chemicals should be controlled.
15		Water seeping into the open pit during mining should be directed into a sump and pumped to surface.
16		Water pumped from the open pit mine during mining should be pumped into a dirty water system and should not be allowed to enter any clean water system, natural drainage line, or the aquifer.
17		Potable water should be made available to affected users due to mine dewatering.
18		A groundwater monitoring plan must be designed with dedicated boreholes drilled to monitor water quality at regular intervals. The parameters analysed for, sampling interval and distribution of monitoring boreholes must be agreed on with the Department of Water Affairs.
19		Drill monitoring boreholes at strategic localities and institute a groundwater monitoring plan.
20		All water retention structures, including tailings disposal facilities, return water dams, storm water dams, retention ponds etc. should be constructed to have adequate freeboard to be able to contain water from 1:50 year rain events.
21		When mining is undertaken, the water-table should always be kept lower than the bottom of the pit to prevent direct contact of contaminants with the groundwater.
22	Emergency	Major spillage incidents will be handled in accordance with the Okorusu emergency response procedure. DWA and surrounding farmers (potential of contaminating farm boreholes) will be informed of major spillages.

7.5

Air Quality MP

7.5 AIR QUALITY MANAGEMENT PROGRAMME

There are a number of sources in all phases that have the potential to pollute the air. In the construction and decommissioning phases these potential pollution sources are temporary in nature, usually existing for a few weeks to a few months. The operational phase will present more long term potential sources and the closure phase will present final land forms that may have the potential to pollute the air through long term wind erosion.

The air quality assessment focused on airborne particulates (PM10 emissions and total suspended particles). Gaseous pollutants (such as sulphur dioxide, oxides of nitrogen, carbon monoxide etc.) deriving from mine vehicles and equipment could not be assessed but were regarded by the specialist as potentially negligible in comparison to particulate emissions.

The commitments derived from the EIA Report with regards to Air Quality forms the basis of this MP.

7.5.1 COMPONENTS

This plan is made up of the following components:

- Fall-out dust and PM₁₀

7.5.2 MANAGEMENT

Objectives

The objective of the management measures is to prevent unacceptable air quality related pollution impacts.

Actions

TABLE 7.10: ACTIONS RELATING TO FALL-OUT DUST, PM₁₀ AND GASEOUS EMISSIONS (SO₂ AND NO₂)

No	Issue	Management commitment
These commitments apply to the <u>construction</u> phase		
1	Dust and PM ₁₀	Prepare a Dust and PM10 management plan to include the following: <ul style="list-style-type: none"> • Water sprays to be applied at the area to be cleared should significant amounts of dust be generated. • Moist topsoil will reduce the potential for dust generation when tipped onto stockpiles. • Ensure travel distance between clearing area and topsoil piles to be at a minimum. • Ensure exposed areas remain moist through regular water spraying during dry,

No	Issue	Management commitment
		<p>windy periods.</p> <ul style="list-style-type: none"> Single dust fallout bucket to be placed downwind to the west of the existing and proposed tailings storage facilities with monthly dust fallout rates not exceeding 1 200 mg/m²/day.
These commitments apply to <u>operation</u> phase		
2	Dust and PM ₁₀	<p>Prepare a dust and PM₁₀ management plan to include the following</p> <ul style="list-style-type: none"> Open pits: <ul style="list-style-type: none"> Drilling to be controlled through water sprays to ensure 70% control efficiency. Controlled blasting techniques to be used to ensure minimal dust generation. Blasting only to be conducted on cloudless days. Vehicle activity on unpaved haul roads: <ul style="list-style-type: none"> Regular water sprays preferably combined with chemicals on unpaved haul roads. Speed limit on unpaved roads not to exceed 40 km/hr. Single dust fallout bucket to be placed next to the main haul roads with monthly dust fallout rates not exceeding 1 200 mg/m²/day. Product trucks to be covered to minimise spillages on paved road. Materials transfer points: <ul style="list-style-type: none"> Drop height from excavator into haul trucks to be kept at a minimum for ore and waste rock. Tipping onto ore stockpiles to be controlled through water sprays should significant amounts of dust be generated. Crushing and screening operations: <ul style="list-style-type: none"> Water sprays combined with chemicals at the crushers to ensure dust control of 50% if the processes result in significant dust generation. Moist ore can be up to 20 times lower than dry ore. Single dust fallout bucket to be placed in the vicinity of the new crusher site with monthly dust fallout rates not exceeding 1 200 mg/m²/day. TSF: <ul style="list-style-type: none"> Progressive vegetation of side walls of tailings storage facilities to ensure 80% cover up to 1 m from the top. Single dust fallout buckets to be placed to the west and to the west-northwest (downwind) of the tailings storage facilities with monthly dust fallout rates not exceeding 1 200 mg/m²/day.
These commitments apply to the <u>decommission and closure</u> phases		

No	Issue	Management commitment
3	Dust and PM ₁₀	<p>Prepare a dust and PM₁₀ management plan to include the following:</p> <ul style="list-style-type: none"> • Topsoil recovered from stockpiles for rehabilitation and revegetation of surroundings. • Topsoil cover onto TSF and vegetate with native grass species. • Contour berm at pits and vegetate with native grass species. • Should the infrastructure removal at the processing plant site reduce significant dust, mitigation measures should be applied. • Demolition of infrastructure that necessitates blasting should only be done during daytime hours. • Replant any previously removed native plant species in disturbed areas. • Indigenous plant species should be used in the final landscaping of the rehabilitated mine site. • Ensure a dense vegetation cover on WRD and TSF as defined by the final closure and decommissioning plan. • Demolition of infrastructure to have water sprays where a lot of vehicle activity is required. • Ensure site is restored to pre-mining conditions.

7.6

Noise & Vibrations MP

7.6 NOISE AND VIBRATION MANAGEMENT PROGRAMME

There is a range of construction, operation and decommissioning activities that have the potential to generate noise and cause related pollution. Noise pollution will have different impacts on different receptors because some are very sensitive to noise and others are not. For example, mine workers in general do not expect an environment free of mine related noise and so they will not be sensitive to environmental noise pollution at work. In contrast, local residents are likely to be more sensitive to unnatural noises and so any change to ambient noise levels because of mine related noise will have a negative impact on them, although studies have shown that only one residence is likely to be affected.

The commitments derived from the EIA Report with regards to noise and vibrations forms the basis of this MP.

