



WEATHERLY
MINING NAMIBIA

OTJIHASE – ENVIRONMENTAL COMPLIANCE REPORT

October 2016 - September 2019

Enquiries relating to this document should be directed to:

Ongopolo Mining Limited
Tel: +264 81 653 1214
E-mail: A.Thomson@weatherlyplc.com.na
Postal: PO Box 40791
Ausspannplatz
Windhoek, Namibia

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1. INTRODUCTION

1.1. PROJECT SUMMARY

Ongopolo Mining Limited (Ongopolo), is owned (97.5%) by Weatherly Mining Namibia Ltd (WMN), has a licence to mine the Otjihase copper deposit located on the farm Hoffnung 66 approximately 18km northeast of Windhoek, in the Khomas Region of Namibia.

Environmental Clearance for the operation of Otjihase Mine referred to herein as 'the Project' was issued by the Ministry of Environment and Tourism (MET) on 10th October 2016 - Appendix 1 and the mining licence was issued by the Ministry of Mines and Energy (MME) licence number ML10 and ML 22 Appendix 2.

Weatherly Mining Namibia Limited (Weatherly) owns all of the assets of its subsidiary company Ongopolo Mining Limited (Ongopolo), which in turn owns and operates the Otjihase Mine, which together with Matchless Mine, form part of its Central Operations. Otjihase Mine is located approximately 18 km northeast of Windhoek within the Windhoek Magisterial District in the Khomas Region, on the Farm Hoffnung 66.

Production at both Otjihase and Matchless mines (known as the Central Operations) was suspended on 15 September 2015 due to very low copper prices. Both operations were placed on care and maintenance and a small team of 17 people was employed across both sites to preserve the assets. Their main task is to keep the underground infrastructure dry by pumping all groundwater ingress to surface.

Restart plans were compiled for both operations but the capital necessary to implement the plans was not available within the company. Towards the end of 2018, a decision was made to try to sell the mines and a sales process commenced. This process is still ongoing. There are several interested parties and due diligence studies by these parties are currently underway.

During this reporting period, no physical work was carried out at the site, the small team maintains the site in a safe and stable condition and only conduct basic tasks. As a result, some elements of the Environmental Management Plan (EMP) such as environmental induction training etc have not occurred during this phase, therefore these elements of the EMP do not apply to the care and maintenance phase and been indicated in the report as "NA in the care and maintenance phase".

All currently disturbed areas are considered on hold in this phase, with no rehabilitation work undertaken during the reporting period This report summarizes the environmental aspects of the project against the EMP for the project.

1.2. TENEMENTS

The project is located on Mining Licence ML 10 and ML 22 held by Ongopolo mining (Appendix 2). There were no changes to the tenement boundaries during the reporting period.

1.3. ENVIRONMENTAL COMPLIANCE CONSULTANCY

Environmental Compliance Consultancy (ECC), a Namibian consultancy registration number 2013/11401, has prepared this report on behalf of the proponent. ECC operates exclusively in the environmental, social, health and safety fields for clients in Namibia in the public and private sector. ECC

is independent of the proponent and has no vested or financial interest in the proposed project except for fair remuneration of professional services rendered.

ECC has been engaged to conduct the findings of an environmental compliance audit, which accompanies the renewal application for the Environmental Clearance Certificate.

All compliance and regulatory requirements regarding this assessment document should be forwarded by email or posted to the following address:

Environmental Compliance Consultancy
PO BOX 9193
Klein Windhoek, Namibia
Tel: +264 81 669 7608
Email: info@eccenvironmental.com

2. COMPLIANCE

2.1. ANNUAL AUDIT OF COMPLIANCE

As requested by MET, an audit of compliance was completed for the project as detailed on the following pages.

Positive Initial findings:

- There is continual maintenance of pumping infrastructure at the Otjihase tailings dam, to enable the collection of the small amounts of seepage water and to prevent it from polluting the nearby river.

2.2. WATER ABSTRACTION

As mentioned above the key activity occurring onsite is the abstraction of groundwater from the underground workings to ensure the site remains safe and stable. During the reporting period, the following volumes were abstracted and distributed to neighbouring farms and discharged as environmental flows.

Water sampling of water abstracted occurred on an irregular basis to determine the quality of water that was discharged from the site, some of the water is supplied to the farmers for watering livestock. Results for the water sampling are included in Appendix 5.

Table 1 – Abstraction volumes at the Otjihase Mine

	VOLUME (M³)			
	2016	2017	2018	2019
January	-	41,968.00	42,103.00	22,272.00
February	-	38,325.00	38,988.00	801
March	-	31,690.00	44,000.00	16,831.00
April	-	41,563.00	39,248.00	31,067.00
May	-	42,858.00	40,277.00	32,220.00
June	-	41,750.00	43,093.00	31,375.00
July	-	41,442.00	41,107.00	32,347.00
August	-	16,992.00	45,674.00	-
September	-	10,715.00	35,049.00	-
October	45,293.00	5,565.00	34,517.00	-
November	41,720.00	12,724.00	33,687.00	-
December	43,000.00	37,413.00	35,937.00	-

2.3. INTERESTED & AFFECTED PARTIES

Issues or concerns raised:

- The owners of Farm Hoffnung 66 raised concerns over the damaged fence from wildlife and rainfall events, particularly in sections across rivers.
 - **Solution:** In response to the concerns raised five large expanses of fencing were repaired during 2017, monitoring of the fence and ongoing repairs continue as required.

Aside from many public enquires about the restart potential of the operations there were no other matters of concerns raised.

TABLE 2 - OTJIHASE EMP AUDIT

Commitment / Permit No.	Commitment / Condition	Source	Role / Position Responsibility	Compliance Information	Compliant YES/NO Partial NA	Details / Proof to sight as evidence	Findings / Observations	Recommended Actions
<i>Reference Number</i>	<i>Details</i>	<i>Parent Document</i>	<i>Who is responsibility for this condition</i>	<i>Evidence of Compliance</i>	<i>Level of Compliance</i>	<i>Details</i>	<i>Notes</i>	<i>Actions to rectify</i>
1.1	Environmental induction training is to be undertaken by all persons undertaking work at the mine (to be incorporated into normal induction training) including permanent workers, contractors and consultants.	EMP	EO	Immediate & ongoing	NA in the care and maintenance phase	Environmental induction training material Environmental awareness	No inductions undertaken during the reporting	When site operations recommence ensure inductions are carried out in line with the EMP.
1.2	On the job environmental training to be undertaken by each person working at the mine.	EMP	EO & Sup	Immediate & ongoing	NA in the care and maintenance phase	General Environmental Training/Training of supervisors Environmental awareness	No training undertaken during the reporting	When site operations recommence ensure inductions are carried out in line with the EMP
1.3	An environmental awareness programme to be implemented for mine workforce addressing pertinent topics as required.	EMP	EO	Immediate & ongoing	NA in the care and maintenance phase	Programme for the implementation of awareness topics Environment to be an agenda item in SHE meetings Environmental awareness	Ad hoc during care and maintenance predominate focus on safety.	When operations recommence ensure a maintenance programme is in place

Commitment / Permit No.	Commitment / Condition	Source	Role / Position Responsibility	Compliance Information	Compliant YES/NO Partial NA	Details / Proof to sight as evidence	Findings / Observations	Recommended Actions
2.1	Environmental Forum to be established which includes the owners and tenants of the mine property and surrounding properties.	EMP	CM	Immediate	NA in the care and maintenance phase	Environmental forum constitution	No invitations for environmental forums were sent out during the reporting periods.	Nil
2.2	Monitoring information to be made available to the affected community.	EMP	CM	Ongoing	NA in the care and maintenance phase	Public reports (quarterly reports) Public meetings (as required but at least once every year)	No reports were made available during the reporting period. The company website has been closed with no annual reports available.	Nil
2.3	Public feedback meetings to be held to communicate information on mine operations and to provide an opportunity for members of the public to ask questions and raise concerns.	EMP	CM	Immediate	NA in the care and maintenance phase	Meetings	No meetings were held during the reporting period	When the operation recommences a clear communication, strategy focused on community and stakeholders should be developed.

Commitment / Permit No.	Commitment / Condition	Source	Role / Position Responsibility	Compliance Information	Compliant YES/NO Partial NA	Details / Proof to sight as evidence	Findings / Observations	Recommended Actions
3.1	Vehicles and fuel-driven machinery will be regularly monitored and maintained. Maintenance programmes will be established and implemented.	EMP	EO & EM	Ongoing	Partial	As there is limited staff available for vehicle maintenance programmes, the limited equipment is services on an as needs bases.	Ad hoc servicing is required and undertaken during the care and maintenance phase.	When operations recommence ensure a full maintenance programme is in place
4.1	As far as is practically possible, restrict mining activities to the planned abstraction areas. The current authorisation only allows for the mining of the existing pillars within the underground workings. This authorisation does not include the opening of new underground areas west of the Kuruma Compartments.	EMP	GM & UM	Ongoing	NA in the care and maintenance phase	Detailed mine planning	No mining took place during the reporting period. The C&M team ensured the working areas around the pump faces were safe and accessible. No other work conducted.	Nil
5.1	Where possible, landscaping will follow the natural contours of the land.	EMP	GM	Ongoing	Partial	No landscaping occurred during the reporting period due to the limited equipment and budget in the care and maintenance phase.	Mine plans in place	Pending the future of the operations some progressive rehabilitation could commence. It is encouraged to commence with progressive rehabilitation and if

Commitment / Permit No.	Commitment / Condition	Source	Role / Position Responsibility	Compliance Information	Compliant YES/NO Partial NA	Details / Proof to sight as evidence	Findings / Observations	Recommended Actions
								unbudgeted funds should be sourced from a closure or rehabilitation fund if available.
5.2	During mine closure the topography of the site will be restored to its natural state where reasonably practicable.	EMP	CM & GM	Closure Phase	Yes	Detailed mine planning	Mine plans in place	Ongoing mine closure and rehabilitation plans to be refined on an annual basis
6.1	Topsoil is to be stripped from the footprint areas required for any development.	EMP	GM & UM	Prior to extension of sites.	NA in the care and maintenance phase	Land Clearing Permit system in place if required	No new land clearing undertaken during the reporting period	Ensure land clearing system is reactivated when sites recommence
6.2	Footprint areas are to be delineated and the soil is to be stripped from these areas.	EMP	GM & UM	Prior to stripping	NA in the care and maintenance phase	Land Clearing Permit system in place if required	No new land clearing undertaken during the reporting period	Nil
6.3	Soils are to be stripped until the subsoil horizon is encountered.	EMP	GM & UM	Ongoing prior to development	NA in the care and maintenance phase	Land Clearing Permit system in place if required	No new land clearing undertaken during the reporting period	Nil
6.4	Soil is to be placed at delineated operation soil stockpile areas are to be less than 1.5 m high with a slope of 1 in 3.	EMP	GM & UM	Ongoing prior to development	NA in the care and maintenance phase	Delineated soil stockpile areas	No new land clearing undertaken during the reporting period	Nil

Commitment / Permit No.	Commitment / Condition	Source	Role / Position Responsibility	Compliance Information	Compliant YES/NO Partial NA	Details / Proof to sight as evidence	Findings / Observations	Recommended Actions
6.5	The natural succession of vegetation on topsoil stockpiles is to be encouraged to reduce the potential for erosion.	EMP	GM & EO		NA in the care and maintenance phase	Vegetation programme	No new land clearing undertaken during the reporting period	Nil
6.6	Soils contaminated with hydrocarbons are to be bio remediated.	EMP	EO & EM	Ongoing	NA in the care and maintenance phase	Soil bioremediation facility	No bio remediation undertaken during the reporting period	Construct bio-remediation facility once operations recommence
7.1	Completed areas of the waste rock dumps not to be used in further operations are to be vegetated.	EMP	EO & GM	When site becomes inactive	NA in the care and maintenance phase	Detailed mine planning	NA	Ensure budgets for progressive rehabilitation is established.
7.2	Slopes are to be re-shaped to a ensure stability, vegetation establishment and erosion control.	EMP	EO & GM	When site becomes inactive	NA in the care and maintenance phase	Determination of final slope requirements (trials).	Draft mine closure and rehab plans in place	Mine closure plans should be updated.
7.3	Soil is to be placed over exposed surfaces at a minimum thickness of 300 mm.	EMP	EO & GM	When site becomes inactive	NA in the care and maintenance phase	-	NA	Nil

Commitment / Permit No.	Commitment / Condition	Source	Role / Position Responsibility	Compliance Information	Compliant YES/NO Partial NA	Details / Proof to sight as evidence	Findings / Observations	Recommended Actions
7.4	The natural succession of vegetation on topsoil stockpiles is to be encouraged to reduce the potential for erosion. Should natural succession not be successful, reseeding options are to be investigated.	EMP	EO & GM	When site becomes inactive	NA in the care and maintenance phase	Suitable indigenous seed mix.	-	Nil
7.5	Vegetation establishment and erosion is to be monitored to ensure that vegetation cover resembles that of the surrounding natural landscape.	EMP	EO	Rainy season following rehabilitation	NA in the care and maintenance phase	-	-	Nil
7.6	Erosion of vegetated slopes is to be repaired.	EMP	EO & GM	As required	NA in the care and maintenance phase	-	-	Nil
8.1	Where practically possible, clean storm water is to be diverted from all areas that may be contaminated.	EMP	GM & EO	Immediate	NA in the care and maintenance phase	Stormwater management measures in place.	-	Ensure compliance to EMP
8.2	Water from potentially contaminated areas is to be contained in pollution control facilities.	EMP	GM & EO	Ongoing	Partial	Stormwater measures in place.	Ad hoc water monitoring occurred during the reporting period.	Ensure water monitoring is conducted in line with the EMP.

Commitment / Permit No.	Commitment / Condition	Source	Role / Position Responsibility	Compliance Information	Compliant YES/NO Partial NA	Details / Proof to sight as evidence	Findings / Observations	Recommended Actions
8.3	Monitor water quality near potential pollution sources and the surrounding farm boreholes.	EMP	EO	Ongoing	NA in the care and maintenance phase	Groundwater monitoring programme	No boreholes have been monitored	Ensure to monitor boreholes when operations recommence or include monitoring of boreholes in care and maintenance budget – if none are located onsite identify neighbours to utilise or install.
8.4	Ground water levels are to be monitored.	EMP	EO	Ongoing	NA	Groundwater monitoring programme	No bores onsite	Nil
8.5	Should monitoring indicate that farmer boreholes do not provide sufficient water as a result of the lowering of the water table caused by mining activities, an alternate water supply is to be made available.	EMP	EO & GM	As required, but prior to the drying up of the water supply point.	NA in the care and maintenance phase	Alternative supply options	No water was needed as there were no operations undertaken during the reporting period; furthermore, the company provided water from the mine to the neighbouring farmer for livestock watering which was sampled on an ad hoc basis.	Ensure water is sampled.

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9.1	Where practically possible, clean storm water is to be diverted from all areas that may be contaminated.	EMP	GM & EO	Immediate	NA in the care and maintenance phase	Stormwater Management Plan	Where possible stormwater is diverted	Nil
9.2	Stormwater management plan to be established to minimise the retention of water on the site.	EMP	GM, CM & EO	Immediate	NA in the care and maintenance phase	Stormwater management measures in place.	Where possible stormwater is diverted however a site assessment during the rainy season is recommended.	Conduct a stormwater assessment during the rainy season to determine stormwater flow paths and sample potential contamination pathways.
9.3	Water from potentially contaminated areas to be contained in pollution control facilities.	EMP	Mining Manager	Ongoing	Partial	Stormwater management measures in place.	Water is held back in a stormwater dam near the processing plant, during operations this water is reused in the plant. In the care and maintenance phase there is no use for this water and therefore it is assumed that the overflow of this	Investigate alternatives for stormwater management in the care and maintenance phase.

