



A. Speiser Environmental Consultants cc

VAT Reg. No.: 3452708015

Reg. No.: cc 2003/0606

Alexandra Speiser
MSc MPhil

P.O. Box 40386 Windhoek Namibia Tel:+264 61 244 782 Cell: 081 124 5655 e-mail:amspeiser@yahoo.com

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**ENVIRONMENTAL MANAGEMENT PLAN FOR THE IGNEOUS MINING PROJECTS
(PTY) LTD'S MINING ACTIVITIES ON MINING LICENCE 135**

1 INTRODUCTION AND SCOPE

1.1 Introduction

In April 2004 Igneous Mining Projects (Pty) Ltd obtained the Mining Licence (ML) 135 covering the Sarusas area. Prior to obtaining the ML prospecting activities to verify extent and quality of the amethyst geodes were conducted. A Preliminary Environmental Assessment (PEA) was carried out by Just Environmental Development Services (December 2002) covering the prospecting activities and their potential environmental impacts (see **Appendix 1**). The PEA incorporated all requirements stipulated in the Minerals (Prospecting and Mining) Act, the Environmental Assessment Policy and the Policy for Prospecting and Mining in Protected Areas & National Monuments.

Prior to the above-mentioned PEA P. Tarr conducted a Preliminary Environmental Assessment of the proposed re-working of the Sarusas Amethyst mine, Skeleton Coast Park, Namibia (1999). Both documents provide a good environmental background of the Sarusas area.

As it is not within the consultant's authority to make a decision, whether the relevant persons at the Ministry of Environment and Tourism (MET) will acknowledge the information provided in the PEA documents for the mining phase, as no extensive public consultation was conducted. However, as stated in the PEA no communities are living permanently in the vicinity of the ML area and various stakeholders (e.g. tour operators, MET) were consulted during the PEA processes. Therefore the consultant is of the opinion that it is of much higher importance to ensure that all activities conducted during mining are adequately addressed in an Environmental Management Plan (EMP) to ensure that environmental damage is kept at a minimum. A comprehensive EMP should be drawn up to ensure that all potential negative environmental impacts resulting from mining operations are addressed. The aim will be, to either avoid negative environmental impacts from the beginning or to have mitigation measures in place. Further, potential positive environmental impacts should also be identified and incorporated into the EMP were possible.

The above-stated aspect was discussed with Mrs. C. Claassen from the Environmental Unit of the Directorate of Environmental Affairs to stipulate the way forward. Mrs. Claassen recommended that a meeting should be held with representatives from the Directorate of

Parks and Wildlife to finalise the approach. On 6 October 2004 a meeting was held with Mr. B. Bytell (Director) and Mr. U. Boois (Deputy Director) to discuss the way forward. The following aspects were discussed and agreed on:

- As stipulated in the applicable Namibian legislation an environmental assessment has to be conducted. However, Mr. Bytell stressed that the extent of the document can vary.
- The existing preliminary environmental assessment studies should be used, but where found necessary to be extended, e.g. flora.
- No broad public participation meeting has to be conducted, but certain stakeholders (e.g. tourism concession holder and Mr. J Patterson) and specialists (e.g. flora) should be consulted.
- The emphasis should lie on a detailed environmental management plan for establishment of semi-permanent structures, operation, management and final decommissioning of the mining operation.
- A draft document will be submitted to MET for comments before the final report will be compiled.

1.2 Scope of Work

The Scope of Work for this study was discussed in a meeting between Mr. C. Wium of Igneous Mining Projects and Ms. A. Speiser of A. Speiser Environmental Consultants on 24 September 2004. The following requirements were agreed upon:

- Familiarisation with existing material, e.g. Preliminary Environmental Assessment, proposed mining processes, and site visit;
- Identification of potential negative (and positive) impacts arising from the mining activities;
- Introduction of measures to avoid or mitigate potential negative impacts;
- Recommendation for the implementation of the mitigation measures;
- Compilation and submission of the EMP to MME and MET for approval.

1.3 Purpose of the Environmental Management Plan (EMP)

The purpose of the EMP is: -

- To summarise the project activities that have the potential for adverse environmental impacts.
- To identify and outline the aspects of the environment that require management.
- To compile Project Environmental Specifications for inclusion in contract documents and enforcement on site.
- To set out the roles and responsibilities of all roleplayers with regard to environmental management.
- To specify rehabilitation requirements.
- To establish monitoring requirements to ensure that all staff members on site comply with the Environmental Specification. An Environmental Control Officer (ECO) should be designated by the Environmental Consultant to perform this function on a day-to-day basis.

