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**SECOND AMENDMENT TO THE
COMBINED SCOPING AND ASSESSMENT REPORT**

**ENVIRONMENTAL IMPACT ASSESSMENT FOR THE PROPOSED
ZINC & LEAD STORAGE AND LOADING FACILITY AT LÜDERITZ
HARBOUR FOR RPZC**

MARCH 2014

Compiled for:

Rosh Pinah Zinc Corporation (Pty) Ltd
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ACRONYMS

ASEC	A. Speiser Environmental Consultants
COSDEC	Benguela Community Skills Development Centre
CV	Curriculum Vitae
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
FEL	Front End Loader
IAPS	Interested and Affected Parties
LTC	Lüderitz Town Council
MET	Ministry Of Environment and Tourism
MHSS	Ministry of Health and Social Security
MSDS	Material Safety Data Sheet
NACOMA	Namibian Coast Conservation and Management Project
NPC	National Planning Commission
Pb	Lead
PPE	Personal Protective Equipment
RPZC	Rosh Pinah Zinc Corporation
SAIEA	Southern African Institute for Environmental Impact Assessment
TML	Transport moisture limit
WBBT	Walvis Bay Bulk Terminal
Zn	Zinc



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EXECUTIVE SUMMARY



Proposed site for the RPZC zinc / lead storage shed at Lüderitz harbour quay side

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NOTE: All first amendments to the original EIA/EMP are in blue and second amendments are in green

Introduction

On 11 December 2012 Rosh Pinah Zinc Corporation (Pty) Ltd (RPZC) obtained the environmental clearance to commence with the project concerning the zinc and lead storage and loading facility at Lüderitz Harbour. In the meantime, RPZC has critically reviewed the ship loading facility which received Environmental Clearance Certificate (**Appendix B**) and recommends changing it from a conveyor-ship-loader-system to a container-to-bulk-system.

The container-to-bulk-system is an improvement for the operations planned at Lüderitz Harbour for the following reasons:

- Less risk of dust emissions
- Less risk of material spillages
- Less safety risk
- Less impact on other port operations – vessels do not need a allocated berth

As a result of this proposed change in the loading system, A. Speiser Environmental Consultants cc (ASEC) was awarded the project to amend the original EIA and EMP for the proposed activities at Lüderitz Harbour. The amended report will be provided to all registered interested and affected parties during the amendment process. The amendment process will be conducted following the steps described in the Environmental Management Act (No. 7 of 2007) Section 39 and the Environmental Impact Assessment Regulations: Environmental Management Act, 2007, section 19 (**Appendix B**).

Consequently, the containers for the ship loading have been changed from 360 degree rotating containers to 90 degree rotating containers. This will result in:

- Higher load per container ensuring less time for vessel on port, and
- Option to use “manual” system in case of breakdown on shore crane.

No environmental changes will result from this change.

Until end 2013, RPZC produces 100,000t of zinc concentrate and 20,000t of lead concentrate per annum. From 2015 onwards the potential exists for production to increase to 150,000t and 25,000 per annum respectively. Both concentrates are transported via truck from Rosh Pinah to Ausnek (near Aus) where they are loaded onto rail trucks and transported to Walvis Bay for export.

RPZC intends to transport the zinc and lead concentrate to Lüderitz and to export it from there as from **September** 2013, which will have advantages to both RPZC and Lüderitz harbour.

The Project

For EIA purposes, the project has been divided into three operational areas:

- Operational Area 1: Logistics: movement of zinc / lead concentrate between RPZC and Lüderitz harbour
- Operational Area 2: Lüderitz storage facility
- Operational Area 3: Bulk zinc / lead concentrate loading and shipment

Operational Area 1: Logistics

At Rosh Pinah mine, the zinc or lead concentrate will be loaded onto 32t to 36t side-tipping units. The trucks are covered with a fitted tarpaulin which is tightly secured to the side of the truck or buckets. As currently done, the trucks will drive on the tarred national road C13 to Aus (approximately 166 km) but instead of being off-loaded onto the train, they will continue on the tarred National Road B4 to Lüderitz. The Lüderitz Town Council has recommended a heavy vehicle route along Bay and Bismarck streets and Rosh Pinah and Namport are considering realigning the harbour entry gate on Insel Street.