Commitment / Permit No.	Commitment / Condition	Source	Role / Position Responsibility	Compliance Information	Compliant YES/NO Partial NA	Details / Proof to sight as evidence	Findings / Observations	Recommended Actions
							stormwater would discharge from site.	
9.4	Sewage effluent, wash bay water and other effluent produced onsite is to be contained, recycled and re-used.	EMP	EM & PM	Ongoing	NA in the care and maintenance phase	-	Limited amounts of sewage produced during the reporting period due to the skeleton staff, sewerage treated onsite.	Nil
9.5	Monitoring programme to be designed and recommendations made.	EMP	CM & EO	Immediate	Yes	Monitoring programme	Ad hoc monitoring is undertaken of the water that is pumped from the underground workings to the surface prior to distribution to the farmers.	Ensure monitoring programme is revised and in place prior to restart of operations. A care and maintenance monitoring plan should be established.
9.6	Develop a Stormwater Management Plan aimed at separating clean and dirty water and preventing contaminated discharge from leaving the site.	EMP	CM, GM & EO	Immediate	NA in the care and maintenance phase	Stormwater Management measures in place	Stormwater management during care and maintenance should be revised to ensure its practical and suitable for the site in preventing potential harm.	Nil

Commitment / Permit No.	Commitment / Condition	Source	Role / Position Responsibility	Compliance Information	Compliant YES/NO Partial NA	Details / Proof to sight as evidence	Findings / Observations	Recommended Actions
9.7	Pollution sources are to be addressed as a matter of urgency. It is anticipated that once the pollution sources have been addressed, contamination within the riverbeds will be alleviated within a few rainy seasons. The effectiveness of this will however need to be monitored.	EMP	CM, GM & EO	Immediate	Partial	Monitoring programme	Ongoing maintenance of seepage recovery systems at the tailing dam are in place and continue to be monitored visually on a daily and weekly basis.	Revise monitoring when operations recommence.
10.1	Limit the mine footprint to the areas required for operations. No access will be permitted outside of these areas.	EMP	CM	Immediate	NA in the care and maintenance phase	Mine plan	Access is limited to the limited staff onsite	Nil
10.2	Rehabilitation and end-use planning are to allow for the re-establishment of vegetation as far as practicable to allow for the restoration of biodiversity.	EMP	CM	Ongoing	NA in the care and maintenance phase	Mine closure plan	Level 2 Mine closure plan drafted.	Review the mine closure plan and ensure a care and maintenance plan is in place.
10.3	Staff will not be permitted access to the areas outside of the mine operational and residential areas.	EMP	CM	Ongoing	NA in the care and maintenance phase	This requirement will be included in all induction and awareness training material.	Limited personnel onsite for the care and maintenance	Ensure staff do not access prohibited areas in accordance to the EMP

Commitment / Permit No.	Commitment / Condition	Source	Role / Position Responsibility	Compliance Information	Compliant YES/NO Partial NA	Details / Proof to sight as evidence	Findings / Observations	Recommended Actions
10.4	Wet suppression will be utilised in order to manage fugitive dust emissions. Should wet suppression not be sufficient, soil binding agents will be utilised. Fugitive dust generated by mine-related activities must be maintained at acceptable levels.	EMP	GM & UM	Immediate	NA in the care and maintenance phase	Wet suppression systems.	No dust suppression measures have been applied during the reporting period.	Ensure dust suppression measures are utilized once operations recommences
10.5	Implement alien invasive species management.	EMP	EO	Immediate and ongoing	NA in the care and maintenance phase	Alien Invasive Species Management Programme	No alien species management was undertaken during the reporting period	Commence removing invasive species such as cacti from around the site.
11.1	Monitor downstream flows to ensure the impact is minimal.	EMP	EO	Ongoing	Partial	Surface water monitoring plan	Monitoring when water is available	Monitor downstream flows to ensure impact is minimal as operations recommence
11.2	Remove all contaminants deposited within drainage lines.	EMP	UM	Immediate	Yes	Ongoing mine closure and rehab plans include details of required work	All drainage lines are cleaned to an acceptable manner	Continue site clean-up programmes

Commitment / Permit No.	Commitment / Condition	Source	Role / Position Responsibility	Compliance Information	Compliant YES/NO Partial NA	Details / Proof to sight as evidence	Findings / Observations	Recommended Actions
12.1	Wet suppression will be utilised in order to manage fugitive dust emissions. Should wet suppression not be sufficient, soil binding agents will be utilised.	EMP	GM & UM	Immediate	NA in the care and maintenance phase	Wet suppression systems	No dust suppression measures have been applied during the reporting period.	Ensure dust suppression measures are utilized once operations recommences
12.2	Vegetate inactive areas onsite.	EMP	GM & UM	Immediate and ongoing	NA in the care and maintenance phase	Rehabilitation Programme	No areas were vegetated during the reporting period	Ensure inactive sites are vegetated
12.3	Monitoring of PM10 and dust fallout.	EMP	EO	Ongoing	NA in the care and maintenance phase	Air quality monitoring	No dust fallout monitoring was undertaken during the reporting period	When operations recommence start dust fallout and PM 10 monitoring
13.1	All noise-related complaints must be kept in a complaint register.	EMP	EO	Ongoing	NA in the care and maintenance phase	Complaints register	None received due to mine location	Ensure a complaints register is in place
13.2	Machinery that creates noise disturbance to human receptors at levels exceeding those permitted for a rural area at night according to the World Health Organisation will not be operated at night.	EMP	GM & UM	Ongoing	NA in the care and maintenance phase	Noise monitoring	Mine location not close to any neighbours	Nil

Commitment / Permit No.	Commitment / Condition	Source	Role / Position Responsibility	Compliance Information	Compliant YES/NO Partial NA	Details / Proof to sight as evidence	Findings / Observations	Recommended Actions
13.3	Annual noise assessments) will be carried out by accredited noise monitoring specialists. These assessments will monitor mining-related noise levels at the local farm residences.	EMP	EO	Ongoing	NA in the care and maintenance phase	Noise monitoring	Mine location not close to any neighbours	Nil
14.1	Lights are to be directed towards areas of work and provided with hoods to reduce light spill.	EMP	EO & EM	Throughout operations	NA in the care and maintenance phase	-	Mine location not close to any neighbours	Nil
14.2	Preference should be made for “softer” lights such as sodium vapour lights.	EMP	EO & EM	Throughout operations	NA in the care and maintenance phase	-	Mine location not close to any neighbours	Nil
14.3	Inactive areas of waste rock dump are to be vegetated using naturally occurring species.	EMP	EO	Immediate and ongoing	NA in the care and maintenance phase	-	Ongoing mine closure and rehab plans	Commence planning for progressive rehabilitation.

Commitment / Permit No.	Commitment / Condition	Source	Role / Position Responsibility	Compliance Information	Compliant YES/NO Partial NA	Details / Proof to sight as evidence	Findings / Observations	Recommended Actions
15.1	No expansion of the footprint of the Otjihase Mine without prior archaeological survey and approval. No archaeological sites are known from the operational area. If artefacts are unearthed, then an investigation will be commissioned.	EMP	EM & PM	Ongoing	NA in the care and maintenance phase	-	No expansion conducted during the reporting period	Nil
16.1	Hazardous chemicals are to be stored in bunded areas.	EMP	EM & PM	Immediate and ongoing	NA in the care and maintenance phase	Bunded areas	No new chemicals were brought onto site during the reporting period and chemicals that were onsite remain bunded.	When in operation all chemicals to be bunded
16.2	Hazardous chemicals (such as fuels and acids) are to be handled over areas provided with impervious surfaces or drip trays.	EMP	EM & PM	Immediate and ongoing	Yes	Impervious surfaces in chemical and hydrocarbon handling areas.	Refuelling of vehicles is conducted at the workshop onsite. All used oil is collected and stored in drums, which are then removed from the site by one of the local oil recycling companies.	Nil

Commitment / Permit No.	Commitment / Condition	Source	Role / Position Responsibility	Compliance Information	Compliant YES/NO Partial NA	Details / Proof to sight as evidence	Findings / Observations	Recommended Actions
16.3	Spills of hazardous chemicals are to be contained and cleaned up to ensure the protection of the environment.	EMP	EM & PM	Immediate and ongoing	NA in the care and maintenance phase	Spill procedures for hazardous substances. Spill kits as appropriate to areas of work. Training on clean-up	No spills were reported during the reporting period	Ensure monitoring in compliance with the EMP
17.1	Waste generated is to be separated at source into recyclable and non-recyclable waste wherever reasonably practicable.	EMP	All	Immediate	NA in the care and maintenance phase	Containers for the separation of waste management guideline	No formal recycling onsite however the site reused materials wherever possible	Consider a recycling programme when operations recommence.
17.2	Recyclable waste is to be re-used onsite or removed for re-use elsewhere.	EMP	EO	Ongoing	NA in the care and maintenance phase	Identify recycling and re-use options Waste management guideline	No formal recycling onsite however the site reused materials wherever possible	Consider a recycling programme when operations recommence.
17.3	Hazardous and general waste is to be separated at source where practically possible.	EMP	EO	Ongoing	NA in the care and maintenance phase	Containers for the separation of waste. Waste management guideline	No formal recycling onsite however the site reused materials wherever possible	Consider a recycling programme when operations recommence.
17.4	Soils contaminated with hydrocarbons are to be bio- remediated.	EMP	EM & EO	Ongoing	Partial	Bio-remediation facility not available onsite	No bioremediation facility onsite	Create a bioremediation facility and bioremediation method statement to be implemented when operations recommence.

Commitment / Permit No.	Commitment / Condition	Source	Role / Position Responsibility	Compliance Information	Compliant YES/NO Partial NA	Details / Proof to sight as evidence	Findings / Observations	Recommended Actions
								Contaminated or recycled oil is removed by Oil Tech.
17.5	Hazardous waste is to be disposed at the hazardous waste disposal site.	EMP	EO	Ongoing	NA in the care and maintenance phase	Identification of hazardous waste disposal site, hazardous waste transport company. Disposal agreements to be put in place with the hazardous waste disposal site operators.	No hazardous waste produced during the reporting period	Ensure all hazardous waste is accounted for and disposed of in accordance with the EMP
17.6	General waste is to be disposed of at the general waste disposal site.	EMP	EO	Ongoing	NA in the care and maintenance phase	General waste disposal site Waste management guideline	General waste disposed of in the on-site landfill.	Ensure good management practices of the onsite landfill
18.1	Vehicles will be regularly monitored and maintained. Maintenance programmes will be established and implemented.	EMP	EM	Ongoing	NA in the care and maintenance phase	Maintenance programme	Ad hoc during care and maintenance	When operations recommence ensure a full maintenance programme is in place
18.2	Vehicular movements onsite will be restricted to operational areas.	EMP	CM, EM & EO	Ongoing	NA in the care and maintenance phase	Induction and awareness training	No induction undertaken as no operations during the reporting period. No new vehicle movements onsite.	When site operations recommence ensure inductions are carried out in line with the EMP.

Commitment / Permit No.	Commitment / Condition	Source	Role / Position Responsibility	Compliance Information	Compliant YES/NO Partial NA	Details / Proof to sight as evidence	Findings / Observations	Recommended Actions
18.3	Drivers will receive induction and awareness training informing them of the rules related to travelling in designated areas and the importance of conserving the local fauna and flora.	EMP	EO	Ongoing	NA in the care and maintenance phase	Induction and awareness training	No induction, training as no operations undertaken during the reporting period	When site operations recommence ensure inductions are carried out in line with the EMP.
18.4	Speed limits will be maintained. Speed limit signs will be visible and legible onsite.	EMP	GM	Immediate and ongoing	Yes	Signs Induction and awareness training	Sign present but no induction as no operations were undertaken during the reporting period	Nil
18.5	Wet suppression will be utilised in order to manage fugitive dust emissions. Should wet suppression not be sufficient, soil binding agents will be utilised.	EMP	GM & UM	Ongoing	NA in the care and maintenance phase	Dust suppression plan	No dust suppression measures in place as there are no operations during the reporting period	Ensure suppression methods are in place when operation recommences
19.1	All employees will be educated on the procedures to follow and the environmental restrictions regarding all environmental parameters. This will form part of the	EMP	EO	Ongoing	NA in the care and maintenance phase	Induction and awareness training	No induction has taken place as no operations were undertaken during the reporting period	Nil

Commitment / Permit No.	Commitment / Condition	Source	Role / Position Responsibility	Compliance Information	Compliant YES/NO Partial NA	Details / Proof to sight as evidence	Findings / Observations	Recommended Actions
	environmental awareness.							
19.2	Access onsite will be restricted to construction and operational areas where practically possible.	EMP	GM & UM	Immediate	NA in the care and maintenance phase	Fencing and fence maintenance Induction and awareness training	Limited care and maintenance personnel onsite. Site remains fenced.	Ensure compliance to EMP when operations recommence
19.3	Workers will be restricted to construction / operational areas.	EMP	CM & GM	Ongoing	NA in the care and maintenance phase	Induction and awareness training	Limited care and maintenance personnel onsite. Site remains fenced.	Ensure compliance to EMP when operations recommence
19.4	The mine will establish and implement a monitoring programme to regulate the harvesting of plant material and fuel-wood from the natural vegetation surrounding the mine.	EMP	CM, GM & EO	Immediate and ongoing	NA in the care and maintenance phase	Monitoring programme	Nil	Ensure compliance to EMP when operations recommence
19.5	The poaching and hunting of animals will be strictly forbidden.	EMP	CM & GM	Ongoing	NA in the care and maintenance phase	Induction and awareness training	Limited care and maintenance personnel onsite no reported poaching cases.	Ensure compliance to EMP when operations recommence
20.1	Monthly internal audits of EMP compliance	EMP	EO	Immediate	NA in the care and maintenance phase	Performance assessment requirements	No audits were undertaken during	Ensure compliance to EMP when

Commitment / Permit No.	Commitment / Condition	Source	Role / Position Responsibility	Compliance Information	Compliant YES/NO Partial NA	Details / Proof to sight as evidence	Findings / Observations	Recommended Actions
							the reporting period	operations recommence
20.2	Annual external audit of EMP compliance	EMP	Independent Consultant	Annual	NA in the care and maintenance phase	Performance assessment requirements	No audits were undertaken during the reporting period	
20.3	Submission of external annual report to environmental authorities	EMP	CM	Annual	Yes	Performance assessment requirements	Submitted to authorities	This report to be submitted to authorities.
21.1	Implementation of the awareness programme on risks associated with STIs and HIV/AIDS for workforce.	EMP	CM & SHE Officer	Immediate and ongoing	NA in the care and maintenance phase	HIV/AIDS Construction Workforce Awareness Programme	No inductions were undertaken during the reporting period	When site operations recommence ensure inductions are carried out in line with the EMP.
21.2	Recruitment of local persons as far as practicable.	EMP	Com	As required	NA in the care and maintenance phase	Affirmative active	No induction was undertaken during the reporting period	When site operations recommence ensure inductions are carried out in line with the EMP.
21.3	Identify training needs and provide such training to local persons as far as practicable.	EMP	Com	As required	NA in the care and maintenance phase	Training	No training system records during the reporting period	When site operations recommence ensure inductions are carried out in line with the EMP.

Commitment / Permit No.	Commitment / Condition	Source	Role / Position Responsibility	Compliance Information	Compliant YES/NO Partial NA	Details / Proof to sight as evidence	Findings / Observations	Recommended Actions
21.4	Local procurement of goods and services were available and where commercially and technically practicable to the project.	EMP	Com	As required	NA in the care and maintenance phase	Database of local service providers	Limited procurement needs due to no operations.	Local providers will be used when operations recommence
21.5	Speed limits will be adhered to at all times.	EMP	All	Ongoing	NA in the care and maintenance phase	Road traffic safety requirements will be included in the induction material. All drivers, including contractors, will receive induction and awareness training.	No inductions were undertaken during the reporting period	When site operations recommence ensure inductions are carried out in line with the EMP.
21.6	Signage in place along the access road to promote traffic safety.	EMP	CM	Immediate	NA in the care and maintenance phase	Maintenance of signage	No inductions were undertaken during the reporting period	When site operations recommence ensure inductions are carried out in line with the EMP.
21.7	Drivers servicing the mine to be subjected to public safety awareness.	EMP	CM	Incorporated into a safety induction programme	NA in the care and maintenance phase	All drivers, including contractors, will receive induction and awareness training.	Company policy states drivers should have valid Namibian drivers' licences.	Nil

Commitment / Permit No.	Commitment / Condition	Source	Role / Position Responsibility	Compliance Information	Compliant YES/NO Partial NA	Details / Proof to sight as evidence	Findings / Observations	Recommended Actions
21.8	Wet suppression will be utilised in order to manage fugitive dust emissions. Should wet suppression not be sufficient, soil binding agents will be utilised.	EMP	GM & UM	Ongoing	NA in the care and maintenance phase	Dust suppression plan	No operations were undertaken during the reporting period	Nil

3. CONCLUSION AND RECOMMENDATION

3.1. RECOMMENDATIONS

It is well understood that operation in a care and maintenance phase has a financial restriction, and the fate and future of operation in care and maintenance is uncertain. Often resulting in a state of limbo between possible restart or closure and rehabilitation, this uncertain state influences what work is feasible and what work can be conducted during this period. Therefore, it should be noted that the company may only be able to implement some of the proposed recommendations below, however, an action plan on how the company intends to address them could be prepared.

- The draft mine closure plan should be reviewed and updated since its last review 3 years ago
- A progressive closure and rehabilitation strategy should be drafted to reduce the Company's and State liability of the operation while in the care and maintenance phase, this strategy should take into account areas that can be rehabilitated without being re-disturbed if operations were to recommence.
- A monitoring plan for care and maintenance should be established, implemented and submitted to MET.
- The stormwater management plan with appropriate mitigation measures should be revised for the care and maintenance phase.
- The pyrite stockpile should be reduced by means of sale or capped and rehabilitated to prevent possible mine drainage concerns.
- When the operations recommence all EMP requirements should be adhered to and the potential for installing groundwater monitoring boreholes should be investigated.

3.2. CLOSE-OUT SUMMARY

OML notes that when operations recommence at Otjihase Mine that environmental monitoring will recommence in accordance with the EMP. Furthermore, external audits will be conducted along with biannual reporting as required by MME and MET.

The mine continues to work towards improving the conditions associated with the historic mine. The abstraction of groundwater from the underground workings is ongoing in order to ensure the site remains safe and stable, the ad hoc monitoring approach could be improved with a care and maintenance monitoring plan.

It is recommended that Otjihase Mine continues to adhere to all environmental legislation and company standards.