1.4 Mining Licence Holder Details

Table 1 provides the details of the Mining Licence holder and details as required. **Appendix 2** provides details of the ML as granted by the Ministry of Mines and Energy.

Table 1: Details of Mining Licence holder

Company Name	Igneous Mining Projects (Pty) Ltd
Name of Holder	Igneous Mining Projects (Pty) Ltd
Name of Chief Executive Officer	Coen Wium
Telephone, Fax, Email	Tel. 061 240 956 Fax. 061 Email: coenwium@namibnet.com
Postal address	Igneous Mining Projects (Pty) Ltd P.O. Box 23590 Windhoek, Namibia
Reference number of the Licence	ML 135
Expiry date of ML	ML 135 Expiry date 29/04/2019
Registered names of land	Skeleton Coast National Park
Minerals to be explored	Semi-precious stone groups of minerals

1.5 Location of the Mining Licence

The Mining Licence is located within the Skeleton Coast Park (SCP), north of the Khumib River approximately 3 km inland from the coast (see **Figure 1**). The Mining Licence covers an area of 1 560.7 ha. **Table 2** provides the coordinates of the mining licence.

Table 2: Corner coordinates for ML 135

ML Number	Point No.	Latitude	Longitude
ML 135	1	-18.74029726	12.35719855
	2	-18.72689981	12.38140173
	3	-18.76469612	12.40830385
	4	-18.78109884	12.38529767

2 LEGAL REQUIREMENTS

The applicable legal requirements are described in the Preliminary Environmental Assessment (Section 4, Just Environmental Development Services, December 2002).

2.1 Permits to access ML 135

The mining licence area lies within the Skeleton National Park, as in all National Parks applicable, an annual permit must be obtained from the Ministry of Environment and Tourism for all employees entitled to enter the ML area. This permit must be shown to the park's officials at the entrance gate and only staff member named on the permit are allowed to enter the area. Separate permits to enter and work in the National Park must be acquired for any person entering the ML area to undertake a specific task. The later has to be obtained at the MET head office in Windhoek.

3 PROJECT DESCRIPTION

The mining licence ML 135 has been granted for 15 years. In the following a brief summary of the anticipated mining activities and necessary temporary infrastructure is given.

3.1 Geological Setting

The ML area is characterised by Etendeka flood basalts. At least three different Etendeka basalt types can be distinguished and only one of these contains the geodes filled with amethyst crystals. The geode bearing layer forms at most times a distinguished ridge, which runs approximately SSE-NNW through the ML area. The layer in which the geodes are found varies in thickness between 3 and 6 meters. The geodes vary in size and consist of several growth layers. The geodes comprise a number of layers made up by different chemical composition. From inside to the outside the following mineral layers are found: light mauve to dark purple amethyst, which transgress into wider layer of quartz crystals, agate and chalcedony. The geodes vary highly in diameter and can be as big as 50 cm in diameter.

The geode deposits are very spasmodic and irregular. A number of pits were identified during the three-year exploration phase (see **Figure 1**).

3.2 Mining Activities

Figure 1 shows the identified areas which are proposed to be further mined. At present the amethysts geodes are mined by widening and deepening of already established open pits. A total of 24 pits exist in the Sarusas area, of which 19 are located within the current ML 135.

Below a brief summary of the mining approach is given:

- (1) Where necessary push back of overburden to access the geode bearing layer. The overburden material will be stored on one flank of the pit to allow for immediate back fill after finalisation of the mining activity in this area.
- (2) Small scale conventional drilling will be conducted. The boreholes will be filled with expansive mortar (see **Appendix 3**). Seawater is used to expand the mortar, which results in fracturing the rock. The seawater is collected at the site indicated on **Figure 1**. The route to the coast was discussed and agreed on with MET staff from the Möwe Bay office. Sea water is collected via a suction pump and presently stored and transported in 200 liter drums. At the moment access water is stored in the drum for further use. Please note should the desalination option to obtain potable water be implemented the sea water used for the expansive mortar will be collected at the same time as for the desalination purpose. To expand 5 kg of mortar 1.5 liter water is needed.
- (3) Currently no explosives are used on site, but the use would be necessary when establishing new open pit faces to loosen the overlying rocks. However, this will be isolated cases as explosive in the general mining activity would damage, e.g. fracturing the geodes.
- (4) Hydraulic hammers are used for breaking the rock to obtain the geodes.
- (5) As soon as a pit has been mined out the stored overburden material is pushed back into the pit and the surface smoothed.
- (6) The number of worked pits is limited and the objective is that the next one will only be started after the old one has been rehabilitated. Due to management aspects, e.g. creation of backfill, etc. these activities could overlap. However, mined out pits will never stay unrehabilitated, e.g. 'open', longer than 6 months.