7.6.1 COMPONENTS

This plan is made up of the following components:

- Noise pollution
- Blast impacts

7.6.2 MANAGEMENT

7.6.2.1 Noise Pollution

Objectives

The objective of the management measures is to limit excessive noise pollution

Actions

TABLE 7.11: ACTIONS RELATING TO NOISE POLLUTION

No	Issue	Management Commitment
These commitments apply to <u>construction, operation and decommissioning</u>		
1	Impact of noise on the environment/	Document and investigate all registered complaints and make efforts made to address the area of concern where possible.
2	sensitive receptors	<p>Communication channels are established to ensure prior notice to the sensitive receptor if work is to take place close to them. Information that should be provided to the potential sensitive receptor(s) include:</p> <ul style="list-style-type: none"> • Proposed working times; • how long the activity is anticipated to take place;

No	Issue	Management Commitment
		<ul style="list-style-type: none"> what is being done; contact details of a responsible person where any complaints can be lodged should there be an issue of concern.
3		Ensure that plant and equipment is well-maintained and fitted with the correct and appropriate noise abatement measures.
4		All diesel powered equipment must be regularly maintained and kept at a high level of maintenance. This must particularly include the regular inspection and, if necessary, replacement of intake and exhaust silencers. Any change in the noise emission characteristics of equipment must serve as trigger for withdrawing it for maintenance.
5		By enclosing the tipper discharge and lowering the conveyor drop heights, noise emissions may be reduced. Mechanical and electrical design also influences the amount of noise from stacking and reclaiming operations.
6		Vibrating structures are known to be noisy and good design philosophies should be followed for equipment of this nature. The mentioned equipment must be installed on vibration isolating mountings.
7	Monitoring	A noise monitoring programme has been developed is included in Table 9.1.

7.6.2.2 Blast Impacts

Objectives

The objective of the management measures is to limit excessive blast vibration and fly rock.

Actions

TABLE 7.12: ACTIONS RELATING TO BLAST IMPACTS

No	Issue	Management commitment
These commitments apply to <u>construction, operation and decommissioning</u>		
1	Minimise impacts of blasting	<p>The blast design, implementation and monitoring will, as a general rule, ensure that:</p> <ul style="list-style-type: none"> fly rock is contained within a maximum of 500m of the blast site; Prior to each blast the blast area will be cleared of third parties to a safe distance determined by appropriate legislation and safe working procedures. Prior to each blast an audible warning will be sounded; ground vibration at the closest third party structures is less than 12mm/s peak particle velocity; air blast at the closest third party structures is less than 130dB; and all registered complaints will be documented, investigated and efforts made to address the area of concern where possible.

7.7

Biodiversity MP

7.7 BIODIVERSITY MANAGEMENT PROGRAMME

To understand biodiversity one must appreciate all of its components. It is not just about the species of plants and animals and the different habitats in which they live (biodiversity patterns) but the way that factors, such as wind, water, steepness of slope and presence of pollinators, affect the habitats and the species living in them (ecosystem processes).

The commitments derived from the EIA Report with regards to Biodiversity forms the basis of this MP.

7.7.1 COMPONENTS

This plan is made up of the following components:

- Managing the physical destruction of biodiversity.
- Reduction of water resource as an ecological driver.
- Managing general disturbance.

7.7.2 MANAGEMENT

7.7.2.1 Physical destruction of biodiversity

Objectives

The objective of the management measures is to prevent or limit the unacceptable loss of biodiversity and related functionality through physical disturbance.

Actions

TABLE 7.13: ACTIONS RELATING TO THE PHYSICAL DESTRUCTION OF BIODIVERSITY

No	Issue	Management commitment
These commitments apply to <u>design phase</u>		
1	Physical destruction of biodiversity	Design footprints of all facilities as small as possible and generally limit mine infrastructure, activities and related disturbance to those specifically identified and described in this EIA report
These commitments apply to <u>construction phase</u>		
2	Physical destruction of biodiversity	<ul style="list-style-type: none"> • As far as possible, avoid areas identified as ecologically or biologically sensitive. • Design footprints of roads to be as small as is legally and practically possible. • Mark out all construction footprints and clearly convey the rule of staying inside these boundaries to all staff.

No	Issue	Management commitment
		<ul style="list-style-type: none"> • Enforce speed limits. • Implement a scientifically based ecological restoration plan for all disturbed areas as soon as possible. • Protect undisturbed areas outside planned mining operations from all forms of disturbance (these must serve as future source areas for re-colonisation after mining). • Prior to construction and in consultation with a specialist scan proposed construction sites for any more sensitive flora and fauna and implement the recommendations of the specialist – these could include but not be limited to: a search and rescue of dens, crèches, and burrows, relocating/demarcating nests, demarcating flora (protected trees) to either be conserved within the construction site or relocated.
These commitments apply to <u>construction and operation phase</u>		
3		<ul style="list-style-type: none"> • Clearly demarcate boundaries of the proposed expansion activities; • Where possible avoid cutting or relocating protected trees and develop plans to care for them during the life of mine until their surroundings have been restored • Where disturbance of protected trees is unavoidable, apply for the necessary permits in a timely manner. • As much as possible and as is feasible, evacuate any animals of conservation significance from the mining area before disturbance • Remove and stockpile topsoil, along with its soil fauna and seed banks, and devise plans for its management during stockpiling and redeployment for restoration • Where feasible, remove other organic material, including litter and dead wood, and stockpile separately for future use in restoration. Appropriate stockpiling methods should be investigated, and should promote the viability of the communities they contain. • Mining staff should be held to the rule of staying inside the demarcated boundaries of the construction and mining site areas • Earthen-bund the perimeter of the mining pit to reduce the chances of animals being killed or injured by blasting, or incurring damage by mining equipment • Increase environmental awareness through training of key staff, including their ability to handle animals during evacuation; and • Rigorously police the construction crews' and mining staff's adherence to

No	Issue	Management commitment
		the rules and do not hesitate to invoke penalty clause/s

7.7.2.2 Managing general disturbance

Objectives

The objective of the management measures is to prevent disturbance to biodiversity.