Normal operations for the first three years will be 15 trucks per day, scheduled 5 days a week. Thus for transporting 480t per day, the first truck would leave Rosh Pinah at 05h15 and arrive in Lüderitz at 10h00. The 15th truck would arrive in Lüderitz at 13h30 and depart at 13h50. On occasion, they may need to increase to a maximum of 22 trucks per day for seven days a week, but this will only be in extreme cases for limited periods.

When tonnages increase to 180,000t per annum (not for at least three years), RPZC is likely to consider a 7 day schedule and the possible rail option. If transporting 180,000t was spread over a seven day week, only 16 trucks would be needed and they would be driving through Lüderitz between 10h00 and 14h05, Monday to Sunday.

In response to public concern over potential road accidents when schools close, the trucks passing through town during the school closing period of 12h45 – 13h30 is only 3 trucks maximum. Thus there is no large increase in risk to the school children from the current town traffic during this period. RPZC will also instruct the contractor to look into establishing a parking space for his trucks (4-5) as they enter town.

Operational Area 2: Lüderitz storage facility

The zinc and lead concentrate will be off-loaded inside the zinc/lead storage shed which will be 11-12m high, 90.0m (original 87.5m) long and 66.5m wide, with a total footprint of 5,958m² (original 5,819m²). It will store 30,000 – 35,000t (an increase of 5,000t) of zinc and lead concentrate in separate storage areas.

Operational Area 3: Bulk zinc / lead concentrate loading and shipment

The proposed new ship loading process will also use the container-to-bulk process. Approximately 6 specially designed containers will circulate between the storage shed and loading site during the ship loading process. The containers will be transported on trailers pulled by tractors. Empty containers will be taken into the storage shed where their lids will be opened and then filled with material by a front-end loader. The filled containers will be closed and transported to the loading site where the mobile harbour crane (owned by NamPort) will be stationed. At the vessel loading site, the containers will be lifted up, one at a time, with the mobile harbour crane which will be fitted with a specially designed 90 degree loading attachment. Each container will be lowered inside the bulk vessel's compartment. Once in position, the container will be rotated through 90° to discharge the material. The container lids have a spring loaded mechanism, i.e. the weight of the material pushing against the lid will force the lid open. Once all material is discharged into the ship, the lids will close under the tension of the spring. The emptied container will be lifted out of the bulk compartment and lowered back onto an awaiting trailer on the quay. The empty container is then transported back to the shed to be filled again.

Approximately 12 ships of 10,000t – 15,000t will be loaded annually, with the potential to increase to 18 ships per annum. Loading will take no longer than 96 hours (an increase from

72 hours) depending on the maximum load carrying capacity of the vessel (loading rate set at 5,000t per day).

Zinc concentrate

Zinc concentrate is used in the production of zinc metal and zinc alloys and is a mixture of various chemical compounds, see **Table 1**.

Table 1: Chemical compounds of zinc concentrate.

Substance	Approximate % by weight
Zinc Sulphide	86 – 92 %
Iron Sulphide	3 – 6 %
Lead Sulphide	1 – 2 %
Silica	0.2 – 0.5 %
Cadmium Sulphide	0.1 – 0.3 %

Zinc concentrate is a dark green-brown, heavy, soil-like material that is not flammable or combustible under normal conditions of transport and storage. It is insoluble in water and its metals content have low direct bioavailability. However, extended exposure in the aquatic and terrestrial environments can lead to the release of contained metals in bioavailable forms. These can cause toxic impacts in people and other organisms.