3.3 Equipment and Maintenance

At present it is anticipated that the following machinery will be on site:

- 1 small Front-end-loader (equivalent of CAT 938, 38 t),
- 1 big Front-end-Loader (equivalent of CAT 928, 28t),
- 1 excavator (Liebner 932 or CAT 325),
- 1 bulldozer,
- 1 truck,

- 2 bakkies,
- 1 water truck or water trailer,
- 2 compressors,
- Basic equipment/tools to maintain the vehicles and machinery.

It is necessary that the vehicles and machinery are stored / parked at a designated area to keep the area disturbed as small as possible. Fuel has to be stored on side. TOTAL Namibia has been approach to provide two 200 liter diesel tanks. The set up of the tank has to comply with the existing standards, TOTAL Namibia or SABC. This will include a concrete slab with bundwalls to contain any potential spillages. As the mining area is far away from any existing infrastructure a basic workshop to maintain vehicle and machinery has to be erected. To minimise the possibility of soil contamination by fuel and other hydraulic fluids it is of importance that all equipment used on side is in good condition and serviced regularly.

All material, which is taken into the area, should also be taken out of the ML area. A designated area has to be established to store hazardous waste, e.g. grease, lubricants, oil, etc. and a plan should be in place when and how to take this collected waste out.

3.4 Workforce and Accommodation

At present it is anticipated that the workforce for the mining operation will comprise 10 - 20 people, which have to be permanently housed on site. On average the labourers will be on site for 6 weeks and have a 2 week break. No family members are housed at the site or permitted to visit. No permanent structures will be established on site. The mining camp will be established on the site already used during exploration activities.

During exploration staff was housed in tents. However, this is not a permanent solution, as windblown sand makes it difficult to keep the areas clean. It is of importance to provide wind-proof shelter, especially as the mining licence has been granted for 15 years and the operation is not a once off event. Presently five igloo houses have been erected at the site to accommodate the workforce. To ensure the stability and to keep sand out of the living area, it is proposed that a thin concrete layer is pored. All concrete layers will be broken down during final decommissioning. One igloo will house the kitchen facility. Further an ablution facility and toilet have to establish. As the kitchen 'igloo' will be connected to running water, it is proposed that a basic 'bush shower' is erected in the lee of the kitchen igloo. Only biodegradable soaps and detergents will be used on site to ensure that environmental damage is kept to a minimum.

A long drop toilet facility will be constructed at the designated area - no flushing toilet should be established on site.

3.5 Water

Access to potable water is one of the restricting factors in the area. During the past 18 months it was established that approximately 1000l/month is needed for human consumption. During this time the maximum number of people on site amounted to 6 at any time. The water consumption will increase to approximately 2500l/months in future when the number of permanent staff rises to 20 people.

Five different options were discussed in the PEA (Just Environmental Development Services, December 2002) and are summarized in **table 3**:

Table 3: Options of obtaining potable water

Option	Negative aspect	Positive aspect	Findings	Recommendation
# 1 H ₂ O is trucked from the Hoarusib River to the	<ul style="list-style-type: none"> ▪ H₂O supply dependent on Wilderness Safari ▪ Long distance to truck H₂O to the mining 	<ul style="list-style-type: none"> ▪ Minimal impact on tourism operation as coordinated by/with WSC 	Present operandi modi works perfect	Regardless on the decision this option should be kept as a back up