4. APPENDICES

APPENDIX 1 – OTJIHASE ENVIRONMENTAL CLEARANCE CERTIFICATE



REPUBLIC OF NAMIBIA

MINISTRY OF ENVIRONMENT AND TOURISM

Tel: (00 26461) 284 2111
Fax: (00 26461) 229 936

E-mail: rikka.shikongo@met.gov.na

Enquiries: Ms. Rikka Shikongo

Cnr Robert Mugabe &
Dr Kenneth Kaunda Street
Private Bag 13306
Windhoek
Namibia

10 October 2016

OFFICE OF THE ENVIRONMENTAL COMMISSIONER

The Managing Director
Weatherly Mining Namibia
P. O. Box 40791
Ausspannplatz
Windhoek

Dear Sir/Madam

SUBJECT: ENVIRONMENTAL CLEARANCE CERTIFICATE FOR THE OPERATION OF OTJIHASE MINE ON MINING LICENSE 10 AND 22, FARM HOFFNUNG 66, KHOMAS REGION


Environmental Management Plan submitted is sufficient as it made provisions of the environmental management concerning the activities. From this perspective regular environmental monitoring and evaluations on environmental performance should be conducted. Targets for improvements should be established and monitored from time to time.

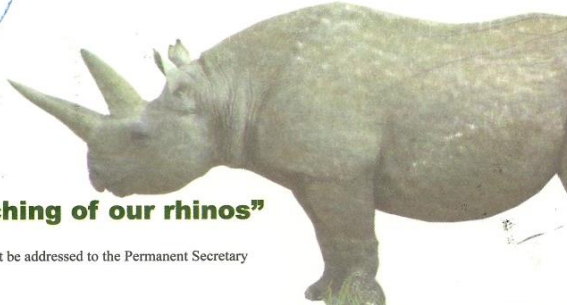
This Ministry reserves the right to attach further legislative and regulatory conditions during the operational phase of the project.

On the basis of the above, this letter serves as an environmental clearance certificate for the project to proceed. However, this clearance letter does not in any way hold the Ministry of Environment and Tourism accountable for misleading information, nor any adverse effects that may arise from this project's activities. Instead, full accountability rests with Weatherly Mining Namibia and his/her consultant.

This environmental clearance certificate is valid for a period of 3 (three) years, from the date of issue unless withdrawn by this office.

Yours sincerely,


Teofilus Nghitila
ENVIRONMENTAL COMMISSIONER



"Stop the poaching of our rhinos"

All official correspondence must be addressed to the Permanent Secretary

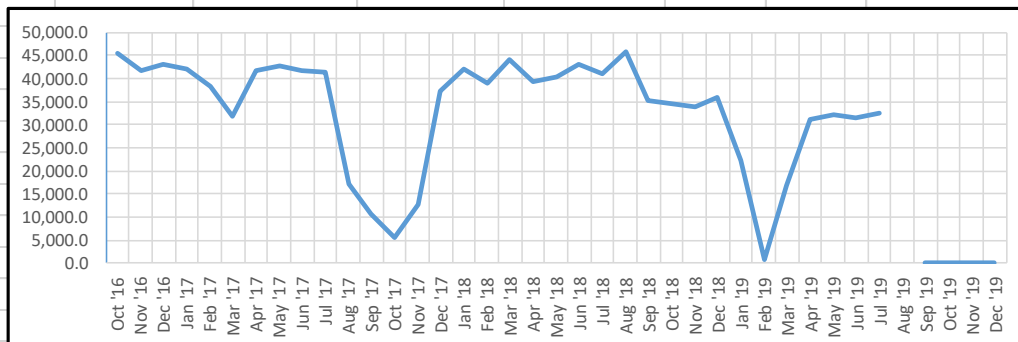
APPENDIX 2– MINING LICENCE - ML10 AND ML 22

APPENDIX 3 – OTJIHASE ENVIRONMENTAL MANAGEMENT PLAN

APPENDIX 4 – OTJIHASE ABSTRACTION VOLUMES

OTJIHASE MINE

Date:	Meter Reading	Volume (m³)	Accumulative		
Sep '16	897,475.0				
Oct '16	942,768.0	45,293.0	45,293.0		
Nov '16	984,488.0	41,720.0	87,013.0		
Dec '16	1,027,488.0	43,000.0	130,013.0	Year end total :	130,013.0
Jan '17	1,069,456.0	41,968.0	171,981.0		
Feb '17	1,107,781.0	38,325.0	210,306.0		
Mar '17	1,139,471.0	31,690.0	241,996.0		
Apr '17	1,181,034.0	41,563.0	283,559.0		
May '17	1,223,892.0	42,858.0	326,417.0		
Jun '17	1,265,642.0	41,750.0	368,167.0		
Jul '17	1,307,084.0	41,442.0	409,609.0		
Aug '17	1,324,076.0	16,992.0	426,601.0		
Sep '17	1,334,791.0	10,715.0	437,316.0		
Oct '17	1,340,356.0	5,565.0	442,881.0		
Nov '17	1,353,080.0	12,724.0	455,605.0		
Dec '17	1,390,493.0	37,413.0	493,018.0	Year end total :	363,005.0
Jan '18	1,432,596.0	42,103.0	535,121.0		
Feb '18	1,471,584.0	38,988.0	574,109.0		
Mar '18	1,515,584.0	44,000.0	618,109.0		
Apr '18	1,554,832.0	39,248.0	657,357.0		
May '18	1,595,109.0	40,277.0	697,634.0		
Jun '18	1,638,202.0	43,093.0	740,727.0		
Jul '18	1,679,309.0	41,107.0	781,834.0		
Aug '18	1,724,983.0	45,674.0	827,508.0		
Sep '18	1,760,032.0	35,049.0	862,557.0		
Oct '18	1,794,549.0	34,517.0	897,074.0		
Nov '18	1,828,236.0	33,687.0	930,761.0		
Dec '18	1,864,173.0	35,937.0	966,698.0	Year end total :	473,680.0
Jan '19	1,886,445.0	22,272.0	988,970.0	No power to meter	
Feb '19	1,887,246.0	801.0	989,771.0		
Mar '19	1,904,077.0	16,831.0	1,006,602.0		
Apr '19	1,935,144.0	31,067.0	1,037,669.0		
May '19	1,967,364.0	32,220.0	1,069,889.0		
Jun '19	1,998,739.0	31,375.0	1,101,264.0		
Jul '19	2,031,086.0	32,347.0	1,133,611.0		
Aug '19			1,133,611.0		
Sep '19		0.0	1,133,611.0		
Oct '19		0.0	1,133,611.0		
Nov '19		0.0	1,133,611.0		
Dec '19		0.0	1,133,611.0	Year end total :	166,913.0



APPENDIX 5 - RESULTS OF THE WATER ANALYSIS

TEST REPORT

To: **Ongopolo Mining Limited**

Otjihase Mine
P.O. Box 40791
Windhoek

Date received: **09-Oct-17**

Date required:

Date completed: **25-Oct-17**

Attn: Mr R. Hulbert / Mr A. Thomson
e-mail: a.thomson@weatherlyplc.com

Your Reference: Otjihase

Lab Reference: **I171862**

Sample details	water sample
Location of sampling point	Otjihase
Description of sampling point	Water out of mine
Date of sampling	2017/10/06
Time of sampling	-
Test item number	I171862/1

Parameter	Value	Units	Classification	Recommended maximum limits		
				Human consumption		
				Group A	Group B	Group C
pH	8.2		A	6-9	5.5-9.5	4-11
Electrical Conductivity	217.4	mS/m	B	150	300	400
Turbidity	20	NTU	D	1	5	10
Total Dissolved Solids	1933	mg/l				
Total Suspended Solids	19	mg/l				
P-Alkalinity as CaCO ₃	0	mg/l				
Total Alkalinity as CaCO ₃	183	mg/l				
Total Hardness as CaCO ₃	1118	mg/l	C	300	650	1300
Ca-Hardness as CaCO ₃	599	mg/l	C	375	500	1000
Mg-Hardness as CaCO ₃	519	mg/l	C	290	420	840
Chloride as Cl ⁻	81	mg/l	A	250	600	1200
Fluoride as F ⁻	0.5	mg/l	A	1.5	2.0	3.0
Sulphate as SO ₄ ²⁻	1130	mg/l	C	200	600	1200
Nitrate as N	0.4	mg/l	A	10	20	40
Nitrite as N	0.02	mg/l				
Ammonia Nitrogen as N	0.2	mg/l				
Total Nitrogen as N	<0.5	mg/l				
Sodium as Na	139	mg/l	B	100	400	800
Potassium as K	23	mg/l	A	200	400	800
Magnesium as Mg	126	mg/l	C	70	100	200
Calcium as Ca	240	mg/l	C	150	200	400
Stability pH, at 25°C	6.9					
Langelier Index	1.3	scaling		>0=scaling, <0=corrosive, 0=stable <6.5=scaling, >7.5=corrosive, ≥6.5 and ≤7.5=stable Applies to water in the pH range 7-8 which also contains dissolved oxygen ratios <0.2 no corrosive properties ratios >0.2 increasing corrosive tendency		
Ryznar Index	5.6	scaling				
Corrosivity ratio	7.1	increasing corrosive tendency				

S. Rügheimer
Laboratory Manager

Page 1 of 2

TEST REPORT

To: **Ongopolo Mining Limited**

Otjihase Mine
P.O. Box 40791
Windhoek

Date received: **09-Oct-17**

Date required:

Date completed: **25-Oct-17**

Attn: Mr R. Hulbert / Mr A. Thomson

e-mail: a.thomson@weatherlyplc.com

Your Reference: Otjihase

Lab Reference: **I171862**

Sample details water sample
Location of sampling point Otjihase
Description of sampling point Water out of mine
Date of sampling 2017/10/06
Time of sampling -
Test item number I171862/1

Parameter	Value	Units	Classification	Recommended maximum limits		
				Human consumption		
				Group A	Group B	Group C
Total Metals:						
Manganese as Mn	0.64	mg/l	B	0.05	1.0	2.0
Iron as Fe	1.5	mg/l	C	0.1	1.0	2.0
Copper as Cu	0.91	mg/l	B	0.5	1	2
Zinc as Zn	1.7	mg/l	B	1.0	5.0	10
Chromium as Cr	<0.01	mg/l	A	0.1	0.2	0.4
Cadmium as Cd	<0.01	mg/l	A	0.01	0.02	0.04
Lead as Pb	<0.01	mg/l	A	0.05	0.1	0.2
Arsenic as As	<0.01	mg/l	A	0.1	0.3	0.6
Uranium as U	<0.01	mg/l	A	1.0	4.0	8.0
Nickel as Ni	<0.01	mg/l	A	0.25	0.5	1.0
Aluminium as Al	1.3	mg/l	D	0.15	0.5	1.0
Mercury as Hg	<0.01	mg/l	**	0.005	0.01	0.02
Dissolved Metals:						
Manganese as Mn	0.58	mg/l	B	0.05	1.0	2.0
Iron as Fe	0.02	mg/l	A	0.1	1.0	2.0
Copper as Cu	0.13	mg/l	A	0.5	1	2
Zinc as Zn	0.66	mg/l	A	1.0	5.0	10
Chromium as Cr	<0.01	mg/l	A	0.1	0.2	0.4
Cadmium as Cd	<0.01	mg/l	A	0.01	0.02	0.04
Lead as Pb	<0.01	mg/l	A	0.05	0.1	0.2
Arsenic as As	<0.01	mg/l	A	0.1	0.3	0.6
Uranium as U	<0.01	mg/l	A	1.0	4.0	8.0
Nickel as Ni	<0.01	mg/l	A	0.25	0.5	1.0
Aluminium as Al	0.04	mg/l	A	0.15	0.5	1.0
Mercury as Hg	<0.01	mg/l	**	0.005	0.01	0.02

Remark ** = 0.01mg/l is our detection limit for Hg with ICP-OES; cold-vapour atomic absorption is the preferred method

S. Rügheimer
Laboratory Manager

Page 2 of 2



Proponent: **Weatherly Mining Namibia**

Operation: **Otjihase Copper Mine**

Report Name: **Environmental Assessment of the Otjihase Copper Mine**
Environmental Management Plan

Report Status: **FINAL**

Revision No: 1

Report Date: January 2013

Report Number: N0575/REP04

Prepared by: Simon Charter



Johannesburg Tel: +27 11 326 4158
Fax: +27 11 326 4118
PO Box 68821, Bryanston, 2021

KwaZulu Natal Tel/Fax: +27 33 343 5826
2 Wattle Grove, Hilton, 3201

Swakopmund Tel: +264 64 406 587
Fax: +264 88 647 501
PO Box 4821, Swakopmund



REPORT DISTRIBUTION

	Name	Designation	Affiliation
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INFORMATION SHEET

MINING OPERATION:

OTJIHASE COPPER MINE

REPORT DETAILS

Report Name: Environmental Assessment of the Otjihase Copper Mine
Environmental Management Plan

Report Number: N0575/REP04

Report Status: Final

Revision Number: 01

Date: January 2013

PROPONENT

Weatherly Mining Namibia

Contact Person: Craig Thomas

Designation: Managing Director

Tel: 061 293 1000

Fax: 061 293 1200

Email: C.Thomas@weatherlyplc.com.na

Postal Address: PO Box 40791, Aussspannplatz, Windhoek

ENVIRONMENTAL ASSESSMENT PRACTITIONER

Synergistics Environmental Services (Pty) Ltd – Namibia

Contact Person: Simon Charter

Designation: Senior Environmental Scientist

Tel: 064 64 406 587

Fax: 064 88 647 501

Email: simon@synergistics.com.na

Postal Address: PO Box 4821, Swakopmund

EAP Expertise: MSc Environmental Management, University of Cape Town, 2006.
6+ years environmental management and assessment experience in the mining and processing sector.

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LIST OF TERMS, ACRONYMS AND ABBREVIATIONS

BID	Background Information Document
CAR	China Africa Resources plc
DWA	Department of Water Affairs
DEA	Department of Environmental Affairs
EIA	Environmental Impact Assessment
EMA	Environmental Management Act
EMP	Environmental Management Plan
IAP	Interested and Affected Party
masl	Metres above sea level
MAWF	Ministry of Agriculture, Water and Forestry
MET	Ministry of Environment and Tourism
OMPL	Ongopolo Mining & Processing (Pty) Ltd.
PM10	Particulate matter with a diameter smaller than 10 micro meters
TCL	Tsumeb Corporation Limited

WEATHERLY MINING NAMIBIA

ENVIRONMENTAL ASSESSMENT OF THE OTJIHASE COPPER MINE

Environmental Management Plan

1. INTRODUCTION

1.1 Background

Weatherly Mining Namibia Limited (Weatherly) owns all of the assets of its subsidiary company Ongopolo Mining Limited (Ongopolo), which in turn owns and operates the Otjihase Mine, which together with Matchless Mine, form part of its Central Operations. Otjihase Mine is located approximately 18 km north east of Windhoek within the Windhoek Magisterial District in the Khomas Region, on the Farm Hoffnung 66. Operations at the mine commenced in 1980 under the Otjihase Mining Company (owned by TCL and JCI) to produce copper concentrate for processing to blister copper at the Tsumeb Copper Smelter. Pyrite concentrate was also produced as part of the TCL operations for supply to Rössing Uranium Mine. The mine was still in operation at the time of the liquidation of TCL, then under the ownership of Goldfields Namibia in April 1998. In 2000 the mine was acquired by Ongopolo Mining and Processing Limited (OMPL). Weatherly Mining took over Otjihase from OMPL in 2006. The current operations are focussed on the production of copper concentrate for export from Namibia.

Access to the mine is via a dedicated access road from the main Windhoek-Gobabis road. The mine is served by TransNamib's Hoffnung Siding which is situated adjacent to the main road.