Actions

TABLE 7.14: ACTIONS RELATING TO THE GENERAL DISTURBANCE TO BIODIVERSITY

No	Issue	Management commitment
These commitments apply to <u>construction, operation and decommissioning phases</u>		
1	General disturbance of biodiversity	The working area of will be fenced.
2		Develop a policy that limits independent movements by staff into the veld outside the fenced-in mining site. Strictly prevent poaching and harvesting, including of firewood, or possession of any such natural materials. Enforce rules with "zero tolerance"
3		Provide or ensure that there is adequate food for workers on site
4		Allow only mining personnel, service providers and construction staff, as well as registered mine visitors on site
5		Train all mine staff to appreciate the natural non-consumptive values of biodiversity, as well as legislation relating to protected species
6		Raise awareness concerning recognising venomous snakes/invertebrates from non-dangerous ones, and ensure that sufficient personnel are trained to handle snakes/invertebrates so as to move them away from the mine without killing
7		Compensate farmers for livestock losses, based on valid claims.
8		Train all drivers of vehicles in the necessary procedures for the safe operation of all vehicles and to maintain regulated speed
9		Carry out regular training to instil appropriate vehicle control and a high degree of professional road conduct
10		Enforce speed limits, including using speed-reducing methods and speed-monitoring devices
11		As much as operationally feasible, driving to and from the mining sites should be avoided at night and limited, if possible, only to within the mining area
12		Use yellow outdoor lights (sodium vapour floodlights with orange covers, or yellow bulbs/tubes for incandescent and fluorescent lights) wherever possible as this is less glaring to invertebrates while serving human requirements

No	Issue	Management commitment
13		Reduce the attraction to invertebrates to indoor lights by installing self-closing doors and non-opening windows in night-time operations buildings
14		Ensure that animals have no access to contaminated water sources
15		Fence in TSF and other areas that are regularly artificially wetted and use other proven means to deter birds from reaching them; wetted areas should be kept to a minimum
16		All chemicals, emissions, and leaching products as well as tailings must be strictly contained and regularly timely cleaned or neutralised, adhering to best practises
17		Develop a site waste management policy and actively enforce it.
18		Develop policy for the management of hazardous materials and actively enforce it.
19		Provide temporary waste deposition facilities on site (rubbish bins, skips), which are secure from scavengers, storms, or other disturbance.
20		Provide adequate toilet facilities for all workers at work sites and enforce a strict policy of not defecating in the field.
21		Apply appropriate hydrocarbon-handling principles (storage tanks should have bunding and be regularly inspected, lubricants should be stored in properly designated and appointed facilities, spillages should be cleaned up immediately, adequate control over use of fuels).
22		Contain all contaminated water and purify it to potable quality before reuse, or release into the environment.
23		Where possible, avoid destroying trees or disturbing their proximity, so that animals can continue to use them.
24		Rehabilitate areas around linear infrastructure after installing it such that they minimise habitat fragmentation, allowing populations to be connected across them
25		Implementing strict controls over the movement of materials onto and off the site to minimise the spread of invasive species; if this becomes a problem monitor the occurrence and spread of invasive species so as to instigate steps for their control, following expert advice
26	Emergency	Major spillage incidents will be handled in accordance with the Okorusu emergency response procedure.
27		Certain instances of injury to animals may be considered emergency situations. These will be managed in accordance with the Okorusu emergency response procedure.
These commitments apply to <u>decommissioning & closure phases</u>		

No	Issue	Management commitment
28	Closure planning	As part of closure planning, the designs of any permanent and potentially polluting structures will take consideration of the requirements for long term pollution prevention and confirmatory monitoring.
29		Dispose of re-usable waste (such as power cables, pipelines and building material) in the appropriate manner.
30		Formulate a scientific-based restoration plan.

7.8

Visual MP

7.8 VISUAL MANAGEMENT PROGRAMME

It is predicted that negative visual impacts would result from the construction, operational and decommissioning phases of the proposed Project. During the closure phase the site will be rehabilitated but the waste dumps and the tailings storage facility will remain and will therefore contribute to the long term negative visual impact of the Project.

The commitments derived from the EIA Report with regards to visual impacts form the basis of this MP.

7.8.1 COMPONENTS

This plan is made up of the following components:

- Visual disturbance.

7.8.2 MANAGEMENT

7.8.2.1 Visual disturbance

Objectives

The objective of the management measures is to limit visual impacts.

Actions

TABLE 7.15: ACTIONS RELATING TO VISUAL DISTURBANCE

No	Issue	Management commitment
These commitments apply to <u>construction and only</u>		
1	Earthworks	It is proposed that areas of disturbance be minimized as far as possible during the construction phases.
These commitments apply to <u>design, construction and operation phase</u>		
2	Lighting	Light pollution should be seriously and carefully considered and kept to a minimum.
3		Security lighting should only be used where absolutely necessary and carefully directed.
4		<p>The negative impact of night lighting, glare and spotlight effects, can be mitigated using the following methods:</p> <ul style="list-style-type: none"> • Install light fixtures that provide precisely directed illumination to reduce light “spillage” beyond the immediate surrounds of the project. • Avoid using bright, white colour lights where possible. Preferably use lights emitting a yellow light which travels less than white coloured lights. • Light public movement areas (pathways and roads) with low level ‘bollard’ type lights and avoid post top lighting.

No	Issue	Management commitment
		<ul style="list-style-type: none"> Avoid high pole top security lighting where possible.
5	Materials	Buildings and structures can be painted with a mat finish in a shade of grey or green that would best blend in with the colours of the environment, to reduce the colour contrast between the structures and the receiving landscape. Avoid the use of bright colours and shiny finishes, especially on roofs and taller structures.
6	Project Area Development and General	Retain as much as possible of the existing vegetation within the study area and along the Project boundaries and roads in aid of screening the Project.
These commitments apply to <u>construction, operation and decommissioning phases</u>		
7	Access	Dust suppression techniques should be in place at all times during the construction, operational, the decommissioning and closure phases.
8		Keep the speed limit as low as possible in order to minimise the creation of dust.
9		Ensure that, when trucks are transporting materials, the material is covered so that the finer particles do not get airborne and create dust pollution.
10	Managing vegetation and soils	All vegetation within the mine site that is not removed needs to be managed and protected
11		In all areas which are to be excavated, topsoil needs to be removed and stockpiled in a suitable location and utilised in rehabilitation of the TSF, WRD, plant areas and infrastructure areas.
12	General	Rehabilitate / restore exposed areas as soon as possible after construction activities are complete.
13		Only indigenous vegetation should be used for rehabilitation / landscaping purposes.
14	Waste Rock Dumps	Final shaping and dumping should be implemented such that the sides of the waste dump are articulated in a fashion that create areas of light and shadow interplay.
15		Harsh, steep engineered slopes should be avoided if at all possible as these could impose an additional impact on the landscape by contrasting with existing topographic forms. The tailings facility and waste dumps are the only surface infrastructure that will remain after decommissioning and it is important that a long-term view of their integration with the surrounding landscape be taken.
16		Maintain the final landform height and slope angles for the tailings facility and waste dumps as low as possible.
17		Where slopes compatible with the surrounding landscape can be achieved, an attempt should be made to visually soften steeper areas by avoiding straight engineered ridges and sharp changes of angle (see also point above).