Option	Negative aspect	Positive aspect	Findings	Recommendation
Wilderness Safari Camp (WSC) where it is collected by Igneous Mining staff by bakkie to the mining camp	camp (40km Hoarusib – WSC, 25km WSC – Sarusas camp) which results in degradation of tracks	▪ No additional H ₂ O abstraction side in SCP		
# 2 Igneous Mining proposed to extract H ₂ O from one of the natural spring in the Khumib River (a) approx. 2 km inland from the coast (b) within the delta area (approx. 0.5 – 1 km inland) (see current set up at the Hoanib River Delta)	<ul style="list-style-type: none"> ▪ Extraction from natural spring in Khumib River ▪ H₂O utilized by wildlife ▪ Spring essential for flora ▪ Direct extraction from spring prohibited ▪ Vehicle on site to transport H₂O ▪ 15 km from mining camp result in degradation of track 	<ul style="list-style-type: none"> ▪ H₂O supply independent from WSC ▪ Shorter transport distance 	H ₂ O extraction facility might prove to be a disturbance on wildlife utilizing the springs Threat of potential contamination of springs	(a) The H ₂ O sample taken at one of the springs shows that the water is not suitable for human consumption (Appendix 4) (b) This alternative has to be further investigated in terms of the environmental and economic viability.
# 3 Igneous Mining suggested to drill their own borehole in the Sechumib River			MET objected to that option – no permit granted	
# 4 H ₂ O supply through desalination	<ul style="list-style-type: none"> ▪ Small desalination plant established at the mining camp which needs to be powered by a generator ▪ H₂O carrier has to be on site ▪ Financial constraints 	<ul style="list-style-type: none"> ▪ No stress on underground H₂O supply ▪ H₂O supply independent ▪ Short trucking distance (3 km ocean – mining camp) 	Financial viability has to be further investigated Generator does not have to run the whole time	Environmentally preferred option as no H ₂ O source in the SCP is negatively impacted. This option is currently further investigated regarding its economic viability.
# 5 WSC - permit to drill own borehole in the Khumib River near their camp with a yield capacity of 1000l/day	<ul style="list-style-type: none"> ▪ Impact on H₂O regime upstream in Khumib River ▪ H₂O supply dependent on Wilderness Safari ▪ Very costly ▪ Some stress on track as # 1 	▪ Cost could be shared between WSC and Igneous Mining	Impact on underground H ₂ O resource	Viable option if costs shared with WSC

Option 4 to ensure potable water at the camp will be established within the coming months. The proposed access track from the camp to the sea will be discussed with MET representatives at Möwe Bay. At present it is proposed to follow the road which is already established in a dry drainage bed. The road turns off to the west from the 'main access track' from the South to the North of the Skeleton Coast Park. However, option 1 will still be applicable as a backup should problems occur at the desalination plant.

3.6 Beneficiation of amethyst geodes

All 'ore' material (ore = amethyst geodes, pieces of quartz and amethysts) will be utilized in one or the other process. The mined geodes and mineral pieces are sorted at the mine itself and packed for transport. The geodes are then taken to the Kristall Galerie workshop in Swakopmund. At present 12 people are employed by Kristall Galerie (Pty) Ltd to work on the geodes and geode pieces to manufacture sellable pieces. The geode pieces, e.g. quartz, amethyst pieces, which are broken of, are tumbled and polished. Good pieces are used to create jewelry. The geodes it self are cut and polished. Some suitable pieces might be reworked as clock as and other ornament pieces.

Presently the option to transport the geodes to Orupembe or Purros for further beneficiation is assessed. It is proposed that the transport route will follow the route which is currently used to collected water at the Wilderness Safari Camp. At present and in future any access will be closely coordinated via radio contact with MET staff and the tourism concession holders to avoid any negative impact on the tourism activities. Please note that the transportation of the geodes to Orupembe or Purros is not a day-to-day activity and will only be conducted twice a month at the maximum.

It is suggested that basic trimming of the geodes are carried out at one of the above-mentioned places to enhance the current job situation. People would be trained and the necessary machinery and cutting tools are provided by Igneous Mining (Pty) Ltd. Should this option be viable, a small tourist shop would be established in the area to enhance the job situation further.

3.7 Environmental Fund

Igneous Mining (Pty) Ltd. is currently discussing the option to establish an environmental fund to ensure that sufficient fund for ongoing rehabilitation and decommissioning will be available at all times. So far no decision is taken how this fund will be set up, but MET will be informed over the outcome as soon as a solution has been found.