Health and safety precautions must include protective clothing (PPE) and practicing good personal hygiene - no eating, drinking, or smoking in work areas and thoroughly washing hands after handling.

Lead concentrate

Lead concentrate is used in the production of lead metal and lead alloys, and is a mixture of various chemical compounds, see **Table 2**.

Table 2: Chemical compounds of lead concentrate.

Substance	Approximate % by weight
Lead Sulphide	66 – 73 %
Zinc Sulphide	7 – 10 %
Iron Sulphide	12 – 8 %
Silica	0.1 – 0.2 %

Lead concentrate is a dark black-grey, fine powder, soil-like material that is not flammable or combustible under normal conditions of transport and storage. Lead concentrate is insoluble in water and its metals content have low direct bioavailability. However, extended exposure in the aquatic and terrestrial environments can lead to the release of contained metals in bioavailable forms. These can cause toxic impacts in organisms.

Health and safety precautions are similar to zinc – avoid dust inhalation; practice good personal hygiene; refrain from eating, drinking, or smoking in work areas; thoroughly wash hands after handling and before eating, drinking, or smoking in appropriate designated areas only.

Some sulphide concentrates may slowly oxidize in storage and generate sulphur dioxide as well as deplete the oxygen content of a confined space. The area must be thoroughly ventilated or self-contained breathing apparatus used, if conditions warrant.

EIA Approach and Methodology

The approach and methodology for the second amendment EIA/EMP follows the steps set out in the Environmental Impact Assessment Regulations, notably:

- Submitted Form 2 for the first amendment to MET (02/03/2014), submit Form 2 for the second amendment to MET (02/03/2014);
- Prepared draft second amendment EIA/EMP report;
- Notified stakeholders and IAPs through advertisements in two national newspapers, by distributing the draft Amendment EIA/EMP by email, by placing it in the public library in Lüderitz on the webpage: www.asecnam.com
- The public and IAPs were invited to raise issues and comment on the first amended Environmental Scoping-Assessment Report within a 21 day period, from the 18 March to 18 April 2013, and for the second amendment Environmental Scoping-Assessment Report from the 02 March to 31 March 2014.

At the end of the review period, the amended EIA/EMP Report was finalized and submitted to the Environmental Commissioner.

Environmental Impact Assessment Findings

The assessment follows Namport's System Procedure – Environmental Impact Assessment. With some additional assessment criteria to comply with the Environmental Regulations (MET, 2012). Impact assessments were conducted on environmental impacts arising from the construction of the zinc and lead storage facility and from activities in the three operational areas of the proposed project.

Table 1: Potential environmental aspects and impacts associated with the construction phase of the proposed project.

Key: The Effect on the environment: Positive / Negative; Type: Permanent (P) / Temporary (T);
 Magnitude: Low (L) / Medium (M) / High (H) Extent: Local (L) / Regional (R) / International (I)
 Probability: Low (L) / Medium (M) / High (H)

Construction Activities	Potential Environmental Impact	Extent	Probability	Type / Magnitude	Mitigation Measure	Significance with mitigation
Foundation excavations Compacting bases	Loss of soil resources and land capability through physical disturbance	L	H	n/a	n/a	
	Loss of biodiversity through general disturbance and physical destruction	L	H	n/a	n/a	
Use of construction vehicles, earth moving equipment and cranes Using of	Increase in disturbing noise levels (nuisance)	L	H	T/ L	Construction should be only carried out during day-time.	L
	Increase in dust levels (nuisance & health impacts)	L	H	T/ M-H	Use water to minimize dust	L-M
	Pollution of surface water, potential run-off into harbour	L	L	T/ L	Have emergency procedures in place regarding accidental hydrocarbon spills	L