No	Issue	Management commitment
18		If possible, backfilling into the underground pit could be done as much as possible to reduce the final heights of the waste dump after closure.
19		Grass seeding and tree planting of the WRDs and TSF should be undertaken to emulate the groupings of natural vegetation within the study area. The Biodiversity specialist should be consulted in this regard.
These commitments apply to <u>decommissioning & closure phases</u>		
20	Rehabilitation	Rehabilitation of all the faces of the WRD to grass / scrub bushes and some trees; Reduce the angle of the WRD slope if not suitable for rehabilitation; There will be continuous rehabilitation of the TSF dam walls as they are raised;
21	Closure	For the closure phase: <ul style="list-style-type: none">Okorusu will establish a mechanism to ensure that the rehabilitation of the mine is properly funded to ensure that sufficient funds are available to implement the rehabilitation and mitigations required for closure.All components of the infrastructure used during operation must be removed. The site must be visually 'cleaned up' so as to portray an uncluttered landscape.The ground where processing plants were located must be decontaminated and then covered by the earth used for the berm and landscaped into a natural form in alignment with the natural hydrological patterns.

7.9

Archaeology MP

7.9 ARCHAEOLOGY MANAGEMENT PROGRAMME

No archaeological sites have been identified in the project area. The archaeological assessment concluded that the Okorusu project will have a negligible impact on the archaeology of the project area and that the project is therefore not expected to have any implications in terms of the National Heritage Act.

The commitments are derived from the EIA Report with regards to archaeology, form the basis of this MP.

7.9.1 COMPONENTS

This plan is made up of the following components:

- Chance heritage finds.

7.9.1.1 Chance archaeological finds

Objectives

To ensure that the correct actions are taken to preserve or document chance archaeological finds.

Actions

TABLE 7.16: ACTIONS RELATING CHANCE ARCHAEOLOGICAL FINDS

No	Issue	Management commitment
These commitments apply to <u>construction and operation phases</u>		
1	Chance Finds Procedure	<p>Areas of proposed mining and related activity have undergone a heritage survey and assessment. It is possible that sites or items of heritage significance will be found in the course of development work. The personnel and contractor heritage induction process is intended to sensitize people so that they may recognize heritage “chance finds” in the course of their work. The procedure set out here covers the reporting and management of such finds.</p> <p>The “chance finds procedure covers the actions to be taken from the discovery of a heritage site or item, to its investigation and assessment by a trained archaeologist or other appropriately qualified person.</p> <p>Operator - To exercise due caution if archaeological remains are found</p> <p>Foreman - To secure site and advise management timeously</p> <p>Superintendent -To determine safe working boundary and request inspection</p> <p>Archaeologist -To inspect, identify, advise management, and recover remains</p> <p><u>Action by person identifying archaeological or heritage material:</u></p>

No	Issue	Management commitment
		<p>If operating machinery or equipment stop work</p> <p>Identify the site with flag tape</p> <p>Determine GPS position if possible</p> <p>Report findings to foreman</p> <p><u>Action by foreman:</u></p> <p>Report findings, site location and actions taken to superintendent</p> <p>Cease any works in immediate vicinity</p> <p><u>Action by superintendent:</u></p> <p>Visit site and determine whether work can proceed without damage to findings</p> <p>Determine and mark exclusion boundary</p> <p>Site location and details to be added to project GIS for field confirmation by archaeologist</p> <p><u>Action by archaeologist:</u></p> <p>Inspect site and confirm addition to project GIS</p> <p>Advise NHC and request written permission to remove findings from work area.</p> <p>Recovery, packaging and labelling of findings for transfer to National Museum</p> <p><u>In the event of discovering human remains:</u></p> <p>Actions as above; and</p> <p>Field inspection by archaeologist to confirm that remains are human</p> <p>Advise and liaise with NHC and Police</p> <p>Recovery of remains and removal to National Museum or National Forensic Laboratory, as directed.</p>
2	Legal requirements	<p>The “chance finds procedure is intended to ensure compliance with the relevant provisions of the National Heritage Act (27 of 2004), especially Section 55 (4): “ <i>a person who discovers any archaeological object must as soon as practicable report the discovery to the Council</i>”. The procedure of reporting set out below must be observed so that heritage remains reported to the NHC are correctly identified in the field.</p>

7.10

Traffic MP

7.10 TRAFFIC MANAGEMENT PROGRAMME

The activities associated with the mine have traffic impacts. This MP aims to provide measures to limit the negative impacts.

The commitments are derived from the EIA Report with regards to traffic issues form the basis of this MP.

7.10.1 COMPONENTS

This plan is made up of the following components:

- Infrastructure – road use.

7.10.2 MANAGEMENT

Objectives

The objective of the management measures is to reduce the potential for safety and vehicle related impacts on road users.

Actions

TABLE 7.17: ACTIONS RELATING TO ROAD USE

No	Issue	Management commitment
These commitments apply to <u>construction, operation and decommissioning</u> phases		
1	Future road use related impacts	A driver trainer programme for all Okorusu employees will be implemented to include: complying with speed limits, holding valid licences, ensuring vehicles are roadworthy, zero tolerance for drinking and driving and using lights appropriately for night driving
2		Contractors will be required to comply with Namibian Roads Authority regulations.
3	Emergency	Any mine related road accident must be handled in accordance with the emergency response procedure.

7.11

Socio-economic MP

7.11 SOCIAL AND ECONOMIC MANAGEMENT PROGRAMME

The activities associated with the mine have socio-economic impacts in all mine phases – some positive and some negative. These impacts related to amongst others employment/job creation, inward migration, local- and regional economies, land use and surrounding landowners and community safety and security. This MP aims to provide measures to enhance the positive impacts and limits the negatives impacts.

The commitments derived from the EIA Report with regards to socio-economic issues form the basis of this MP:

7.11.1 COMPONENTS

This plan is made up of the following components:

- Economic Impact.
- Inward migration and community health/safety and security.
- Change of land-use and neighboring communities.

7.11.2 MANAGEMENT

7.11.2.1 Economic Impact

Objectives

The objective of the management measures is to enhance the positive impacts associated with job creation and investment.