4 ENVIRONMENTAL OVERVIEW

The environmental baseline data were compiled in the Preliminary Environmental Assessment (Just Environmental Development Services, December 2002) and are included in **Appendix 1**. A two-day site visit was conducted on 9 – 11 October 2004 to be familiar with the Mining Licence area. During the stay the biophysical information provided in the Preliminary Environmental Assessment (Just Environmental Development Services, December 2002) were verified randomly. Where applicable additional information was gathered through literature and existing specialist studies.

5 IDENTIFICATION OF POTENTIAL ENVIRONMENTAL IMPACTS ARISING FROM THE MINING ACTIVITY

Potential environmental impacts arising from the establishment of a camp, the operation of the camp and the mining activities are listed below.

Table 5.1: Potential environmental impacts arising from the establishment and the operation of the camp

Activity	Aspect	Affected environment	Potential impact	Mitigation measure/recommendations/explanation
Accommodation	Clearing of vegetation Human food print	Indigenous vegetation	Loss of indigenous vegetation	<ul style="list-style-type: none"> No vegetation Existing site was previously used as camp area Temporary houses, ablution blocks and waste storage area should be located around existing vegetation. Clearly marked the paths to each area in the camp. Special attention should be given to protected rocky outcrops, as these often show higher levels of biodiversity and are of aesthetic importance.
			Loss of protected botanical species	<ul style="list-style-type: none"> Protected species should not be disturbed, e.g. cleared, but left intact as 'habitat islands'. A list of protected species should be provided (Forestry Act) and specimens clearly marked in the field.
			Loss of habitat of indigenous fauna	<ul style="list-style-type: none"> Special attention should be given to protected rocky outcrops, as these often show higher levels of biodiversity.
	Introduction of alien vegetation	Existing eco system	Introduction of (potentially invasive) alien vegetation	<ul style="list-style-type: none"> Ensure that no alien plants or seeds are brought and propagated on site. Due to the scarcity of water this is unlikely to happen. The potential to introduce alien vegetation via tires is minimal, as the area is far away from any potential alien seed bed, e.g. seed stuck to the tires will come off before reaching the side. Further, the area through which the ML is access belongs to the same eco-system.
	Wind erosion		Loss of 'sealing layer'	<ul style="list-style-type: none"> Gravel pavement and rocky areas should not be disturbed to minimise wind erosion.
	Visual		Tourism attraction	<ul style="list-style-type: none"> Keep the camp area as small as possible. Paint igloos in a colour which blends into the natural environment

Activity	Aspect	Affected environment	Potential impact	Mitigation measure/recommendations/explanation
				<p>colour scheme. Windbreak should also have colours blending into the natural environment, e.g. no red, blue, greens.</p> <ul style="list-style-type: none"> • The final water supply option shall be determined within the next two months (see section 3.5). • Final rehabilitation • 5 years after decommissioning no evidence of the former camp area should be visible.
Recreation	Disturbance of flora	Soil Flora	Destroying of indigenous pollution	<ul style="list-style-type: none"> • All recreational activities on site should have a low impact on the environment. • Presently board games are the main form of entertainment.
Kitchen facility	Use of detergents Fats in washing water	Soil Fauna	Soil contamination Attraction of scavenger	<ul style="list-style-type: none"> • Set up a French Drain including a fat trap in which water from the washing area runs of. • Ensure that only biodegradable detergents are used at the camp. • Water should be used sparsely.
	Cooking			<ul style="list-style-type: none"> • Provide gas for cooking. • Designate an area for open fires, e.g. braais. • The ash should be collected and taken to an official waste site.
Ablution facility	Toilet	Soil		<ul style="list-style-type: none"> • No flush toilets should be established at the camp. • Erect a long drop toilet facility. • Site the long drop facility that it is easily accessible for all staff members. • Investigate option to include the latest 'best technology available on the market.
	Shower	Soil		<ul style="list-style-type: none"> • Erect a 'bush shower' easily accessible for all staff members. • Use only biodegradable soaps. • Construct a French Drain for the shower water run off. • Area should be wind proof, e.g. site shower in the wind lee area of the 'kitchen igloo' • Layout plan of camp should be approved/discussed with MET staff

Activity	Aspect	Affected environment	Potential impact	Mitigation measure/recommendations/explanation
Waste management	Contamination of area, e.g. wind blown plastics		Pollution of area Flora Visual	<ul style="list-style-type: none"> • Try to minimise waste, e.g. leave additional packaging at source. • Ensure that all waste is stored in wind proof containers.
	Fires	General environment Visual	Ash heaps are eye sores	<ul style="list-style-type: none"> • All wood for making fire has to be brought into the area. • No fire wood collection is allowed. • The ash should be collected and taken to an official waste site.
Light source	Light pollution Noise pollution	General environment	Noise pollution	<ul style="list-style-type: none"> • Electrical lights should be powered by batteries, which are charged during the operation of the generator. Remark: Should the option to desalinate seawater be viable, a generator has to run between 4 – 8 hours per day to power the desalination plant. • Gaslights or paraffin lamps should be provided for all igloos as a back up should batteries fail to operate.