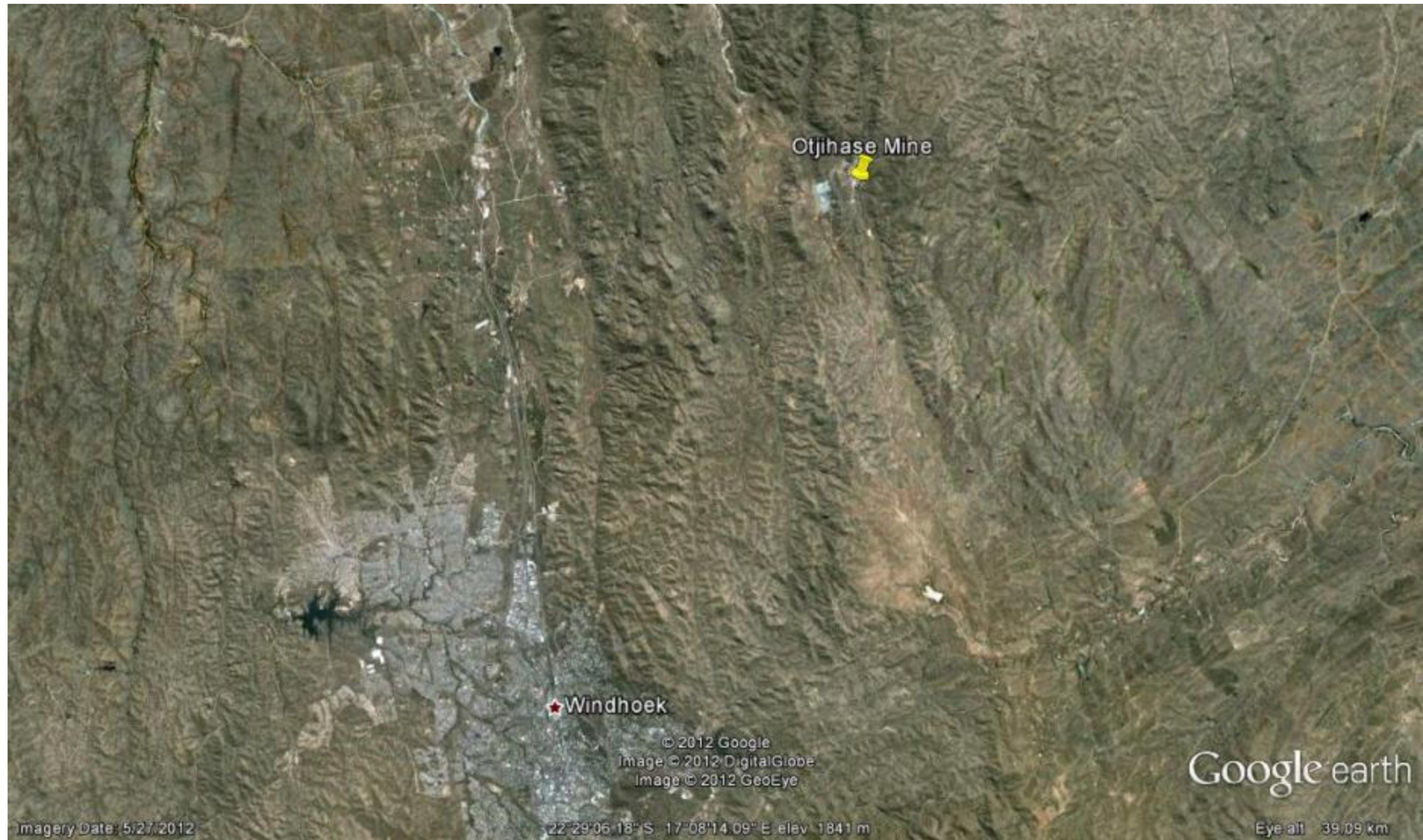


Figure 1-1: Location of the Otjihase Mine (Source: Google Earth)

1.2 Historical Background

The development of the Otjihase Mine by the Otjihase Mining Company (OMC), a subsidiary of JCI, began in 1973 and came into production in late 1975. Due to the fall in the price of copper, mining operations were suspended in 1977. The mine was placed on care and maintenance until the end of 1980, when TCL entered into a joint venture agreement with OMC. The mine was re-equipped, the mining method was changed and a new access tunnel was developed. Full production was achieved in 1982.

The mine was still operating at the date of provisional liquidation of TCL, then a subsidiary of Goldfields Namibia, in April 1998. All of the copper concentrate was sent to the Tsumeb Smelter for the production of blister copper and the pyrite was railed to Rössing Uranium Mine for the manufacture of sulphuric acid used in the uranium extraction process.

The TCL operations including Otjihase Mine were operated under OMPL from 2000 until 2006, when OMPL was acquired by Weatherly Plc.

In recent years the market for pyrite has dwindled and no pyrite concentrate has been produced at the mine as part of the OMPL or the Weatherly operations.

Otjihase Mine, together with Weatherly's other Namibian operations were placed in care and maintenance in December 2008 as a result of the downturn in the international metal price. Operations once again commenced at the mine in February 2011.

In March 2010, Dundee Precious Metals acquired the Tsumeb Smelter from Weatherly and the current focus of the Otjihase Mine is to produce copper concentrate for export in terms of an offtake agreement with the Swiss metals trader Louis Dreyfus Commodities Metals Suisse S.A. (LD). As part of the agreement Weatherly will sell to LD its entire output from the mine until 2017.

Currently Otjihase Mine and Matchless Mine are managed as a single operation (Central Operations) with ore produced at both underground operations being processed at the Otjihase concentrator.

1.3 Ore Reserves

Production at Otjihase until 2015 will be from the Kuruma and Kuruma West areas with future production from pillar extraction from the upper levels of the mine. Deeper resources in the Tigerschlucht compartment are subject to further feasibility studies. This would involve the extension of the existing decline, which if deemed feasible would need to be addressed as an amendment to this EA.

Recoverable reserves for the Otjihase and Matchless operations are estimated at 3.9 million tonnes (Mt) grading 1.7% copper and 0.25 g/t gold and production is expected to average more than 7 000 tpa of contained copper metal until 2015.

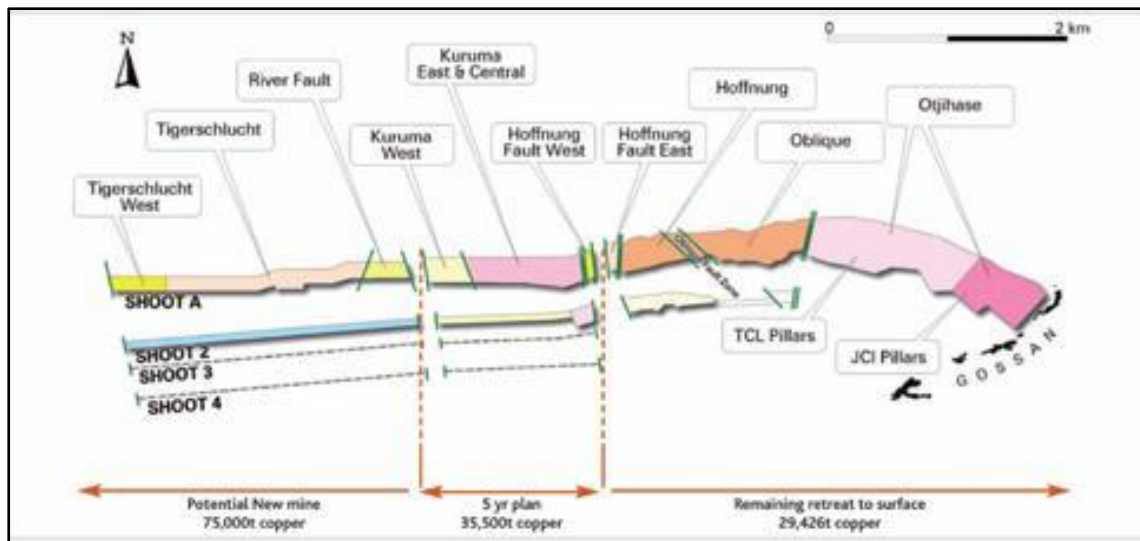


Figure 1-2: Otjihase Mine – Plan View

Source: www.weatherlyplc.com

1.4 Current operations

Figures 1-3 and 1-4 provide a regional overview and site layout respectively.

The description of the operations provided below has been abstracted from the following document:

“Coffey Mining South Africa. 2010. Technical Review and Valuation of Otjihase and Matchless Mines, Central Operations of Weatherly Mining Namibia.”

Figure 1-3: Regional overview

Figure 1-4: Site layout

1.4.1 Mining

Historically, mining has been by means of room and pillar with primary extraction rates ranging from around 80% to 85% in the upper Otjihase compartment to 45% in the Kuruma compartment. Development has reached the Kuruma compartment by means of a footwall drive with access for the workforce and material by means of a drive on the southern margin of the ore body. The ore is trucked to an underground crusher station immediately east of the Hoffnung East fault from where it is transported by means of 10 conveyor belt sections to a point where it is tipped into hoppers pulled by locomotives which take the ore the last 1.5km to the mill receiving bins on surface.

A significant amount of the current production is derived from pillar extraction in the Kuruma compartment at a depth of starting at around 650m from surface and continuing to approximately 800m depth. The primary workings in the Kuruma compartment have been filled with plant tailings, supplemented by classified reclaimed tailings and a 3% cement additive. Two thirds of the cement, a high cost item, is planned to be replaced by fly ash which may be made available by NamPower free of charge at their plant in Windhoek.

A maximum monthly production rate of 35,000tpm is planned for the Otjihase mine. In the initial start-up of the mine the majority of the tonnage, up to 25,000tpm, is being sourced from pillar mining in the Kuruma East and Central compartments. During this period a 300m footwall drive is being developed to access the un-mined Kuruma West area.

Once complete, production should commence from the Kuruma West compartment building to a maximum monthly production rate of 20,000tpm in Year 5.

Approximately half of the production in the five-year plan is to be extracted by pillar extraction from the Kuruma East and Central compartment, a further quarter of the reserve will be sourced from the Kuruma West compartment (primary extraction). Kuruma East, Central, and West compartments will be mined for the first three years. During this period, the upper compartments will be prepared (backfilling and return water infrastructure) for extraction.

Over the last two years of the five-year plan some 16% of the total tonnage will be sourced in the upper levels with the partial removal of the JCI pillars (square pillars when the mine was operated similarly to a Witwatersrand gold mine) and TCL pillars (rib pillars similar as in the Kuruma compartment). Only a small (10,000t or 2.6%) portion of the five-year plan includes the JCI pillars which are Inferred Mineral Resources. Further mine design work will be required to determine the pillar extraction percentage and methodology. In addition, some remnant mineralization in the footwall in the areas mined by JCI (level 1 to 3) are targeted for extraction but detailed work will be required to understand the stability of the area. This area is only scheduled to begin production in year five.

1.4.2 Geotechnical environment

The Otjihase deposit lies in quartz-biotite-chlorite and quartz-biotite schists and consists of a shoot of massive and disseminated sulphides about 200m wide plunging to the west at about 6°. The deposit dips to the northwest at about 16°. The shoot thickness varies between 4m and 12m with an average between 6m and 8m. The hangingwall is a quartz-biotite-chlorite schist with distinct schistosity which sometimes spalls. It is competent if supported. The declines and other development are usually excavated in competent quartz-mica schists.

The mineralization stretches from near surface to depths of 800m and more and is divided into compartments by north-south trending faults. These faults are water bearing and contain flowing material and are thus difficult to traverse.

The bulk of the planned mining is from the Kuruma compartment which has already been mined with strike drives and apparent dip holings in a room and pillar mining method. The Kuruma compartment lies beyond the Hoffnung Fault at depths between 600m to 800m below surface and the north - south extent of this compartment is approximately 250m.

Beyond the Kuruma West Fault, downthrown by 250m is the Tigerschlucht compartment, at a depth below surface averaging 1,100m. This will only be accessed later.

The Otjihase compartment extends from the surface down to a depth of approximately 260m below surface. The upper area, down to around 180m below surface was mined by JCI using a room and pillar system based on 5m by 5m square pillars with 15m wide rooms on dip and strike. There is considerable variation in both pillar dimensions and room dimensions. The lower area from 180m to 250m below surface was mined by TCL using a drift system based on 4.5 to 10m wide pillars between 10.5m wide drifts. In some areas the pillars were split to give dimensions of 4.5m wide and between 10m and 20m long.

1.4.3 Mining methods and support strategies

The Kuruma East and Central compartments have been mined with strike drives and apparent dip holings in a room and pillar mining method. This mining was completed to extract some 45% of the mineral resources. Most of the strike drives have been filled with a cemented tailings backfill.

The pillar extraction in the Kuruma East and Central compartments is to mine the remaining ore reserves using drives about 6m to 10m wide and between pillars of ore or of backfill. The mining is a form of drift and fill method and is a commonly used methodology.

The use of cable bolting in all drifts will be part of the support strategy. The final extraction would be between 80% and 90 %.

Two previously mined areas: the Oblique and the Hoffnung compartments were mined in a similar way. In parts of both compartments extraction ratios which appear to approach 95% were achieved without any major instability.

Once accessed, the Kuruma West compartment will be mined using a similar drift and fill method as used in the Kuruma East and Central compartments.

It is planned to mine the pillars in the TCL portion of the Otjihase compartment after placing cemented tailings backfill in the existing drifts. The mining method is very much the same as that planned for the Kuruma compartment and was used when mining the Oblique and the Hoffnung compartments.

The 5m by 5m pillars remaining in the JCI area of the Otjihase Compartment will be partially extracted that the remaining areas filled. This is carried out using backfill to constrain the remaining pillars and extract about 80% of the pillars.

1.4.4 Otjihase Concentrator

The process plant is comprised of the following:

- Concentrator Plant
- Electrical sub-station for the plant complex
- Standby generator setup
- Ore receiving
- Crushing and storage
- Compressor house
- Milling Plant
- Copper Flotation
- Pyrite Flotation
- Concentrate thickening
- Concentrate storage and filtration
- Drying and loading area
- Water storage and management
- Lime plant
- Workshop areas

- Laboratory
- 61m thickener tailings handling
- Backfill Plant
- Tailings Dam

The Otjihase concentrator is designed as a sequential flotation plant treating a base metal sulphide mineral deposit. The economic metals in the ore are copper and silver with pyrite and small amounts of gold. Historically, the flotation plant sequentially produced copper concentrate, and pyrite concentrate with silver being primarily contained in the copper concentrate. The concentrator plant comprises a two-stage crushing circuit, ball milling, copper flotation and pyrite flotation (no longer operational). The flotation agents included: sodium normal propyl, xanthate, LSB, sodium sulphide, Senkol 26, Fat 1 and lime.

The floated copper concentrates are thickened and fed into drum filters. On average, 92% of the copper is recovered. Some of the filtered concentrate is then transported in bags by truck to the Hoffnung Siding, where it is stored in sheds prior to being railed to the Walvis Bay harbour for export. The remaining bags are transported directly to the harbour by truck. The tailings comprise the final residue product.

The process diagrams for the processing plant are provided below.