Actions

TABLE 7-18: ACTIONS RELATING TO ECONOMIC IMPACT

No	Issue	Management commitment
These commitments apply to <u>construction, operation and decommissioning</u> phases		
1	Employment opportunities and development benefits.	<ul style="list-style-type: none"> • Weighting tender selection is weighted in favor of suppliers of goods and services which use local suppliers down the supply chain (assuming that the vendor is qualified and that they can deliver the requested product of the required standard in the requested time with their requested quality); • Mine procurement policies that promote the use of small and medium enterprises; • A human resources policy which prioritises the selection of women for training and recruitment and which supports women to perform well in the workplace; • Skills development strategies and programmes are in place prior to construction to maximise use of the local labour force.
These commitments apply to <u>operation</u> phase		
2		<ul style="list-style-type: none"> • Support employees and community members to continue learning and developing skills so they too benefit from being able to offer labour flexibility and productivity, throughout the LoM and on mine closure;

No	Issue	Management commitment
		<ul style="list-style-type: none"> Promote continuous learning programmes to diversify and upgrade skills; Ensure skills upgrading during employment at mine is documented and accredited where possible so skills are recognised with future employers; Maximise the permanent workforce; Provide training on personal financial management; Enable and promote home ownership throughout the workforce; and Assist Otavi and Otjiwarongo town councils to diversify their economic activities.

7.11.2.2 Inward migration and community health/safety and security

Objectives

The objective of the management measures is to limit the impacts associated with inward migration.

Actions

TABLE 7-19: ACTIONS RELATING TO INWARD MIGRATION AND COMMUNITY HEALTH/SAFETY AND SECURITY

No	Issue	Management commitment
These commitments apply to <u>construction, operation and decommissioning</u> phases		
1	Perceived job opportunities causing inward migration	<ul style="list-style-type: none"> Build up local skills before operations begin by working with local training establishments, providing bursaries for key skills. Actively recruit women for training and employment into the mining sector. Give preferential recruitment to Otjozondjupa residents. Support the town councils to have enlightened town plans which enable affordable land tenure and business development. Fence in the working area of the ML and employ strict security. Okorusu must ensure that the security of personnel and property is carried out in accordance with relevant human rights principles and in a manner that avoids or minimizes risks to the neighbouring community. Have zero tolerance to alcohol in the workplace and on site. Establish a comprehensive HIV / AIDS / TB workplace policy and wellness programme.

7.11.2.3 Change of land use and neighboring communities

Objectives

The objective of the management measures is to reduce negative impacts on land use and neighbouring communities.

Actions**TABLE 7-20: ACTIONS RELATING TO CHANGE OF LAND USE AND NEIGHBORING COMMUNITIES**

No	Issue	Management commitment
These commitments apply to <u>construction, operation and decommissioning</u> phases		
1	Issues relating to change of land use and neighbouring communities	<ul style="list-style-type: none"> • Manage the non-mining areas as productively as possible, including restoring bush encroached areas for productive farming. • Establish a platform for on-going dialogue with neighbouring farmers, as a special interest group and provide a named point of contact. • Enforce strict rules of no walking except along roads. • Any person conducting work for/on behalf of Okorusu on neighbouring farms shall first liaise with farm owner(s) and obtain the necessary authorization before entering these properties.

7.12

Resource MP

7.12 RESOURCE MANAGEMENT PROGRAMME

This MP provides management actions regarding scarce resources like water and provides means of reducing consumption of resources.

7.12.1 COMPONENTS

This plan is made up of the following components:

- Consumption of energy.
- Consumption of water.
- Use of manufactured materials.
- Consumption of fuel.

7.12.2 MANAGEMENT

7.12.2.1 Consumption of Energy (electricity and diesel)

Objectives

The objective of the management measures is to monitor the energy (electricity and diesel) consumption and to find ways to minimise consumption.

Actions

TABLE 7.21: ACTIONS RELATING TO ENERGY CONSUMPTION

No	Issue	Management commitment
These commitments apply to <u>all</u> phases		
1	Understanding	Maintain the electricity consumption monitoring system.
2	Okorusu's electricity consumption and demand	Total consumption to be monitored and recorded and compared with NamPower readings.
3		Maintain the energy management plan that optimises electricity consumption whilst meeting efficiencies as far as practically possible.
4	High consumption of electricity	Maintain the energy management plan that optimises electricity consumption whilst meeting efficiencies.
5	Monitoring of the energy management plan	Review energy consumption in relation to the energy management plan.

No	Issue	Management commitment
6	Awareness and training	Implement an awareness programme pertaining to energy usage.
7	Maintenance of electrical equipment	Maintain a maintenance schedule for all electrical equipment used on site.

7.12.2.2 Consumption of water

Objectives

The objective of the management measures is to monitor the water consumption and to find ways to optimise water usage.

Actions

TABLE 7.22: ACTIONS RELATING TO WATER CONSUMPTION

No	Issue	Management commitment
These commitments apply to <u>all phases</u>		
1	Water usage and control	Install and calibrate water flow meters on pipes at selected locations (including tailings lines and dewatering boreholes).
2		Monitor monthly abstraction volumes to ensure that the permitted annual volumes are not exceeded.
3	Maintenance of equipment	Further develop, maintain and implement a comprehensive maintenance programme for tanks, tankers, pumps and pipes.
4	Monitoring of water leaks	Ensure that checking for water spills is included in the daily inspections.
5		Report spillages as per the incident management procedure.
6	Training and awareness	Maintain and implement water awareness programme for Okorusu employees and contractors.
7	Reporting to Society	Reporting to stakeholders on water management.
These commitments apply to <u>operation and decommissioning</u> only		
8	Water usage and control	Ensure that storm water falling inside the processing area is captured and directed via drains and pipes to the return water dam and re-used.
These commitments apply to <u>operation</u> only		
9	Water usage	Ensure that the design of the relevant clean and dirty water systems are sufficient to cater for the water volumes associated with the infrequent flood events and that

No	Issue	Management commitment
	and control	unacceptable discharges of polluted water are prevented.
10		Optimise the recycling of process water in the process plant to reduce the demand for fresh water.
11		Recycle tailings decant water back to the return water dam in closed pipes for reuse in the process plant.
12		Groundwater encountered in the pit is dewatered and used (e.g. in the process plant).

7.12.2.3 Use of manufactured materials

Objectives

The objective of the management measures is to monitor the use of manufactured materials and to ensure efficient usage.