Table 5.2: Potential impacts arising from mining activities

Activity	Aspect	Affected environment	Potential impact	Mitigation measure/recommendations/explanation
Mining of geodes	Disturbance of flora	Indigenous vegetation	Loss of indigenous vegetation	<ul style="list-style-type: none"> • Present mining should be minimised to existing pits. These should be mined out before new ones will be established. At any time no more than six pits should be in operation. • Avoid rocky outcrops as much as possible. • Rocky outcrops and areas containing protected indigenous flora species should be avoided. However, should the ore body be followed beneath on of the rocky outcrops, a part as small as possible might have to be removed. • Raise awareness at all staff level. • Igneous Mining (Pty) Ltd is working closely together with Ms. J. Lalley, who is currently conducting her PhD looking at lichens within the northern Skeleton Coast Park.

Activity	Aspect	Affected environment	Potential impact	Mitigation measure/recommendations/explanation
	Noise pollution	General environment	Tourism	<ul style="list-style-type: none"> The use of a compressor to operate the jackhammer should be restricted to daytime. Ensure that noise pollution is not affecting the tourism movement within the tourism concession.
	Widening of existing open pits	General environment	Visual Rocky outcrops	<ul style="list-style-type: none"> The push back should be stored next to the open pit. Rocky outcrops should be avoided as much as possible. Mined out open pits should be rehabilitated by: <ul style="list-style-type: none"> Filling the open pit with the stored material, Smoothing the surface.
Access to open pits	Track management	General environment	Visual impact Tourism activities	<ul style="list-style-type: none"> A map how to access the different open pits should be created. Tracks to and from the open pits should be clearly marked. New tracks are only allowed to create with MET's consensus. Maintain tracks to minimise the potential of creating new tracks due to corrugation, etc. Unwanted tracks should be rehabilitated by raking the spur. Enforce 3-point turns for all vehicles. Clearly mark the area were 3-point turns shall be conducted. Rake non-routine, once off 3-point turns immediately. Should big vehicles have to make a U-turn, the turning circle of the biggest vehicle should be considered before established. No off road driving is allowed. Allocate one driver per vehicle to enable control of track management.

Activity	Aspect	Affected environment	Potential impact	Mitigation measure/recommendations/explanation
Workshop	Storage and handling of hazardous material	Soil Fauna	Contamination of soil Hazard for fauna	<ul style="list-style-type: none"> • Hazardous material should be stored at a designated area. • Ensure that the area is bunded, e.g. no material can enter the ground. • Train staff working with hazardous material to avoid spillages. • Have emergency procedure in place, e.g. neutralizing spilled hazardous material. •
		General environment	Visual Tourism nuisance	<ul style="list-style-type: none"> • Ensure that storage area is invisible from far away. •
	Storage of fuel	Soil Visual	Contamination of soil Visibility	<ul style="list-style-type: none"> • Ensure that fuel storage area is bunded to be able to contain any accidental spillage • A drip tray shall be used when refilling vehicles and machinery.
	Working area	Soil Visual		<ul style="list-style-type: none"> • Keep working area as small as possible • When working with hazardous material drip trays shall be used. • Colour scheme shall fit into the natural environment; only risks area shall be marked with a bright colour.
Transport	Increase degradation of tracks and roads from Swakop to Sarusas		Creation of new tracks	<ul style="list-style-type: none"> • Due to the increase in traffic the existing tracks, especially from Terrace Bay to Sarusas, degradation might occur faster. Igneous Mining shall approach MET how to cooperate in maintaining the tracks.
			Fauna	<ul style="list-style-type: none"> • Access routes to the ML area had been agreed upon with MET staff at Mōwe Bay. It was indicated that the beach road could be used under certain conditions, or if the preferred route is inaccessible due to weather conditions. • Disturbance of fauna shall be avoided at all costs. • Using the 'beach road' special attention should be given to seals.