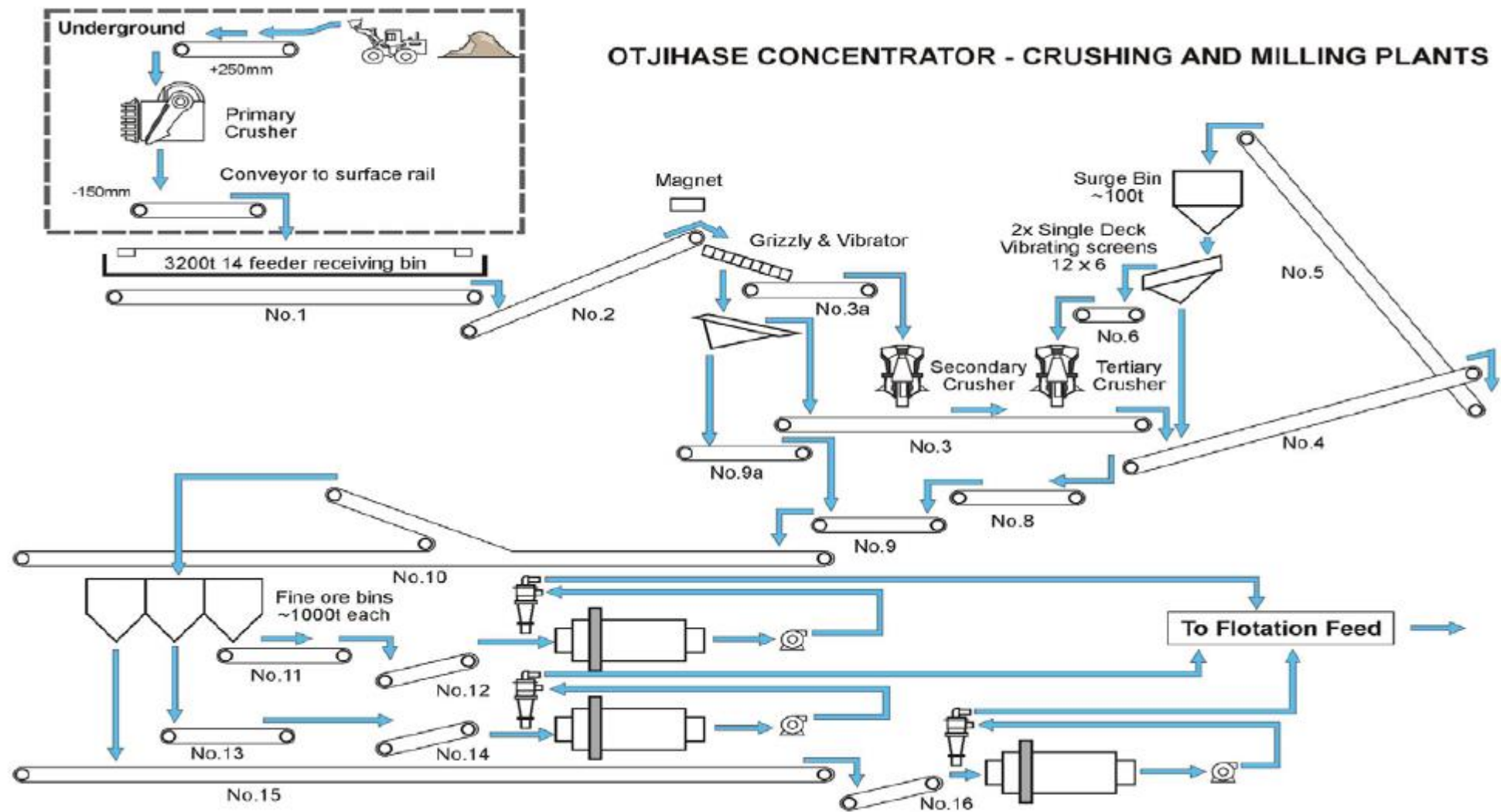


Figure 1-5: Crushing and milling plants

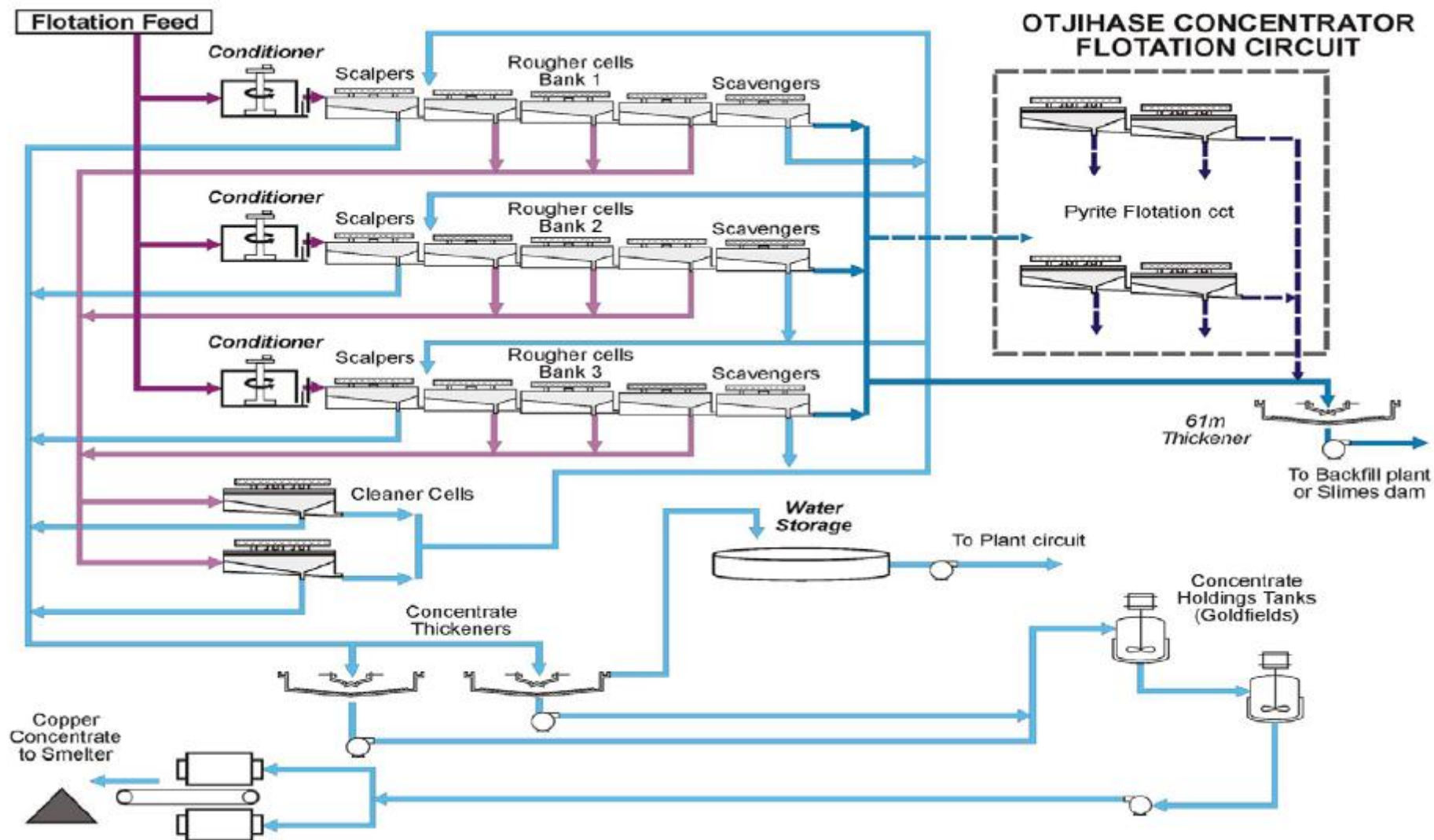


Figure 1-6: Ore flotation

1.4.5 Concentrator Plant

The Otjihase concentrator was constructed by JCI and commissioned during 1976 as a sequential flotation plant with some process and measurement control instrumentation. The plant capacity was a nominal 1 200 000 tonnes per annum.

During the last 22 years, the plant has been operated by TCL, Ongopolo and most recently by Weatherly. No major plant modifications were implemented over the operating period other than a Maxwell cell which was installed in the pyrite circuit, the backfill plant, and some equipment refurbishment to ensure continuity of operations.

1.4.5.1 Ore Receiving, Crushing and Storage

Ore from the Otjihase mine is crushed underground through a jaw crusher to a nominal 150mm prior to being transported to surface, to a 3,200t receiving bin at the plant. Ore from Matchless mine is road hauled and similarly crushed at Otjihase ahead of the same receiving bin. The receiving bin has 14 off take points feeding a single conveyor.

The different ore types are stored separately in the receiving bin with no mention or plan of blending practice. The ratio of ore received Otjihase:Matchless is roughly 35,000t:15,000t.

The crusher plant consists of a primary grizzly with oversize being crushed in the 5½ft Standard Symons secondary crusher. The grizzly fines are screened on a vibrating screen to reduce the load on the tertiary crusher. The screen oversize and the secondary crusher product are conveyed to a surge bin then to the tertiary screen and tertiary crusher, a 5½ft Shorthead Symons. The screen undersize is directed to three fine ore silos whilst the screen oversize is crushed in the tertiary crusher and recycled back to the screens where the fines are removed. This is a very conventional crusher circuit. The final crusher product size is nominally 100% passing 10mm. Crushed product is conveyed to three mill feed silos each with 1,100t capacity.

Historically, the plant utilisation was about 70%, indicating that there is sufficient installed crusher capacity. Throughput is given as 400tph.

1.4.5.2 Milling Plant

The milling circuit consists of three closed circuits ball mills. Historically the grind was approximately 80% passing 250 micron. The milling circuit configuration is very conventional, and considered suitable for the type of ore to be processed.

1.4.5.3 Compressor House

The air requirement for underground and plant is 2,900cfm to 3,000cfm. Installed capacity is in excess of 4,000cfm indicating a more than adequate supply.

1.4.5.4 Copper Flotation

The flotation circuit consists of three rougher and rougher scavenger flotation banks with two banks of cells for the cleaning operation. Rougher and cleaner concentrate report as final concentrate and the various froth products being recycled.

Typically the plant will produce 40tpd of concentrate. The tailings are discharged and pumped to the 61m tailings thickener prior to being transferred to the backfill plant or tailings dam.

1.4.5.5 Concentrate Thickening, Filtration and Storage

The concentrates from the flotation plant are pumped to thickeners, sized to suit the production from the flotation circuit. The thickened slurry is pumped to 30t storage tanks ahead of the filter circuit and the thickener overflow is recycled to the plant. The required capacity is 120t per 24 hour period. Four units will ultimately be operational, giving this capacity.

The copper concentrate is filtered on a conventional rotary vacuum filter. Two 14ft stainless steel drum filters are utilised. The filtered concentrate is conveyed into the concentrate shed for daily storage prior to dispatch by road. The operating philosophy is to keep minimal concentrate stock on the mine site and to weigh and ship concentrate as soon as possible for metallurgical and reconciliation accounting purposes.

1.4.5.6 Concentrate Logistics

The concentrate is bagged in 1.25 t bags and loaded onto transport trucks and weighed to the load limit of the vehicles. Each vehicle is sampled for moisture analysis and thus the quantity of material being dispatched from the mine is accurately known. Concentrate is transported by an external hauler.

1.4.5.7 Reagent Mixing

Reagents, such as collector and frother, are generally received in bulk bags or drums and are mixed with fresh water in the reagent mixing plant. The mixed batches are transferred to day tanks and then distributed to the plant via an extensive system of variable speed pumps.

Lime is received in bulk as a dry powder and is mixed with water (slaked) and distributed to the plant. The reagent plants are in a reasonable state of repair and major work is not expected in the near future.

1.4.5.8 Water Balance and Control

Process water is stored in two steel storage dams with gland seal water in a separate tank.

The overall water balance around the concentrator and mine indicated that water is lost through evaporation on the tailings dam. The water lost to evaporation is minimized but still occurs.

1.4.5.9 Thickener

The 61m diameter thickener is important in the overall concentrator operation, as all tailings pass through this circuit. The thickener was refurbished in 2008 at a cost of N\$1.7 million including the rakes and the drive system. The thickened product is pumped through five pump stages to the tailings dam or backfill plant.

1.4.6 Tailings

The tailings are classified and the coarse fraction (approximately 85%) is pumped into the backfill plant where it is mixed with cement and pumped underground as backfill to stabilise the underground workings.

The fine fraction of the tailings not used underground is pumped to the tailings dam. The tailings dam has been constructed in the valley of a tributary of the Kuruma River. The dam has 3 sections. Material from the southern section was reclaimed in 2008 for the purpose of backfilling the underground workings.

Water from the dam is removed via a penstock and drain pipe system to a sump from which it is returned to the plant. Cut-off drains have been constructed at the toe of the dam to collect seepage which is directed to the sump.

1.4.7 Backfill Plant

The backfill plant is an integral part of the mining operation. The backfill plant provides material to fill the voids created by mining operations and to provide support. The bulk of the fill is cycloned tailings, both current and re-mined with (or without) 3% cement addition. The cemented fill also uses special additives to remove excess water from the slurry being placed. The slurry is cycloned to obtain correct density of at least 1.4. Backfill is placed into the underground voids at a rate to be determined by mining operations.

1.4.8 Ancillaries

Heavy vehicle maintenance is carried out underground. There is a light vehicle workshop located on surface. Other workshops include the workshop and plant workshops. There is a NamPower substation located south of the processing plant for the purposes of power supply.

There are change houses, offices, stores, fuel tanks and a compressor house located in close proximity to the concentrator plant and the offices.

1.4.9 Solid Waste Management

General waste produced as part of the ongoing operations at the mine is deposited at the waste rock dump and is covered with waste rock.

Explosive bags removed from underground are also burned at a designated site on the waste rock dump.

Scrap metal is stored in salvage yards located to the south of the workshop area. This material is then sold to metal scrap dealers.

1.4.10 Water Management

Water originating within the underground workings is pumped from underground as raw water for use in the process. Excess water not used in the processing is pumped to a dam namely "Etosha Dam". Overflow water from the dam enters the Kuruma River.

Potable water supply to the Otjihase Village is from two NamWater-owned concrete reservoirs located on the hilltop to the east of the mine and plant area.

1.4.11 Sewage Treatment

There is a sewage treatment works located at the mine. The works consists of oxidation ponds and sludge drying beds. The treated effluent is used as plant process water.

1.4.12 Housing

Mine residences include 35 houses and single quarters at the Otjihase Village.

1.5 Historical Operations

1.5.1 JCI Shaft at Erzberg

There are remnants of the original mining operations on the Erzberg Koppie approximately 1.7 km east northeast of the existing Otjihase Plant Area. This includes a waste rock/low grade ore dump and an incline shaft. Waste rock from the OMPL open pit operations has been deposited over the JCI stockpile area and the surface infrastructure has largely been removed. The site is located at the source of tributary of the Otjihase River, a tributary of the White Nossob River, approximately 3.5 km downstream of the area.

During the operation of the shaft, the run of mine material was stockpiled to the north of the shaft area. The contaminated run-of mine stockpile platform was covered with topsoil removed from the surface exposed by the OMPL open pit operations.

The JCI shaft is used by the mine for the ventilation of the underground workings.

1.5.2 OMPL Open Pit

Open pit operations were carried out adjacent to the Erzberg Koppie for the purpose of accessing the underlying ore body from surface. There remains an open pit void which is approximately 0.9 Ha in extent and 20 m deep. Waste rock and overburden extracted from the pit was placed in the JCI Shaft area.

1.5.3 JCI Shaft at Ventilation Shaft

There are remnants of old operations including a shaft, some old infrastructure and a waste rock platform. A ventilation shaft for underground workings was subsequently also constructed in this area. The ventilation shaft has been sealed but some infrastructure still remains on site. The area straddles a small watercourse which is a tributary of the Kuruma River.

1.5.4 Pyrite Concentrate Stockpiles

Pyrite concentrate that was produced historically at Otjihase was dried using paddock areas. There are three paddocks areas made from earthen walls located south of the Otjihase concentrator and adjacent to the Kuruma River. The paddocks are in the process of being removed and rehabilitated.

1.5.5 Hostel

The hostel area has largely been demolished although the foundations remain in place.

2. ENVIRONMENTAL MANAGEMENT PLAN

2.1 Aims

The aim of the environmental management plan (EMP) is to detail the actions required to effectively implement the mitigation measures identified in the scoping report. These actions are required to minimise negative impacts and enhance positive impacts associated with the operations at the Otjihase Mine.

The EMP gives the commitments, which form the environmental contract between Weatherly and the Government of the Republic of Namibia represented by the Ministry of Environment and Tourism.

It is important to note that an EMP is a living document in that it will be updated and amended as new information (e.g. environmental data), policies, authority guidelines and technologies develop.

2.2 Objectives

Specific objectives are given for each of the actions described in the EMP. These objectives relate directly to addressing the impacts identified in the EIA.

2.3 Management Actions

The various actions that need to be implemented in order to ensure that environmental objectives are met are described in the EMP. Each action is given a reference number. The actions are measurable and are therefore easy to monitor. Compliance with the EMP can thus also be audited.

2.4 Roles and Responsibilities

It is the responsibility of Weatherly to implement the EMP and to make sure that all the actions are carried out. The successful implementation of the EMP is however dependent on clearly defined roles and responsibilities for each of the management actions given.

Roles have been ascribed to the following parties:

Country Manager & Technical Director (CM):	<p>Overall responsibility for the management of environmental matters at all Weatherly operations.</p> <p>Directs the Implementation of the EMPs for all WMN operations.</p> <p>Is the designated person to deal with all public issues, communications and legal matters.</p>
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General Manager (GM):	Overall responsibility for the Management of Weatherly's Central Operations, which comprises Otjihase and Matchless Mines. Takes overall responsibility for the implementation of the EMPs for both Otjihase and Matchless Mines.
Underground Manager (UM):	Responsible for the proper management of the Otjihase Mine. Responsible for the implementation of the EMP in mining areas.
Environmental Officer (EO):	Appointed to provide support to the Weatherly staff with regard to the implementation of environmental management measures.
Engineering Manager (EM):	Appointed to manage the engineering function at WMN's Central Operations.
Processing Manager (PM):	Appointed to manage the processing plant, backfill plant and the tailings dam.
Commercial Manager (Com):	Overall responsibility for WMN administration function, including the employment of staff and the procurement of goods and services.
Supervisors (Su):	Persons responsible for work teams.

2.5 Schedule

The schedule serves to give the period for the environmental action to commence. It is not always possible to implement an action immediately as some actions require planning and the availability of financial and/or human resources before they can be implemented. The successful commencement of the committed action within the specified period is to be monitored.

2.6 Requirements for Implementation

This component of the EMP details what is required for the action to be implemented successfully. This includes equipment, supplementary documentation, protocols and additional actions that may need to be put into place.

2.7 Operations

Ref.	Objective	Responsibility	Schedule	Requirements for Implementation
1	Environmental Awareness and Training			
Objective: To ensure that all persons working at the mine are aware of the objectives of the EMP as well as the consequences of their individual actions				
1.1	Environmental induction training is to be undertaken by all persons undertaking work at the mine (to be incorporated into normal induction training) including permanent workers, contractors and consultants.	EO	Immediate & ongoing	Environmental induction training material Environmental awareness is addressed in section 5
1.2	On the job environmental training to be undertaken by each person working at the mine.	EO & Sup	Immediate & ongoing	General Environmental Training/Training of supervisors Environmental awareness is addressed in section 5
1.3	An environmental awareness programme to be implemented for mine work force addressing pertinent topics as required.	EO	Immediate & ongoing	Programme for implementation of awareness topics Environment to be an agenda item in SHE meetings Environmental awareness is addressed in section 5
2	Public Relations			
Objective: To promote transparency and facilitate communication of the affected public				
2.1	Environmental Forum to be established which includes the owners and tenants of the mine property and surrounding properties.	CM	Immediate	Environmental forum constitution
2.2	Monitoring information to be made available to the affected community.	CM	Ongoing	Public reports (quarterly reports) Public meetings (as required but at least once every year)

2.3	Public feedback meetings to be held to communicate information on mine operations and to provide opportunity for members of the public to ask questions and raise concerns.	CM	Immediate	
3.	Climate			
Objective: To reduce climatic impacts caused by emissions				
3.1	Vehicles and fuel-driven machinery will be regularly monitored and maintained. Maintenance programmes will be established and implemented.	EO & EM	Ongoing	Vehicle maintenance and inspection programmes.
4.	Geology			
Objective: To minimise geological impacts				
4.1	As far as is practically possible, restrict mining activities to the planned abstraction areas. The current authorisation only allows for the mining of the existing pillars within the underground workings. This authorisation does not include the opening of new underground areas west of the Kuruma Compartments.	GM & UM	Ongoing	Detailed mine planning
5.	Topography			
Objective: To minimise topographical alterations				
5.1	Where possible, landscaping will follow the natural contours of the land.	GM	Ongoing	Detailed mine planning
5.2	During mine closure the topography of the site will be restored to its natural state where reasonably practicable.	CM & GM	Ongoing	Detailed mine planning