Actions

TABLE 7.23: ACTIONS RELATING TO THE USE OF MANUFACTURED MATERIALS

No	Issue	Management commitment
These commitments apply to <u>construction, operation and decommissioning</u>		
1	Transport of hazardous materials	Conduct routine inspections of the supply companies transporting hazardous materials to and from site.
2		Ensure companies compliance to legal and Okorusu requirements and that the contractor has all the necessary hazardous protection equipment for people and environment in the advent of a spill.
3	Consumption of reagents and chemicals	Monitor reagent consumption monthly.
4		Review and implement best practices for use by cleaning contractors. Monitor compliance.
5		Identify consumables that might qualify to be replaced by more environmentally friendly products and conduct market research on such products.
6	Consumption of consumables (e.g. PPE, paper)	Calculate the volumes of consumables used and determine ways of reducing consumption.
These commitments apply to <u>operation</u> only		
8	Consumption	Monitor and update the process flow balance regularly to ensure optimum use of

No	Issue	Management commitment
	of reagents and chemicals	reagents.

7.12.2.4 Consumption of fuel

Objectives

The objective of the management measures is to monitor the fuel consumption and to find ways to optimise fuel usage.

Actions

TABLE 7.24: ACTIONS RELATING TO FUEL CONSUMPTION

No	Issue	Management commitment
These commitments apply to <u>construction, operation and decommissioning</u>		
1	Fuel consumición	Maintain and implement the preventive maintenance plan for all equipment and mine vehicles using diesel, petrol and gas on site to avoid wastage and leakages.
2		Monitor fuel consumption in all departments.
3		Monitor use of diesel heaters.

7.13

Soil MP

7.13 SOIL MANAGEMENT PROGRAMME

Management of soils is important as mining is a temporary land use where-after rehabilitation is the key to re-establishing post closure land capability that will support conservation, agricultural and tourism type land uses. Soil is a key part of rehabilitation.

The commitments derived from the EIA Report with regards to soil form the basis of this MP.

7.13.1 COMPONENTS

This plan is made up of the following components:

- Topsoil stockpiling/management.

7.13.2 MANAGEMENT

7.13.2.1 Topsoil stockpiling/management

Objectives

The objective of the management measures is to ensure that all topsoil stripping, stockpiling and replacement operations will be undertaken in a manner that limits impacts on the soil functionality and to ensure it can be used for rehabilitation as and when required.

Actions

TABLE 7-25: ACTIONS RELATING TO TOPSOIL STOCKPILING/MANAGEMENT

No	Issue	Management commitment
These commitments apply to <u>construction and operation phases</u>		
1	Delineation of stockpiling areas and	Limit the disturbance of soils to what is absolutely necessary. Stripping will only occur where soils are to be disturbed by activities described in the 2013 Scoping/ Assessment Report.
2	stockpile management	Soil stockpiles will be demarcated, and clearly marked to identify both the soil type and the intended area of rehabilitation.
3		Investigate the possibility of establishing storm water diversion berms to prevent run off erosion around stockpiles.
4		Stockpiles will be benched to a maximum height of 20m. Design the benches to ensure maximum security of topsoil and to minimize erosion.
5		For storage periods greater than 3 years, erosion control in the form of vegetation will be established and the stockpile sides should as far as practically possible be stabilised as a slope of 1 in 6 or less.
6		No waste material will be placed on the soil stockpiles.

No	Issue	Management commitment
7		Equipment movement on top of the soil stockpiles will be limited.
8	Stripping and handling of soils	Handle soils in dry weather conditions so as to cause as little compaction as possible.
9		Utilizable soil is considered to be the top 300mm of soil or until hard rock is encountered where soil depths are <300mm. The utilizable soil will be stripped and stockpiled together with any vegetation cover present.

7.14

Waste Management MP

7.14 WASTE MANAGEMENT PROGRAMME

Waste is generated during all phases of the mine. This MP deals with solid waste management.

7.14.1 COMPONENTS

This plan is made up of the following components:

- Non-hazardous solid waste (non-mineralised).
- Hazardous solid waste (non-mineralised).
- Medical waste.

Waste Inventory list:

Waste type	Waste specifics (example of waste types)	Source
Non-hazardous solid waste (non-mineralised)	Metal Cut offs, rubber, wood, product packaging, organic materials, glass, plastics, food scraps, cardboard/paper, used PPE, etc.	Across site
Hazardous solid waste (non-mineralised).	Printer cartridges, sewerage, batteries, hydrocarbons (oils, grease), fluorescent bulbs, etc.	Admin building, workshops, plant
Medical waste	Syringes, material with blood stains, bandages, etc.	First Aid Centre

7.14.2 MANAGEMENT

7.14.2.1 Non-hazardous solid waste (non-mineralised)

Objectives

The objective of the management measures is to ensure proper storage, recycling, re-using, removal, transportation and disposal of non-hazardous solid waste.

Actions

TABLE 7.26: ACTIONS RELATING TO NON-HAZARDOUS SOLID WASTE (NON-MINERALISED)

No	Issue	Management commitment
These commitments apply <u>construction, operation and decommissioning</u> phases		
1	General	The waste management procedure for Okorusu must cover the recycling, re-use, storage, handling, transportation and disposal. Ensure that the

No	Issue	Management commitment
		contractor's responsible are made aware of these procedures.
2	Collection of waste	Designated waste collection points will be established on site. Care will be taken to ensure that there will be sufficient collection points with adequate capacity.
3	Disposal of waste	Waste will be disposed of at the existing waste disposal facility on site.
4		A waste disposal facility management procedure will be written up and implemented.
5	Waste storage/separation – domestic waste	Collect general domestic and recyclable waste from all offices, tearooms, ablutions, security office, laboratory, workshop and stores and place into wheely or luggar bins and skips.
		Segregate the discarded domestic general and recyclable waste before placed into the correct wheely or luggar bins and skips.
6		Provide the recyclable materials to qualified companies that either directly or indirectly recycle the materials themselves or through third party companies.
7		Ensure that waste storage areas and/or containers meet the risk needs for that specific waste (e.g. impervious floor, bunded areas with drainage/containment systems, lids to prevent light material from blowing away or sealed containers for hazardous material).
8	Waste classification (domestic and industrial)	The waste inventory will be kept up to date.