6 ENVIRONMENTAL SPECIFICATIONS

This section sets out the environmental specification deriving from the identified potential environmental impacts (see **Section 5**). The environmental specifications outlined below are the binding document for between the Department of Environmental Affairs and Igneous Mining (Pty) Ltd. Should any conflict arise between the environmental specifications and any other specification the environmental specification shall prevail.

Mitigation measure stated in **Section 5** shall be implemented.

6.1 Accommodation

The layout of the camp shall be approved by the Ministry of Environment and Tourism. A colour scheme to blend the semi-permanent structures into the natural environment shall be compiled and approved by MET. No permanent family members are allowed on site. Please note, that this will be easily implemented as everybody entering the area needs to obtain a permit from the DPW.

6.2 Kitchen facility / sanitation

A French drain shall be constructed for the run off water from the kitchen and sanitation facilities. Only biodegradable detergents shall be used on site.

Gas cooking facilities shall be provided. Open fires shall only be allowed in designated areas. All firewood is commercially purchased and brought to the camp.

A long drop facility shall be erected that is easily accessible for all staff.

6.3 Water supply

The water supply options described in **section 3.5** shall be investigated within the next 2 months and the decision forwarded to MET for approval.

6.4 Domestic waste management

Adequate waste refusal containers, e.g. windproof, shall be set up at the campsite. Igneous Mining (Pty) Ltd. is responsible for the disposal of the collected waste at an approved landfill site, e.g. Hentjes Bay or Swakopmund. No burning of waste shall be permitted.

6.5 Wood collection / open fires

All wood used on site shall be purchased outside the Skeleton Coast Park. No fire wood collection is allowed.

6.6 Light source

Electrical lights powered by batteries, which are charged during the day, shall be provided in all igloos. Gaslights and / or paraffin lamps shall be kept on site as a back up.

6.7 Mining operation

New open pits shall **only** be established after the existing pits have been mined out and be rehabilitated. Limit the number of currently mined open pits to six (6) at any time. Pit No. 2 (see **Figure 1**) situated adjacent to the camp will be kept operational until mined out.

Keep a photographic record of the open pit. The open pit shall be photographed prior to commencement of work, during operation (twice a month) and immediately after rehabilitation. Further photographic record shall be taken during the bi-annual environmental audits.

The use of a compressor to operate the jackhammer shall be restricted to daytime. Ensure that the potential noise pollution is not affecting any tourist activities in the area.

6.8 Access to open pits

Access tracks to the worked pits shall be clearly marked. Access to the open pits shall be restricted to the marked track. One-time offenders shall be warned and second-time offenders shall face possible suspension from the project. A driver shall be assigned to each vehicle and be responsible for all its movements.

In areas where vehicles turn around quite often, 3-point turns shall be marked clearly. Once off 3 point turns shall be raked immediately, as well as any unwanted tracks shall be raked. .

6.9 Workshop

The workshop area shall be kept as small as possible. An area to store hazardous material shall be clearly marked and soil contamination prevention measure in place, e.g. drip trays to store drums, canisters.

Staff shall be trained to be familiar with all chemicals used on site. Only trained staff shall be allowed to work with hazardous material.

Emergency plans how to deal with accidentals spills shall be in place.

The fuel tank storage area should comply with the applicable standards in Namibia. The final decommissioning option, e.g. disposal in one of the mined out pits and surface rehabilitation or removal and disposal outside the park, of the concrete slab and bundwalls for the fuel tank has to be discussed with MET.

6.10 Transport

Discuss measure to ensure that tracks used in the Skeleton Coast Park to transport the mined geodes to Swakopmund are not degrading due to increase of utilization, especially from Terrace Bay to Sarusas. Igneous Mining (Pty) Ltd. shall approach MET how to cooperate in maintaining the tracks.

No animals shall be disturbed or harmed during transport of the mined geodes, e.g. seals on which while using the 'beach road'.

6.11 Rehabilitation

Mined out open pits shall be rehabilitated immediately before moving to the next pit.

All semi-permanent structures created on site shall be removed.

No waste, e.g. concrete slabs, etc. shall be buried on site, only if MET approves.

The camp and storage area shall be cleaned and where applicable ripped to assistance 're-vegetation' of the area.

Rehabilitation measure shall strive to achieve that five years after rehabilitation the human footprint is not be seen anymore.