6.	Soils			
Objective: To salvage and protect available soil resources.				
6.1	Topsoil is to be stripped from the footprint areas required for any development.	GM & UM	Prior to extension of sites.	
6.2	Footprint areas are to be delineated and soil is to be stripped from these areas.	GM & UM	Prior to stripping	
6.3	Soils are to be stripped until the subsoil horizon is encountered.	GM & UM	Ongoing prior to development	
6.4	Soil is to be placed at delineated operation soil stockpile areas are to be less than 1.5 m high with a slope of 1 in 3.	GM & UM	Ongoing prior to development	Delineated soil stockpile areas
6.5	The natural succession of vegetation on topsoil stockpiles is to be encouraged to reduce the potential for erosion.	GM & EO		Vegetation programme
Objective: To salvage soils contaminated with hydrocarbons.				
6.6	Soils contaminated with hydrocarbons are to be bioremediated.	EO & EM	Ongoing	Soil bioremediation facility.
7.	Land use and rehabilitation			
Objective: To minimum impacts on air quality and landscape character.				
7.1	Completed areas of the waste rock dumps not to be used in further operations are to be vegetated.	EO & GM	When site becomes	Detailed mine planning

			inactive	
Objective: To prevent erosion and promote successful vegetation establishment.				
7.2	Slopes are to be re-shaped to ensure stability, vegetation establishment and erosion control.	EO & GM	When site becomes inactive	Determination of final slope requirements (trials).
7.3	Soil is to be placed over exposed surfaces at a minimum thickness of 300 mm.	EO & GM	When site becomes inactive	
7.4	The natural succession of vegetation on topsoil stockpiles is to be encouraged to reduce the potential for erosion. Should natural succession not be successful, reseedling options are to be investigated.	EO & GM	When site becomes inactive	Suitable indigenous seed mix.
7.5	Vegetation establishment and erosion is to be monitored to ensure that vegetation cover resembles that of the surrounding natural landscape.	EO	Rainy season following rehabilitation	
7.6	Erosion of vegetated slopes is to be repaired.	EO & GM	As required	
8.	Groundwater resources			
Objective: To protect groundwater resources from potential seepage from potential contaminant sources				
8.1	Where practically possible, clean storm water is to be diverted from all areas that may be contaminated.	GM & EO	Immediate	Stormwater Management Plan – Appendix A
8.2	Water from potentially contaminated areas to be contained in pollution control facilities.	GM & EO	Ongoing	Stormwater Management Plan – Appendix A

Objective: To assess the effectiveness of pollution control measures.				
8.3	Monitor water quality near potential pollution sources and the surrounding farm boreholes.	EO	Ongoing	Groundwater monitoring programme (section 3.1)
Objective: To monitor impact on groundwater availability.				
8.4	Ground water levels are to be monitored.	EO	Ongoing	Groundwater monitoring programme (section 3.1)
Objective: To ensure access of farmers to potable water.				
8.5	Should monitoring indicate that farmer boreholes do not provide sufficient water as a result of the lowering of the water table caused by mining activities, an alternate water supply is to be made available.	EO & GM	As required, but prior to the drying up of the water supply point.	Alternative supply options.
9.	Surface water resources			
Objective: To prevent the contamination of clean storm water run-off				
9.1	Where practically possible, clean storm water is to be diverted from all areas that may be contaminated.	GM & EO	Immediate	Stormwater Management Plan (included in Appendix A)
Objective: To minimise the loss of surface water from catchment				
9.2	Stormwater management plan to be established to minimise the retention of water on the site.	GM, CM & EO	Immediate	Stormwater Management Plan (included in Appendix A)
Objective: To contain potentially contaminated water preventing release into the environment.				
9.3	Water from potentially contaminated areas to be contained in pollution	Mining	Ongoing	Stormwater Management Plan (included in Appendix A)

	control facilities.	Manager		
9.4	Sewage effluent, wash bay water and other effluent produced on site is to be contained, recycled and re-used.	EM & PM	Ongoing	
Objective: To minimise health risks to surrounding communities, livestock and natural fauna and flora.				
9.5	Monitoring programme to be designed and recommendations made.	CM & EO	Immediate	Monitoring programme (Section 3.1)
9.6	Develop a Stormwater Management Plan aimed at separating clean and dirty water and preventing contaminated discharge from leaving the site.	CM, GM & EO	Immediate	Stormwater Management Plan (included in Appendix A)
9.7	Pollution sources are to be addressed as a matter of urgency. It is anticipated that once the pollution sources have been addressed, contamination within the riverbeds will be alleviated within a few rainy seasons. The effectiveness of this will however need to be monitored.	CM, GM & EO	Immediate	Monitoring programme
10.	Terrestrial ecosystems			
Objective: To limit the loss of biodiversity through the clearance of natural vegetation to allow for the development of mining infrastructure and mining activities.				
10.1	Limit the mine footprint to the areas required for operations. No access will be permitted outside of these areas.	CM	Immediate	Mine plan
10.2	Rehabilitation and end-use planning is to allow for the re-establishment of vegetation as far as practicable to allow for the restoration of biodiversity.	CM	Ongoing	Mine closure plan
Objective: To prevent the harvesting of vegetation and the poaching of animals.				

10.3	Staff will not be permitted access to the areas outside of the mine operational and residential areas.	CM	Ongoing	This requirement will be included in all induction and awareness training material.
Objective: To limit the impact of fugitive dust emissions from road on vegetation in the area.				
10.4	Wet suppression will be utilised in order to manage fugitive dust emissions. Should wet suppression not be sufficient, soil binding agents will be utilised. Fugitive dust generated by mine related activities must be maintained at acceptable levels.	GM & UM	Immediate	Wet suppression systems.
Objective: To limit the spread of alien invasive vegetation.				
10.5	Implement alien invasive species management.	EO	Immediate and ongoing	Alien Invasive Species Management Programme
11.	Aquatic ecosystems			
Objective: To protect users and aquatic life downstream of the mine.				
11.1	Monitor downstream flows to ensure impact is minimal.	EO	Ongoing	Surface water monitoring plan
11.2	Remove all contaminants deposited within drainage lines.	UM	Immediate	
12.	Air quality			
Objective: To reduce dust levels produced during mine operations.				
12.1	Wet suppression will be utilised in order to manage fugitive dust emissions. Should wet suppression not be sufficient, soil binding agents will be utilised.	GM & UM	Immediate	Wet suppression systems.
12.2	Vegetate inactive areas on site.	GM & UM	Immediate and	Rehabilitation Programme

			ongoing	
Objective: To monitor the effectiveness of dust management during operations and implement improvements as required.				
12.3	Monitoring of PM10 and dust fallout.	EO	Ongoing	Air quality monitoring is addressed in section 3.2
13.	Noise			
Objective: To minimise noise disturbance to surrounding communities.				
13.1	All noise-related complaints must be kept in a complaints register.	EO	Ongoing	Complaints register
13.2	Machinery that creates noise disturbance to human receptors at levels exceeding those permitted for a rural area at night according to the World Health Organisation will not be operated at night.	GM & UM	Ongoing	Noise monitoring is addressed in section 3.3
13.3	Annual noise assessments) will be carried out by accredited noise monitoring specialists. These assessments will monitor mining-related noise levels at the local farm residences.	EO	Ongoing	Noise monitoring is addressed in section 3.3
14.	Visual environment			
Objective: To minimise the disturbance caused by light.				
14.1	Lights are to be directed towards areas of work and provided with hoods to reduce light spill.	EO & EM	Throughout operations	
14.2	Preference should be made for “softer” lights such as sodium vapour lights.	EO & EM	Throughout operations	
Objective: To minimise disturbance caused by mine infrastructure.				
14.3	Inactive areas of waste rock dump are to be vegetated using naturally	EO	Immediate and	

	occurring species.		ongoing	
15.	Cultural resources			
Objective: To protect graves, cemeteries, archaeological and historic sites from damage.				
15.1	No expansion of the footprint of the Otjihase Mine without prior archaeological survey and approval. No archaeological sites are known from the operational area. If artefacts are unearthed then an investigation will be commissioned.	EM & PM	Ongoing	
16.	Storage and management of dangerous chemicals			
Objective: To ensure effective implementation of the EMP				
16.1	Hazardous chemicals are to be stored in bunded areas.	EM & PM	Immediate and ongoing	Bunded areas
16.2	Hazardous chemicals (such as fuels and acids) are to be handled over areas provided with impervious surfaces or drip trays.	EM & PM	Immediate and ongoing	Impervious surfaces in chemical and hydrocarbon handling areas.
16.3	Spills of hazardous chemicals are to be contained and cleaned-up to ensure protection of the environment.	EM & PM	Immediate and ongoing	Spill procedures for hazardous substances. Spill kits as appropriate to areas of work. Training on clean-up
17.	Waste Management			
Objective: To prevent the contamination of soils and water resources due to inappropriate management and disposal of waste.				
17.1	Waste generated is to be separated at source into recyclable and non-recyclable waste wherever reasonably practicable.	All	Immediate	Containers for the separation of waste Waste management guideline tables are included in section 2.12

17.2	Recyclable waste is to be re-used on site or removed for re-use elsewhere.	EO	Ongoing	Identify recycling and re-use options Waste management guideline tables are included in section 2.12
17.3	Hazardous and general waste is to be separated at source where practically possible.	EO	Ongoing	Containers for the separation of waste. Waste management guideline tables are included in section 2.12
17.4	Soils contaminated with hydrocarbons are to be bio- remediated.	EM & EO	Ongoing	Bio-remediation facility.
17.5	Hazardous waste is to be disposed at the hazardous waste disposal site.	EO	Ongoing	Identification of hazardous waste disposal site, hazardous waste transport company. Disposal agreements to be put in place with the hazardous waste disposal site operators.
17.6	General waste is to be disposed of at the general waste disposal site.	EO	Ongoing	General waste disposal site Waste management guideline tables are included in section 2.12
18.	Vehicles / machinery on site			
Objective: To minimise the impacts of vehicles and machinery.				
18.1	Vehicles will be regularly monitored and maintained. Maintenance programmes will be established and implemented.	EM	Ongoing	Maintenance programme
18.2	Vehicular movements on site will be restricted to operational areas.	CM, EM & EO	Ongoing	Induction and awareness training
18.3	Drivers will receive induction and awareness training informing them of the rules related to travelling in designated areas and the importance of conserving the local fauna and flora.	EO	Ongoing	Induction and awareness training
18.4	Speed limits will be maintained. Speed limit signs will be visible and legible on site.	GM	Immediate and ongoing	Signs

				Induction and awareness training
18.5	Wet suppression will be utilised in order to manage fugitive dust emissions. Should wet suppression not be sufficient, soil binding agents will be utilised.	GM & UM	Ongoing	Dust suppression plan
19.	Staff on site			
Objective: To minimise the impacts of staff on site.				
19.1	All employees will be educated on the procedures to follow and the environmental restrictions regarding all environmental parameters. This will form part of the environmental awareness.	EO	Ongoing	Induction and awareness training
19.2	Access on site will be restricted to construction and operational areas where practically possible.	GM & UM	Immediate	Fencing and fence maintenance Induction and awareness training
19.3	Workers will be restricted to construction / operational areas.	CM & GM	Ongoing	Induction and awareness training
19.4	The mine will establish and implement a monitoring programme to regulate the harvesting of plant material and fuel-wood from the natural vegetation surrounding the mine.	CM, GM & EO	Immediate and ongoing	Monitoring programme
19.5	The poaching and hunting of animals will be strictly forbidden.	CM & GM	Ongoing	Induction and awareness training
20.	EMP implementation			
Objective: To ensure effective implementation of the EMP				
20.1	Monthly internal audits of EMP compliance	EO	Immediate	Performance assessment requirements are addressed in section 4
20.2	Annual external audit of EMP compliance	Independent	Annual	Performance assessment requirements are addressed in section 4

		Consultant		
20.3	Submission of external annual report to environmental authorities	CM	Annual	Performance assessment requirements are addressed in section 4
21.	Socio-economics			
Objective: To promote awareness on issues related to STIs and HIV/AIDS.				
21.1	Implementation of awareness programme on risks associated with STIs and HIV/AIDS for workforce.	CM & SHE Officer	Immediate and ongoing	HIV/AIDS Construction Workforce Awareness Programme
Objective: To promote economic development of local communities.				
21.2	Recruitment of local persons as far as practicable.	Com	As required	Affirmative active
21.3	Identify training needs and provide such training to local persons as far as practicable.	Com	As required	Training
21.4	Local procurement of goods and services where available and where commercially and technically practicable to the project.	Com	As required	Database of local service providers
Objective: To promote road traffic safety.				
21.5	Speed limits will be adhered to at all times.	All	Ongoing	Road traffic safety requirements will be included in induction material. All drivers, including contractors, will receive induction and awareness training.
21.6	Signage in place along access road to promote traffic safety.	CM	Immediate	Maintenance of signage
21.7	Drivers servicing the mine to be subjected to public safety awareness.	CM	Incorporated	All drivers, including contractors, will receive induction and awareness

			into safety induction programme	training.
21.8	Wet suppression will be utilised in order to manage fugitive dust emissions. Should wet suppression not be sufficient, soil binding agents will be utilised.	GM & UM	Ongoing	Dust suppression plan

2.8 Existing environmental concerns

A number of specific concerns have been identified on site through site observations, research, I&AP communication and document reviews. Although many of these environmental issues were the result of historical activities that took place prior to Weatherly taking over the mine, Weatherly will make efforts to remediate these impacts where practically possible. This section outlines the identified impacts

The information presented below is a synthesis of the findings of numerous liability assessments that have been carried out on site, as well as observations made on site. Also included are recommendations for the remediation of the identified historical impacts.

2.8.1 JCI Shaft and Opencast Waste Rock Dump

Remnants of the JCI operations that took place over 29 years ago on the Erzberg Koppie, approximately 1.7 kilometres east northeast of the existing Otjihase plant area, include a waste rock/low grade ore dump and an incline shaft. The JCI material is acid forming with evidence of acid rock drainage visibly evident. The waste rock dump excavated from the relatively recent open cast operation that took place adjacent to the JCI area has been dumped over the old waste rock dump and extends to the north and south of the old JCI waste rock dump area. This material is not acid forming. This material also contained topsoil material and seed banks. As a result there is a small proportion of grass cover on the dump.

This site is located at the source of a very minor watercourse that runs from the dump onto the neighbouring property in an easterly direction and eventually joins the Otjihase River, a tributary of the White Nossob River, approximately 3.5 km from the dump. The catchment of this minor water course is limited to the dump slopes.

The Old JCI shaft is in use for the ventilation of the current underground workings.

Environmental Issues and Concerns

- The JCI material is acid-forming and has the potential to pollute water quality of run-off originating on the koppie. Elevated levels of copper, cadmium and manganese were recorded in the watercourse on the neighbouring property (Synergistics, 2008).

- There is uncertainty as to the effectiveness of the waste rock dump material that covers the JCI dump as a capping, thus preventing ingress of surface water and seepage of contaminants from the waste rock dump.
- The dump has steep slopes and has been subject to erosion due to run-off. There has been slope failure on the waste rock dump.
- There is limited space available for changing the shape of the dump as the site is located on the mine boundary.
- The shaft area will potentially be unsafe for humans and animals at closure.

Environmental Risk: High

There is a risk that the Old JCI material will continue to result in the contamination of watercourses downstream of the site as the waste rock material may not prove to be effective in preventing the ingress of water into the JCI material and seepage from the foot of the dump. This is of particular importance, in that this contamination is on the adjacent farmer's property. The steep slopes of the dumps are unstable, and affected by erosion which will result in sediment being washed away into the watercourses below the dump.

Recommendations for environmental management

In order to improve the effectiveness of the waste rock material as a capping for the acid-forming JCI material, it is suggested that the JCI dump be covered with at least 0.75 m of waste rock. Surface flows of water across the waste rock dump must be reduced through the creation of water chutes put in place to carry clean water over the surface of the dump. This will reduce the potential for seepage into the dump. Where possible the dump should be covered with soil or overburden material to facilitate vegetation growth and thus reduce the erosion potential. The steep slopes of the dump cannot be reshaped and so must be protected from erosion. The table of the dump must be sloped back toward the trench and compacted to further reduce infiltration. Seepage and run-off from the base of the dump must be captured through the construction of a trench and toe paddocks. This will prevent contaminated water from entering the water-course. The ventilation shaft equipment is to be removed and the shaft must be closed by backfilling with waste rock at mine closure.

2.8.2 JCI Pyrite Stockpile Area

During JCI operations on the Erzberg Koppie the run of mine pyrite material was stockpiled on a large stockpile area (approximately 1.4 hectares) adjacent to the JCI shaft. The pyrite material was removed from the area over 30 years ago, but left a contaminated footprint area. During mining of the opencast pit topsoil was stockpiled on the JCI pyrite stockpile area.

Environmental Issues and Concerns

- Soil conditions at the pyrite pad area are acidic, characterised by elevated levels of cadmium, manganese, iron and copper which are not conducive to plant growth (Synergistics, 2001).
- The natural amelioration of conditions to promote natural establishment of vegetation is unlikely.
- Run-off from the pyrite stockpile area impacts on the surrounding soil conditions, making them less conducive for plant growth.
- The majority of metals and sulfates are restricted to the upper 10 cm of soil, although pH levels remain low until a depth of 1m (WSPW, 2001).

Environmental Risk: Low

Although the pyrite paddock is phytotoxic, the risk to the environment and receptor health from the stockpile area is considered to be low.

Recommendations for environmental management

It was previously recommended (WSPW, 2003 and Synergistics, 2008) that the highly acidic soils from the pyrite stockpile are removed and the underlying soils be limed. However, subsequently the area was used for the stockpiling of soil from the opencast operations. It is thus recommended that the soils currently stockpiled on the pad are spread over the surface of the area.