7.14.2.2 Hazardous solid waste (non-mineralised)

Objectives

The objective of the management measures is to ensure proper storage, removal, transportation and disposal of hazardous solid waste

Actions

TABLE 7.27: ACTIONS RELATING TO HAZARDOUS SOLID WASTE (NON-MINERALISED)

No	Issue	Management commitment
These commitments apply <u>construction, operation and decommissioning</u> phases		
1	General	The waste management procedure for Okorusu will cover the storage, handling, and transportation of waste. Ensure that the contractor's responsible are made

No	Issue	Management commitment
		aware of these procedures.
2	Collection of waste	Designated waste collection points will be established on site. Care will be taken to ensure that there will be sufficient collection points with adequate capacity.
3	Waste storage	Hazardous waste will not be stored in skips but in designated suitable containers.
		Store empty print cartridges in a designated box at the office assistant's desk until removal from site.
4		Store fluorescent tubes in a special labelled steel drum at the engineering workshop.
5		Collect and accumulate other hazardous waste i.e. car batteries, miscellaneous batteries, oil filters, etc. at the engineering workshop until such time that the amounts can be removed from site.
6		Explosives packaging shall be safely burnt at the magazine site according to permit conditions and procedures.
7		Place oil and greasy cloths and rags into a steel drum and when full transported off site to the hazardous waste site.
8		Keep empty reagent bags (for a short period of time) at the reagents store until removed by the reagent contractor for refills.
9		Ensure that waste storage areas and/or containers meet the risk needs for that specific waste (e.g. impervious floor, bunded areas with drainage/containment systems, lids to prevent light material from blowing away or sealed containers for hazardous material).
10	Waste classification	An inventory of wastes will be compiled and will include estimated quantities of waste. The inventory will be kept up to date.
11	Waste transport	An approved waste management subcontractor will undertake the waste transport.
12	Disposal	Disposal of waste at appropriate permitted waste disposal facilities as follows: <ul style="list-style-type: none"> ○ Hazardous waste shall be removed from site and may be recycled or disposed of at the nearest hazardous site (i.e. Walvis Bay) ○ Dispose of spoiled reagents offsite at the reagents facility in Walvis Bay. ○ Damaged reagent bags shall also be removed by the reagent contractor for repairs or disposal.
13	Disposal records	Written evidence of safe disposal of waste will be kept.

7.14.2.3 Medical waste

Objectives

The objective of the management measures is to ensure proper storage, removal, transportation and disposal of medical waste

Actions

TABLE 7.28: ACTIONS RELATING TO MEDICAL WASTE

No	Issue	Management commitment
These commitments apply <u>construction, operation and decommissioning</u> phases		
1	General	The medical waste handling procedure for Okorusu will cover the storage, handling, and transportation of all medical waste. Ensure that the contractor's responsible are made aware of these procedures.
2	Disposal	Incinerate the medical waste offsite at an approved medical facility.

8 PARTIES RESPONSIBLE FOR THE IMPLEMENTATION OF THE EMP

This section describes the roles and responsibilities for implementing the various management plans.

8.1 MANAGING DIRECTOR

The Okorusu Fluorspar Mine General Manager has overall responsibility for environmental management on the mine and for ensuring this EMP is implemented. To assist the General Manager, Okorusu will have an Environmental Department that will be dedicated to managing and monitoring the environmental issues associated with the mine's activities.

8.2 SHE DEPARTMENT

The Okorusu SHE Department will be responsible for assisting the Managing Director and various other managers in all environmental and community issues, and specifically to ensure that the commitments as set out in this EMP are implemented during the design, operations, decommissioning and closure phases.

In addition to the above, the SHE Department is responsible for ensuring that all persons involved with Okorusu Fluorspar Mine comply with this EMP.

The SHE Department will be responsible for the following aspects related to compliance of this EMP:

- Regular inspections and auditing compliance to this EMP and any other relevant legal requirements e.g. permits and authorisations.
- Conduct environmental awareness training during induction training and on an ad hoc basis thereafter.
- Conduct scheduled monitoring as outlined in section 9 as well as any additional monitoring required by permit and authorisations issued to Okorusu by relevant authorities.
- Ensure compliance to this EMP and permits and authorisations issued to Okorusu by relevant authorities. Ensure responsibilities and target dates are developed for each one of the commitments in this EMP. This will be through one of the following mechanisms:
 - Design requirements; or
 - Construction tender documents and contracts.
- Submit required information to relevant authorities such as reporting related to monitoring and with regard to compliance with the EMP, permit and relevant authorisations.
- Liaise with Okorusu Management and various external stakeholders such as authorities and interested and affected parties on environmental management (where required).

8.3 EXTERNAL SPECIALISTS

Okorusu may appoint external environmental specialists, as and when required, to assist with the implementation of certain commitments made in the various management plans.

An independent auditor will also assess compliance against the EMP on a bi-annual basis.

9 MONITORING AND AUDITING

9.1 MONITORING

The management programmes in Section 7 have covered various aspects of the proposed monitoring. This section both augments those requirements and sets further detail where relevant. Okorusu will develop detailed monitoring procedures including the relevant monitoring commitments spelled out in this EMP.

As a general approach, the monitoring procedures will comprise the following:

- A formal procedure.
- Appropriately calibrated equipment – regular inspections and calibration of equipment will be undertaken in line with the equipment calibration/validation procedure.
- Where samples require analysis, they will be preserved according to laboratory specifications.
- Where practical, an accredited, commercial laboratory will undertake sample analyses
- Parameters to be monitored can be identified in consultation with a specialist in the field and/or the relevant authority.
- If necessary, following the initial monitoring results, certain parameters may be removed from the monitoring programme in consultation with a specialist and/or the relevant authority.
- Monitoring data will be stored in a structured database.
- Data will be interpreted and reports on trends in the data will be compiled on a quarterly basis.
- Both the data and the reports will be kept on record for the life of mine.

As a general comment, if monitoring points become damaged or redundant then they can be replaced with new points.

9.1.1 WATER MONITORING

Groundwater levels, metered abstraction and pumped yield must be recorded at monthly intervals from all boreholes that are used for groundwater abstraction and/or mine dewatering purposes. This is important for the purpose of establishing baseline values, but also to monitor any impacts from abstraction.

A groundwater monitoring plan must be compiled with dedicated boreholes drilled to monitor water quality at regular intervals. The monitoring plan must take into account the kind of contaminants/major ions/metals that potentially can be dissolved in the groundwater system due to the mining activities. The number of boreholes, the parameters that are analysed for, and the intervals of water sampling must be agreed on with the Department of Water Affairs.

The monitoring boreholes should be located in such a manner as to target any contamination coming from the mine operations.

Due to fact that no natural surface water resources exist on site, no surface water quality monitoring is required. However, stormwater management is essential for the prevent of contamination spreading beyond the mine's operation boundaries and it is important that the stormwater management structures be monitoring during the daily inspections.