2.8.3 Opencast Void

An opencast pit was excavated adjacent to the JCI pyrite platform on the Erzberg Koppie. The purpose was to access the underlying ore body from surface. The opencast pit has been left as a void, which is approximately 0.9 ha in extent and 20 m deep. Access into the underground workings is possible through the void.

Environmental Issues and Concerns

- The void has near vertical walls.
- Access into the underground workings is possible through the shaft in the void.

Environmental Risk: Very High

The void has near vertical walls which are extremely dangerous to human and animal safety. Any access into the underground workings also poses a high risk to human and animal safety.

Recommendations for environmental management

Ideally the slopes of the opencast area should be stabilised and shaped in order to ensure stability and safety. This would require extensive blasting and shaping. As a minimum it is thus suggested that the void be made safe in the most effective manner possible. The shaft entrances in the base of the void need to be sealed to prevent any access into the underground workings. Access to the void itself needs to be prevented. It is recommended that a trench and berm be established around the void's perimeter. The area must be fenced off with a diamond mesh security fence and adequately signed when use of the site is no longer required.

2.8.4 Old JCI Area and Ventilation Shaft

Remnants of the old JCI operations, located 1.1 km north east of the plant, remain and include a waste rock platform, an old adit and the remains of some infrastructure. A ventilation shaft for more recent underground workings was constructed within this area. These have been sealed but some infrastructure is still in place at the site. The disturbed area straddles a small water course that drains to the Kuruma River.

Environmental Issues and Concerns

- The ventilation shafts and portions of the waste material are located within a drainage line.
- The waste rock material is acid forming and can be expected to be leaching high levels of heavy metals directly into the drainage line at the base of the dump.
- Seepage from this source drains to the Kuruma River.
- The adit is unsafe and a danger to humans and livestock.

Environmental Risk: High

The current situation is considered to be environmentally unacceptable and poses a significant risk to the natural ecology, community health and livestock. Material within the drainage line is contributing to the contamination of the Kuruma River.

Recommendations for environmental management

Contaminating material needs to be removed from the drainage line and further contamination reduced. It is recommended that the sediments and dumps in the drainage line be excavated and placed on the platform and the drainage line re-constructed. The toe of the platform needs to be cut back by at least 3 m and a waste rock wall constructed for stabilisation and prevention of future erosion. The entire platform should be covered with 0.75 m of waste rock, sloped back toward the high ground and compacted. A diversion trench should be excavated to divert water around the eastern edge of the platform. The adit entrance should be doubled bricked and made safe.

2.8.5 Old Tailings Paddock Area

The old tailings paddocks, located alongside the Kuruma River are still in place. Although the tailings material has been removed from this site, the paddock walls are still present and are located along the banks of the Kuruma River. The dam was used to store material when the thickener was under repair. It also forms an emergency spill containment barrier between the thickener and the river and needs to be repaired so no further contamination may enter the river.

Environmental Issues and Concerns

- The paddock is located on the banks of the Kuruma River.
- The paddock is constructed with earthen walls and is not lined. This allows seepage into the Kuruma River which is contributing to the contamination of the Kuruma River.

Environmental Risk: Low

Indications are that this is not a significant contamination source (WSPW, 2001).

Recommendations for environmental management

At closure the site must fully rehabilitated, but in the short term it just needs to be cleaned up, repaired and regularly cleaned / pumped out in the dry season. The walls must be compacted in order to prevent seepage into the Kuruma River.

2.8.6 Backfill Plant

The backfill plant is located on the banks of the Kuruma River approximately 1.5 km downstream of the Klein Kariba Dam. The coarse fraction of tailings (85%) is mixed with cement and pumped underground as backfill to stabilise the underground workings. Since not enough new tailings material is being generated at the plant to backfill the workings, additional tailings are recovered from the old tailings dam (Fraser Alexander Project) and piped to the backfill plant. In TCL time some tailings material was stockpiled at the backfill plant although material located along the banks of the Kuruma River has been removed. Fuel and oil for use underground are also stored at the site which occupies an area of approximately 1 ha.

Environmental Issues and Concerns

- Material stockpiled at this site contributes to the contamination of the Kuruma River.

Environmental Risk: Low

Indications are that this is not a significant contamination source (WSPW, 2001) and the risk will be further reduced by the fact that the tailing stockpiles have been removed from the river banks.

Recommendations for environmental management

Before closure, all tailings and contaminated material on the site must be removed to the tailings dam, and the footprint remediated. Provision must be made for liming to increase the pH of the footprint, especially where tailings have been stockpiled. The need for this will however need to be confirmed by soil testing. The banks of the Kuruma River will need to be cleaned and re-established.

2.8.7 Tailings Dam

The tailings dam has been constructed in the valley to the north of the mine village. The dam consists of two sections, with an old section to the south and a smaller new section located to the north. Cut-off drains have been constructed at the toe of the dam to collect any seepage, which is directed to a sump and recycled to the mine. A section of the southern portion of the tailings dam was excavated and placed at the backfill plant for use as backfill in the underground workings.

There is currently a tailings reclamation project (Fraser Alexander Project) at which the tailings from the southern portion of the tailings dam is slurried and piped to the backfill plant to supplement the backfill of the underground workings. When the backfill plant is not operating the reclamation is suspended and tailings from the plant are deposited onto the northern section of the tailings dam. There is a single penstock on this portion of the dam.

Environmental Issues and Concerns

- The seepage trench, sump, pumps and pipe systems are not functioning adequately. Seepage from the dam is entering the tributary to the Kuruma River located at the toe of the dam.
- The quality of seepage from this source is unknown but is likely to have low pH, elevated sulfate and high levels of cadmium, manganese, copper and iron.
- A dust blown plume from the tailings dam is evident in the valley. The soils in the dust plume are not conducive to plant growth (Synergistics, 2008).

Environmental Risk: High

Indications are that the Otjihase Village will continue to be occupied after closure. Dust from the dam poses a potential health risk and is creating phytotoxic conditions in the adjacent areas. The continued seepage of water from the tailings dam into the Kuruma River will affect water quality in the river. The current situation is considered to be environmentally unacceptable and poses a significant risk to the natural ecology, community health and livestock. Significant amounts of contamination are entering the Kuruma River from this source.

Recommendations for environmental management

It is essential that the surface of the tailings dam be covered to control dust emissions from this source. At this stage it is not practically possible to stabilize and cover the slopes. Provision should be made for a combination of rock cladding, placement of soil and establishment of vegetation.

Seepage from the tailings dam needs to be controlled to reduce the contamination of the local watercourses. The seepage should be collected in the trench and sump and returned to the tailings dam for evaporation or for reuse in the process plant. Long-term management and maintenance of the seepage trenches, sump and pumps will be required to reduce contamination of the rivers. A stormwater management plan has been developed in order to manage surface water movement on site. Refer to Appendix A for a copy of the Stormwater Management Plan.

There is an identified need for a Tailings Storage Facility Plan to be developed. This plan would include control measures for continued operation of the facility as well as planning for closure.

2.8.8 Tailings pipeline

The pipeline transporting tailings from the plant to the tailings dam often develops leaks, which results in tailings being deposited along the pipeline route.

Environmental Issues and Concerns

- The tailings spills may result in soil and water contamination.

Environmental Risk: High

This occurs relatively frequently and has a high probability of occurring as a result of the nature of the route of the pipeline. The soil is contaminated during spill events and any surface water runoff will be contaminated.

Recommendations for environmental management

Clean-up crews must be assembled on a monthly basis with the aim of cleaning up any spills along the route. An emergency plan will also be developed which will be aimed at dealing with the pipeline leaks.

Milling operations must be shut down as soon as any leak is identified, and not restarted until the leak is repaired. No further leakages will take place if the milling operations are shut down as no tailings will be transported along the pipeline.

The Engineering Manager should also investigate further options for the prevention of future leaks as well as methods of containing any leaks that occur.

2.8.9 Kuruma River

The Kuruma River flows northwards from its origin near Bellerode through the mine property. It continues its course in a northerly direction to where it joins the Otjihavera River approximately 7 km north of the Otjihase processing plant. The Otjihase operations have contributed to the contamination of the Kuruma River over an extended period of time.

Environmental Issues and Concerns

- Contamination of the bed of the Kuruma River was recorded for a distance of 6 km from the mine boundary (Synergistics, 2008).
- Contaminants have been entering the Kuruma River from various sources at Otjihase over the last 30 years.

Environmental Risk: High

The contaminated watercourse poses a risk to the natural ecology, humans and livestock.

Recommendations for environmental management

Pollution sources are to be addressed as a matter of urgency, the most important being the pyrite paddocks (currently being addressed) and Klein Kariba Dam. It is anticipated that once the pollution sources have been addressed, contamination within the riverbed will be alleviated within a few rainy seasons. The effectiveness of this will however need to be monitored.

A stormwater management plan has been developed, which will include measures for ensuring the separation of clean and dirty water on site and the improvement of the natural hydrological systems. Refer to Appendix A for the Stormwater Management Plan.

2.9 Decommissioning

Ref.	Objective	Responsibility	Schedule	Requirements for Implementation
1.	Planning			
Objective: To promote the success of land restoration and minimise community risks				
1.1	An environmental risk assessment is to be completed.	CM & EO	Prior to commencement of rehabilitation	Risk Assessment
1.2	A detailed closure and rehabilitation plan is to be completed aimed at minimising identified environmental risks.	CM & EO	Prior to commencement of rehabilitation	Closure and Rehabilitation
2.	Pollution control			
Objective: To ensure protection of soils, ground and surface water.				
2.1	Handling of hydrocarbons and other contaminants used in decommissioning and rehabilitation must occur at designated areas on impervious surfaces.	CM, EO & EM	During decommissioning	
3.	Dust and noise			
Objective: To minimise the generation of dust during decommissioning.				
3.1	Surface wetting to take place on roads and material handling points.	Contractor	Decommissioning	Dust suppression plan

4.	Waste management			
Objective: To ensure the safe and appropriate disposal of waste generated during decommissioning.				
4.1	Waste materials are to be separated into salvageable (scrap metal) and non-salvageable materials.	Contractor		
4.2	Salvageable waste is to be removed from site for recycling.	Contractor		
4.3	General waste (not contaminated with hazardous substances) is to be disposed at a general waste disposal facility.	Contractor		
4.4	Hazardous waste is to be disposed of at a hazardous waste facility.	Contractor		
5.	Rehabilitation			
Objective: To facilitate successful restoration of land capability of infrastructure areas.				
5.1	All infrastructure is to be demolished and removed.	GM & EM	Decommissioning phase	
5.2	All hard standing is to be broken apart and removed.	GM & EM	Decommissioning phase	
5.3	All demolished material and footprint areas are to be checked for contamination with hazardous substances and hazardous material to be removed and disposed of as hazardous waste.	GM & EM	Decommissioning phase	
5.4	Footprint areas are to be shaped and excavated areas backfilled to ensure that they resemble the surrounding landscape.	GM & EM	Decommissioning phase	
5.5	Topsoil is to be placed over disturbed areas	GM & EM	Decommissioning	Soil balance to check availability of soils

			phase	
5.6	Topsoil is to be fertilised to replace nutrients if required.	GM & EM	Decommissioning phase	Appropriate fertiliser
5.7	In the event of a lack of natural succession following the next rainy season, topsoils areas are to be seeded with a naturally occurring seed mix.	PM & EM	After next rainy season	Monitoring Appropriate indigenous seed mix
Objective: To facilitate the restoration of the land capability of waste areas.				
5.8	Slopes are to be landscaped to ensure that they are stable in the long term.	UM		
5.9	Exposed surfaces are to be covered with soil.	GM	Decommissioning phase	Soil balance to check availability of soils
5.10	In the event of a lack of natural succession following the next rainy season, topsoils areas are to be seeded with a naturally occurring seed mix.	GM & EM	After next rainy season	Monitoring Appropriate indigenous seed mix

2.10 Post Closure

Ref.	Objective	Responsibility	Schedule	Requirements for Implementation
1.	Vegetation establishment			
Objective: To promote successful rehabilitation.				

1.1	Rehabilitated areas are to be monitored in terms of vegetation establishment and erosion. The associated costs must be included in mine closure provisions.	CM	After the first rain season following rehabilitation	
1.2	Vegetation establishment is to be augmented where required by re seeding.	CM	Prior to the following rainy season	
1.3''	Eroded areas are to be repaired	CM	Prior to the following rainy season	
2.	Protection of water resources			
Objective: To monitor risks to surrounding communities associated with contaminants emanating from site.				
2.1	Ground and surface water monitoring should continue to be monitored post-closure.	CM	Continued from operational phase for 5 years after mine closure.	

2.11 Rehabilitation and Closure Objectives

Weatherly needs to plan for sustainable closure by ensuring that every reasonable effort has been made to achieve rehabilitation closure objectives that will give effect to the following principles:

- Safety and health of people, flora and faunas are safeguarded from hazards resulting from the decommissioned mining operations.
- Environmental damage or residual environmental impacts are minimised to the extent that they are acceptable to all parties involved.
- The land is rehabilitated to achieve a condition approximating its natural state, or so that the envisaged end use of agricultural land (grazing).
- The physical and chemical stability of the remaining structures must be such that risk to the environment through naturally occurring forces is eliminated.
- Mine closure is achieved efficiently, cost effectively, and in compliance with the law.
- The social impacts resulting from mine closure are managed in such a way that establishment of a socially stable community in line with the principles of sustainable development is facilitated.

2.12 Guideline tables

Table 2-1: Disposal of Waste

Items to be considered		Intentions
General	Specific	
Procedures	General	A waste management procedure will be developed. This will cover the storage, handling and transportation of waste.
	Waste minimization and recycling	Opportunities to minimize waste production will be identified and taken where possible. Where possible, waste will be recycled.
Waste disposal facilities	Collection points	Waste collection points will be established on site. Care will be taken to ensure that there will be sufficient collection points with adequate capacity and that these are serviced frequently. Different skips shall be provided for wood, scrap metal, and hazardous waste.
	On site waste disposal facilities	No waste disposal facility will be developed without the relevant legal authorisation.

Items to be considered		Intentions
General	Specific	
	Off-site waste disposal facilities	Waste will be disposed of at appropriate permitted waste disposal facilities. An agreement will be put in place to ensure that the facility is capable of handling the waste.
Waste transport	Contractor	An approved subcontractor, working to local authority standards, will undertake the waste transport.
Disposal of different types of waste	Hazardous wastes	Hazardous waste will be collected by a contractor with the relevant permits and will be removed to a permitted hazardous waste disposal facility. Hazardous waste may only be stored on site, in a fenced off area with access control, for up to 90 days.
	Non-hazardous waste	Waste will be collected and landfilled on site.
	Any soil polluted by a spill of chemicals	If remediation of the soil in situ is not possible, the soils will be classified as hazardous waste s and will be disposed of at an appropriate permitted waste facility.
	Scrap metal	Care will be taken to ensure that scrap metal does not become polluted or mixed with any other waste. The scrap metal will be collected in a designated area for scrap metal (scrap yard). It will be sold to scrap dealers.
	Oil	Oil will be collected in suitable containers at designated collection points. The collection points will be bunded and underlain by impervious materials to ensure that any spills are contained. Notices will be erected at each waste oil point giving instructions on the procedure for waste oil discharge and collection. An approved subcontractor will remove oil from site.

Table 2-2: Storage of hazardous chemical substances

Product	Storage
Oils	Stored in sealed drums. The containers will be stored in bunded facilities that will have the capacity contain all potential spills. Bunded areas must be capable of containing 110% of the capacity of maximum capacity of the storage containers within the storage areas.
Diesoline	Diesoline will be stored in tanks within bunded areas with smooth, impermeable surfaces. Bunded areas must be capable of containing 110% of the capacity of maximum capacity of the storage containers within the storage areas. Diesoline may be stored in externally clean drums. These drums may only be stored on smooth, impervious surfaces in facilities that will contain spills.

Herbicides & pesticides	<p>These substances will be stored under lock and key and away from food and water sources.</p> <p>Sub-contractors who require such substances for the execution of their duties will also be expected to store these hazardous substances in an appropriate storage area or they will be required to keep the substances off site at their usual business premises.</p> <p>Such sub-contractors will be liable for control over the issuing of the herbicides to their staff, and thus are required by law to maintain records. Material Safety Data Sheets are required to be kept by the competent person, and these will be submitted when a specific substance is brought to site for use/application.</p>
Other: Paint, thinners, varnish, turpentine, detergents etc.	<p>These substances must be stored in clearly marked containers.</p> <p>These containers must be sealable and must not leak.</p> <p>They may only be stored within the workshops and storerooms.</p>

Table 2-3: Handling of hazardous chemical substances

Product	Handling
Oils	All oils will be handled according to their specific Material Safety Data Sheets.
Diesoline	<p>Diesel will be handled according to its Material Safety Data Sheet.</p> <p>Where possible, diesel transferrals must take place in the designated refuelling areas on smooth, impervious surfaces.</p> <p>Drip trays will be positioned at each machine whilst being refilled. Drip trays will be drained into suitable containers. Smaller plant and tyre wheeled equipment will also re-fuel at the main storage areas.</p>
Herbicides & pesticides	Herbicides, pesticides and other potentially poisonous substances, will be used according to the manufacturer's specifications. Care will be taken to avoid spills and unnecessary contact with any part of the environment for which they were not intended e.g. soil, water bodies and vegetation or animals. Mixed herbicide/ pesticide or other poison shall be kept in clearly marked, closed containers and decanting will occur over a drip tray to prevent spillage, this will not take place within forty meters of any watercourse.
Other: Paint, thinners, varnish, turpentine, detergents etc.	These substances must be used in accordance with their respective MSDS's.