9.1.2 AIR MONITORING

A dust monitoring network, comprising of single dust fallout units following the following the American Society for Testing and Materials standard method for collection and analysis of dust fall (ASTM D1739), should be implemented at the mine. A total of nine locations have been identified for dust monitoring (refer to Figure 9.1). Dust fallout should not exceed 1 200 mg/m²/day for any three months in a calendar year or for two consecutive months. The proposed dust bucket placements are:

- Site 1: north of the satellite pits (F);
- Site 2: north-west of the WRD 2;
- Site 3: east of the interim ore stockpile;
- Site 4: east of the Pit E;
- Site 5: south east of the crusher site;
- Site 6: west of Pit B;
- Site 7: east of the tailings storage facility;
- Site 8: west-northwest of the tailings storage facility; and
- Site 9: north east of pit D.

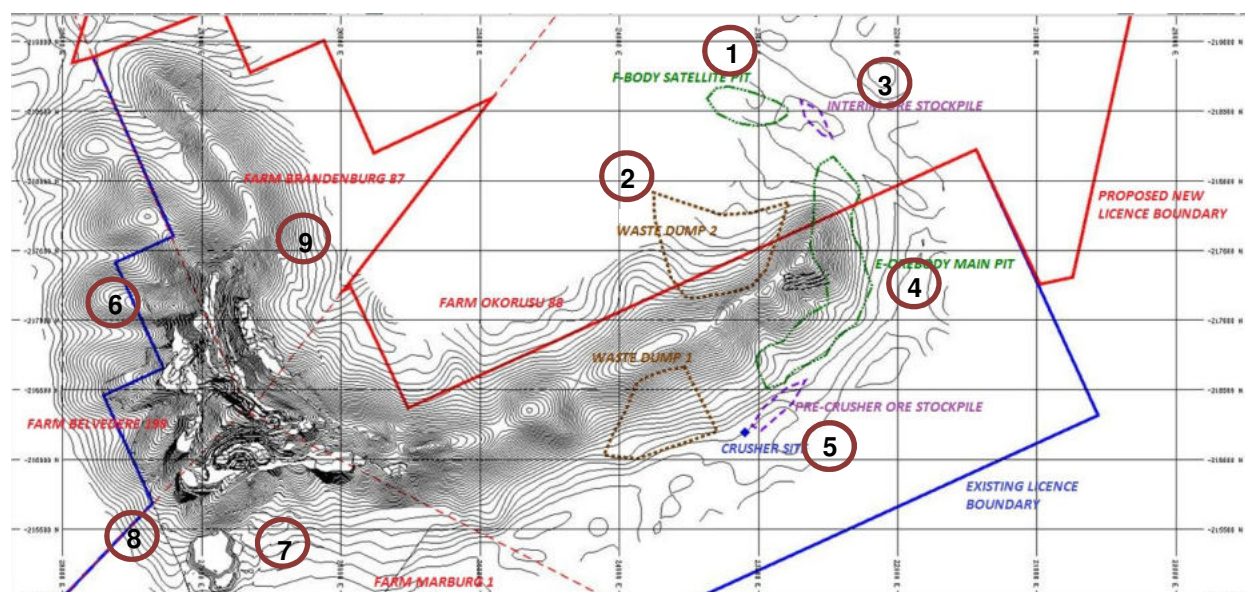


FIGURE 9.1: DUST BUCKET LOCATIONS

9.1.3 NOISE MONITORING

The frequency of noise monitoring as well as the parameters that should be determined are summarised in Table 9.1. In addition to the measurement of sound pressure levels, the 3rd octave band frequency spectra should also be recorded. Frequency spectrum data can provide useful insight into the nature of recorded sound pressure levels and assist with distinguishing between potential sources of noise that contribute to noise levels at a certain location. Source noise measurements could be conducted to confirm equipment manufacturer sound power data and assumed sound power data used in the current study.

TABLE 9.1: NOISE MONITORING PROGRAMME

Proposed Monitoring Plan	
Parameters to be Measured	Frequency
L_{Aeq}(1 hour) between 07:00 and 22:00	One campaign during the construction phase One campaign per year of operation
L_{Aeq}(1 hour) between 22:00 and 07:00	One campaign during the construction phase One campaign per year of operation
3rd Octave band frequency spectrum	During every campaign

9.1.4 BIODIVERSITY MONITORING

The biodiversity monitoring will include the following:

- An ecological management plan that includes recommendations on best rangeland management practises including a fire management plan, suitable game species and stocking rates, drinking water placement and vegetation monitoring.

- Monitor the occurrence and spread of invasive species so as to instigate steps for their control, following expert advice.
- Enforce speed limits, including using speed-reducing methods and speed-monitoring devices.

9.1.5 SOIL MANAGEMENT MONITORING

Regular inspections of soil stockpiles and rehabilitated areas will be undertaken to ensure that the soil conservation procedure is being implemented.

9.1.6 MINERALISED WASTE FACILITIES

The following issues will, where relevant, be monitored on a quarterly basis and reported as required by relevant permits and authorisations issued to the Okorusu Fluorspar Mine by the authorities:

- Slope stability, integrity of walls and liner in the tailings facility, presence of seepage, capacity of dirty water system, and functioning of drains.
- The volume of mineralised waste generated as well as the disposal area, height and footprint of mineralised waste disposal/storage facilities will be monitored and recorded as required. The results will be reported bi-annually.

9.1.7 NON-MINERALISED SOLID AND LIQUID WASTE

Weekly inspections of non-mineralised waste handling and management facilities will be undertaken to ensure that the waste management procedures are being implemented. The volume and type of non-mineralised waste, and the disposal destination, will be monitored and recorded as required. The results will be reported annually.

9.2 AUDITING COMPLIANCE OF THE EMP

The commitments contained in this EMP will, once an environmental clearance has been obtained, be Okorusu's contractual agreement with the Namibian authorities for sound environmental management. All employees, contractors and sub-contractors and any visitors to site will be expected to comply with the commitments contained herein.

9.2.1 AUDITS AND INSPECTIONS

The Environmental Department will conduct internal management audits against the commitments in the EMP. During the construction phase, these audits will be conducted every month. In the operational

phase, these audits will be conducted on a quarterly basis. The audit findings will be documented for both record keeping purposes and for informing continual improvement.

In addition, an independent professional will conduct an EMP performance assessment at least once a year for the Bi-Annual Report. The mine's compliance with the provisions of the EMP and the adequacy of the EMP relative to the on-site activities will be assessed in this report.

The Environmental Department will furthermore conduct daily inspections during construction and weekly inspections during mining operations.

9.2.2 SUBMISSION OF INFORMATION

As a minimum, the following documents will be submitted to the relevant authorities on an ongoing basis:

- The bi-annual report required by the MET will be submitted every six months.
- Other monitoring reports will be provided to the relevant authorities as per the permit and other agreements.

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