Table 2-4: Disposal of hazardous chemical substances

Product	Disposal
Hydrocarbons	Old/used hydrocarbons will be stored in drums and weatherproof waste collection containers. Receipts /proof of their final disposal must be

	received and kept on file.
Other: Paint, thinners, varnish, turpentine, detergents etc.	These substances must be used in accordance with their respective MSDS's.

3. ENVIRONMENTAL MONITORING

3.1 Water Monitoring Programme

The aim of the water monitoring programme is to assess the impact and legacy issues of contaminants on ground and surface water quality. The programme will also serve to monitor the impact of dewatering on surrounding groundwater users.

Weatherly personnel will be trained to carry out the monitoring programme.

Water monitoring at Otjihase Mine is to be managed by Weatherly as to be based on the following protocol:

- Sampling positions:
 - Surface water sampling:
 - Upstream of the mine operations (for baseline information for comparison with downstream sample results);
 - Etosha Dam;
 - Klein Kariba Dam;
 - During flowing events:
 - The first order tributary of the White Nossob River downstream of the JCI shaft area;
 - The Kuruma River downstream of the operational area.
 - All point source discharges.
 - Geohydrological sampling:
 - The water pumped out of the underground workings is pumped into the Etosha dam. The monitoring of the water quality of at the discharge pipe outlet to the dam will fulfil the requirements of monitoring underground water quality.
- Analysis frequency:

- The Etosha Dam and Klein Kariba Dam will be monitored quarterly;
- The Kuruma River and first order tributary of the White Nossob River will be monitored monthly during flowing events;
- Point source discharges (excluding water from underground workings) will be monitored monthly.
- Parameters:
 - The parameters selected for laboratory analysis were standard major ions, plus a limited metals suite selected based on results of the more extensive metals suite analysed in the past.

Parameter	Units	Limits*
pH		5,5 – 9,5
EC	mS/m	<150
TDS*	mg/l	<1000
Total Hardness	mg/l	N/A
Ca-Hardness	mg/l	N/A
Mg-Hardness	mg/l	N/A
Chloride	mg/l	<1500
Fluoride	mg/l	<2
Sulphate	mg/l	<1000
Langelier Index		Refer to TDS & pH
Ryzner Index		Refer to TDS & pH
Corrosivity		Refer to TDS & pH
Suspended solids	mg/l	N/A
Sodium	mg/l	<2000
Potassium	mg/l	<50?
Magnesium	mg/l	<500
Calcium	mg/l	<1000
Manganese	mg/l	<10

Iron	mg/l	<10
Chromium	mg/l	<1
Cadmium	mg/l	<10
Copper	mg/l	<0.5
Zinc	mg/l	<20
Cobalt	mg/l	<1
Nickel	mg/l	<1
Uranium	mg/l	<0.5
Aluminium	mg/l	<5

All water released from the operational area must comply with the recommended maximum limits for livestock watering in accordance with the South African Guidelines for Livestock Watering included in the table above. These limits are recognised as a minimum requirement by the Namibian Ministry of Agriculture, Water and Forestry.

3.2 Air Quality Monitoring

In order to prevent excessive emissions of air pollutants and to determine the effectiveness of emissions management strategies, an emissions and air quality monitoring programme must be implemented.

Air emission monitoring must take place for:

- All generators.
- Engines (including vehicles).

The air quality monitoring program must consider the following elements:

- Monitoring parameters.
- Baseline calculations.
- Monitoring type and frequency.

The following parameters must be monitored annually by entities permitted or certified for this purpose:

Table 3-1: Air emission monitoring parameters

Emission	Monitoring	Limits
NOx	Continuous monitoring of either NOx emissions or indicative NOx emissions using combustion parameters.	500 tpy per unit
PM10	Continuous monitoring of PM10 emissions west and south of the tailings dam.	PM10: 50 tons per year (tpy)

Source: World Health Organisation Guidelines.

Dustfall monitoring will take place as follows:

Table 3-2: Monitoring Strategy Criteria / Dustfall Monitoring

Monitoring Strategy Criteria	Dustfall Monitoring
<i>Monitoring objectives</i>	<p>Obtain baseline dust measurements.</p> <p>Assessment of compliance with dustfall limits within the main impact zone of the operation.</p> <p>Facilitate the measurement of progress against environmental targets within the main impact zone of the operation.</p> <p>Temporal trend analysis to determine the potential for nuisance impacts within the main impact zone of the operation.</p> <p>Tracking of progress due to pollution control measure implementation within the main impact zone of the operation.</p>
<i>Monitoring location(s)</i>	<p>Indications are that the tailings dam produces fugitive dust which impacts air quality. A dust blown plume from the tailings dam is evident along the valley where the tailings dam is located. The soils in the dust plume are not conducive to plant growth with minimal die-back evident on the hillslopes where dust has been deposited.</p> <p>The mine village is located roughly 900 m from the southern end of the tailings dam. During northerly wind events, the dust from the tailings is blown from the tailings dam towards the village. The mine village is thus an important receptor in terms of air quality impacts associated with the mine.</p>

	<p>The dominant wind direction is south-easterly, although northerly, easterly and southerly winds are not uncommon.</p> <p>It is therefore recommended that dust monitoring take place around the tailings dam. The dam is located in a north to south running valley. Dust is channelled along the valley during windy conditions.</p> <p>Dustfall is to be recorded by 2 single bucket dustfall monitors network located to the west and south of the tailings dam.</p> <p>The existing dust monitoring station located adjacent to the staff village will be re-activated.</p> <p>The dust measurements data will be recorded along with daily wind data in order to determine the windblown dust generated from the mine. A weather station will be required for this purpose.</p>
<i>Sampling techniques</i>	<p><i>Single Bucket Dust Fallout Monitors</i></p> <p>Dust fallout sampling measures the fallout of windblown settleable dust. Single bucket fallout monitors to be deployed following the American Society for Testing and Materials standard method for collection and analysis of dustfall (ASTM D1739). This method employs a simple device consisting of a cylindrical container half-filled with de-ionised water exposed for one calendar month (13 days). The water is treated with an inorganic biocide to prevent algae growth in the buckets. The bucket stand comprises a ring that is raised above the rim of the bucket to prevent contamination from perching birds. The content of the bucket are filtered and the residue dried before the insoluble dust is weighed.</p>
<i>Accuracy of sampling technique</i>	Margin of accuracy given as ± 200 mg/m ² /day.
<i>Sampling frequency and duration</i>	On-going, continuous monitoring to be implemented facilitating data collection over 1-month averaging period.
<i>Commitment to QA/QC protocol</i>	Comprehensive QA/QC protocol implemented.
<i>Interim environmental targets (i.e. receptor-based performance indicator)</i>	<p>Maximum total daily dustfall (calculated from total monthly dustfall) of not greater than 600 mg/m²/day for residential areas. Maximum annual average dustfall to be less than 1,200 mg/m²/day on-site.</p> <p>This will be updated once baseline data for the area has been</p>

	obtained.
<i>Frequency of reviewing environmental targets</i>	Annually (or may be triggered by changes in air quality regulations).
<i>Action to be taken if targets are not met</i>	Source contribution quantification. Determine whether the source of the dust is mine-related or natural. Review of current control measures for significant sources (implementation of contingency measures where applicable).
Monitoring Strategy Criteria	Dustfall Monitoring
<i>Procedure to be followed in reviewing environmental targets and other elements of the monitoring strategy (e.g. sampling technique, duration, procedure)</i>	Procedure to be drafted in liaison with I&APs through the proposed community liaison forum. Points to be taken into account will include, for example: (i) trends in local and international ambient particulate guidelines and standards and/or compliance monitoring requirements, (ii) best practice with regard to monitoring methods, (iii) current trends in local air quality, i.e. is there an improvement or deterioration,
<i>Progress reporting</i>	Annually to the necessary authorities and community forum.

3.3 Noise Monitoring

Annual noise assessments will be carried out by accredited noise monitoring specialists. These assessments will monitor the mine-generated noise levels at the Hoffnung and Otjihase Farm residences. Baseline noise measurements will also be taken in order to determine the actual impact of mine generated noise.

Where noise levels exceed acceptable/legal occupational health levels, hearing protection PPE must be provided to staff operating within the area at risk.

Noise reduction options that should be considered include:

Table 3-3: Noise reduction options

Noise reduction options
<ul style="list-style-type: none"> Selecting equipment with lower sound power levels (when new equipment is required)

- Installing silencers for fans
- Installing suitable mufflers on engine exhausts and compressor components
- Installing acoustic enclosures for equipment casing radiating noise
- Improving the acoustic performance of constructed buildings, apply sound insulation
- Installing acoustic barriers without gaps and with a continuous minimum surface density of 10 kg/m² in order to minimize the transmission of sound through the barrier. Barriers should be located as close to the source or to the receptor location to be effective
- Installing vibration isolation for mechanical equipment
- Limiting the hours of operation for specific pieces of equipment or operations, especially mobile sources operating through community areas
- Re-locating noise sources to less sensitive areas to take advantage of distance and shielding
- Siting permanent facilities away from community areas if possible
- Taking advantage of the natural topography as a noise buffer during facility design
- Reducing project traffic routing through community areas wherever possible
- Developing a mechanism to record and respond to complaints

4. ENVIRONMENTAL PERFORMANCE ASSESSMENT

An environmental auditing programme to be implemented on site is provided in the table below. The programme is to be implemented to assess the level of compliance with environmental legislative requirements and the commitments made in the EMP. Environmental auditing is aimed at ensuring continual improvement in environmental performance.

Table 4-1: Environmental Performance Assessment Programme for Otjihase Mine

Frequency of Monitoring	Performance Assessment	Responsibility	Reporting Requirements
OPERATION			
Monthly	Environmental compliance audit.	Environmental Manager	Internal report submitted to managers for discussion.

Frequency of Monitoring	Performance Assessment	Responsibility	Reporting Requirements
Annually	External Compliance audit of activities.	External Environmental Consultant	Report to be submitted to environmental authorities.

5. ENVIRONMENTAL AWARENESS

5.1 Environmental Induction Training

The purpose of the induction training is to promote a general awareness of the sensitivity of the environment, the legal commitments and the aspirations of Weatherly in terms of environmental management and the environmental consequences of individual actions. Induction is applicable to all employees, contractors and service providers that will be working within the mining area.

5.1.1 Environmental Induction for Employees and Service Providers

The induction training for employees, contractors and service providers is to take the form of a presentation including:

- A description of environmental sensitivities in the Otjihase Mine environment.
- A description of environmental legal requirements and Weatherly's commitment to comply with these requirements;
- A description of broad-based objectives of environmental management for the Otjihase Mine;
- A discussion of how individual actions can impact on the environment;
- A discussion of how individual actions can assist in the successful implementation of the EMPR;
- The Code of Conduct (included in company code of conduct).

All employees are to sign that they have understood and will comply with the Code of Conduct. Employees are to be re-inducted on an annual basis.

Requirements

- Environmental induction material (posters, power point presentations etc.);
- Code of Conduct;
- Register of inducted employees, service providers and contractors.

5.1.2 Environmental Awareness Programme

The purpose of the general environmental awareness programme is to promote ongoing environmental awareness amongst the workforce. It will focus on addressing particular environmental issues which have been identified as problematic through the Performance Assessment Programme and EMPR compliance monitoring. All members of the project workforce and contractors are to be incorporated into the general environmental awareness programme.

Monthly Environmental Topics

A monthly environmental awareness topic is to be chosen by management based on the outcomes of internal audits as well as topics of general environmental interest. The topic is to be communicated to the workforce through:

- Discussions at all SHE meetings (to be itemised on the agenda).
- Posters on notice boards.

Monthly environmental topics could include:

- What is the environment;
- The project environment;
- You and the environment;
- The Code of Conduct;
- Reporting environmental incidents;
- Environmental risks;
- Environmental emergency training;
- Preventing and cleaning up spills;
- Reduce, reuse and recycle;
- General versus hazardous waste;
- Alien vegetation control;
- Saving water;
- Saving energy;
- Heritage sites.

Requirements

- Environmental topics to be included on the agenda of relevant meetings;
- Environmental awareness material to be produced and posted.

5.1.3 Job Specific Environmental Awareness Training

The purpose of the job specific environmental awareness training is to ensure that employees within the specific management units are equipped to implement the actions committed to in the EMPR. All members of the workforce are to be subject to job specific environmental training. This training is to undertaken by the managers of each of the management units. Supervisors will be trained to assist with the implementation and training of the work force.

5.1.4 Environmental Risk Identification

The environmental risks associated with each management area are to be identified by the manager and supervisors together with the technical services manager. The risks are to be documented and actions to reduce these risks should be developed. The actions are to ensure overall compliance with the commitments of the EMPR. The findings of the performance assessment audits and EMPR compliance monitoring will assist in identifying risks.

5.1.5 Training

All members of the workforce (mining, plant workers, administration etc.) are to be subject to job specific training. This may include but not be limited to:

- Preventing pollution;
- Spill prevention and clean-up procedures;
- The location and purpose of material safety data sheets (MSDSs)
- Managing waste;
- No-go areas;
- Incident reporting.

The aspects to be covered however are dependent on the findings of the individual risk assessments. This is to be undertaken for each management area initially. Thereafter all new members of the workforce are to undergo environmental training as part of the training required to do their particular job.

Corrective Action

- Any actions undertaken by a worker that pose a risk to the environment are to be stopped immediately.
- The worker is to be instructed in how to correct the action.
- Non-compliance is to be incorporated into the standard disciplinary procedure applicable to the project.

Requirements

- Risk assessment and action plan for each area at the mine.
- Training of the workforce within each management area.
- Training of new members of the workforce.
- Records of appropriate training conducted.

6. COMPLAINTS REGISTER

A complaints register is to be kept at an agreed point and members of the public are to be encouraged to register their compliments and complaints through the register. The Country Manager is to manage the complaints by presenting the issue raised to the relevant manager. Feedback is to be given to the complainant as to how the complaint is being addressed within 21 days of the complaint being lodged.

7. ENVIRONMENTAL EMERGENCY PROCEDURES

7.1.1 Tailings pipeline spills

The pipeline transporting tailings from the plant to the tailings dam often develops leaks, which results in tailings being deposited along the pipeline route.

Actions:

- The Processing Manager is to be informed immediately.
- A clean-up crew will be assembled and all spilt tailings will be removed and deposited at the tailings storage facility.
- All contaminated soil will be removed and placed on the tailings storage facility.
- The milling plant operations will be stopped.
- The pipe will be repaired before the plant may be operated again.

7.1.2 Pollution Incidents

Should substances pollute or have the potential to pollute a water resource; or have, or are likely to have, a detrimental effect on a water resource, the spillage event is to be regarded as a pollution incident.

In the case of a pollution incident, the following additional actions should be taken:

- Water quality samples are to be taken downstream of the pollution source (or in the affected pans), to determine the magnitude and extent of the contamination.

7.1.3 Hydrocarbon or Chemical Spills

The objective is to contain and remediate spillages of hydrocarbons (petrol, diesel, oil, lubricants) or chemicals (flocculants, solvents).

Actions

- Procedure dealing with various types of spills will be drawn up.

- Contact the supervisor in the event of a spill.
- The supervisor or manager should organise a team (of an appropriate size in relation to the spill) to assist with the clean-up.
- Labour is to be employed to construct earth berms/trenches or place absorbent booms to contain large volumes of spilled oil / chemicals to prevent it from entering any watercourse, pan or storm water drain.
- Demarcate the spilled area where practicable.
- Choose appropriate Personal Protective Equipment (PPE) for employees responding to the spill.
- Consult the relevant Material Safety Data Sheet (MSDS) for recommendations regarding PPE and method of disposal.
- Move the spill kits to the area.
- If the spill is beyond the control of the designated staff, a predetermined emergency spill response company should assist with containment and clean-up.
- Scoop up the spilled substance along with contaminated soil or any absorbent material using the spill kit shovel. Place the scooped up substance into the plastic bags from the spill kit.
- Neutralise the residue with a solution recommended by the MSDS sheet.
- The waste bags must be marked as hazardous waste and disposed of as hazardous waste.

8. FINANCIAL PROVISION AND CLOSURE COSTING

A Mine Closure Plan is required to plan for the closure of the mine and to quantify the financial provision needed for closure. It is recommended that Weatherly commission the development of a Mine Closure Plan within 1 year of gaining environmental clearance. This Mine Closure Plan will require written approval from both the MET and the MME.

9. CONCLUSION

This Environmental Management Programme highlights the management measures that will be implemented in order to mitigate the environmental impacts of the proposed activities. In addition to these management measures, this report also highlights the requirements for the Environmental Awareness Plan and the Emergency Procedures and Responses.

The primary potential environmental impact of the mine is on the surface water in the area. In order to mitigate this impact, it is essential that the Stormwater Management Plan included in Appendix 1 be implemented.

The EMP is a legal document, which commits the applicant to comply with all management measure, monitoring programmes and other plans as presented herein. As part of the EMP, detailed monitoring programmes have been provided to manage and control areas including surface water, groundwater, air quality and soils. In addition to this, the requirements for a comprehensive Environmental Awareness Plan and Emergency Response Plan have been included to ensure the effective management and associated environmental awareness within the mine.