Construction Activities	Potential Environmental Impact	Extent	Probability	Type / Magnitude	Mitigation Measure	Significance with mitigation
Generators	Contamination of groundwater resources (seawater)	n/a	n/a	n/a	n/a	
General building activities (e.g. painting)	Pollution of surface water resources and run off into harbour	L	L	T/ L	Have emergency procedures in place regarding accidental spills	L
	Contamination of groundwater resources	n/a	n/a	n/a	n/a	
Waste management (hazardous & non-hazardous)	Emissions to land and the sea Nuisance impacts	L	L	T/ L	Ensure that all contractors adhere to the waste management procedures within Lüderitz Harbour. Put requirement into tender document.	L
Employment	Positive impact – short term job creation of 20-30 jobs for 6 months	R	H	T / H+	Recruit local labour	H+
Purchase of Namibian goods and services	Small contribution to GDP, government revenue & to the local economy	R	H	T/M+	Give tender preference to contractors who are from Lüderitz, the Karas Region and who are Namibian and contract them to buy Namibian goods and services wherever possible.	M+
Temporary workforce	Temporary construction workforce could bring risks to local population	L	H	T/H	All contractors must have an HIV policy, workplace programme and must provide proof of implementation with invoicing. Work with LTC, MHSS & NGOs to coordinate measures.	M
Traffic due to construction activities	Additional traffic carrying construction materials through the town	L	H	T/H	Keep LTC & NamPol traffic department informed of activities. Include awareness of road safety in tender documents.	M

Table 3: Potential environmental aspects and impacts associated with the proposed activities & facilities for the operational phase.

Proposed Operation Activities	Potential Environmental Impact	Extent	Probability	Type / Magnitude	Mitigation Measure	Significance with mitigation
Operational Area 1: Transport of zinc and lead concentrate from Aus to Lüderitz harbour						
Transporting zinc and lead concentrate from Aus to harbour	About 15 additional 32t to 36t vehicles daily on B4 from Aus to Lüderitz and through the town. (Potential increase to 22 trucks per day). Cumulative impact of trucks for Skorpion, petroleum (~20) and liquid gas through	R	H	P/M	Ensure implementation of a detailed safety code of conduct for transport contractor; to be closely monitored with penalties enforced if necessary. Notify NamPol traffic department and the public of transport schedule.	L

Proposed Operation Activities	Potential Environmental Impact	Extent	Probability	Type / Magnitude	Mitigation Measure	Significance with mitigation
	Lüderitz.					
	Increase in road kills involving wildlife	R	M	P/M	Operations plan will avoid night driving Awareness training of truck drivers to wildlife hotspots and procedures to report & deal with accidents with wildlife. Tender documents will specify to fit warning whistles on trucks	L
	Heavy traffic and parked trucks in town centre during day and night. Noise and fumes from trucks	L	H	P/H	Specify in tender documents no parking and overnight staying of drivers in town centre.	M
Transporting zinc /lead concentrate from Aus to Lüderitz via trucks	Biodiversity (Flora) Soil contamination Pollution of surface water resources	R	L	T / L	Maintenance of side tipper units and tarpaulins to be carried out on a regular basis. Ensure that the route is regularly checked regarding spillages. Clean-up procedures to be put in place.	L
	Contamination fauna, soil and water courses	L	L	T / M	Ensure that emergency plans are in place.	L
Transporting zinc / lead concentrate	Cumulative pollution of burst tyres on road verges	R	M	T/M	Include procedure for picking up burst tyres.	L
	Socio-economic: TransNamib will lose road/railway revenue. It could win road contract to Lüderitz (tender process) Reduced employment in Aus for casual workers as transfer of goods from road to rail will cease.	R	H	P/M	The road haulage contractor (could be TransNamib), will increase number of jobs for road transport drivers by about 10 drivers. Also if RPZC expands requirement for material to be transported, it will increase revenue and more jobs	M
	Deterioration of road surfaces in Lüderitz. Accidents avoiding potholes. Higher maintenance costs, especially on 600 – 700m gravel section.	R	H	P/M	None. LTC, not RPZC, is the owner of the road and is thus responsible. An alternative tar road is available but LTC have requested RPZC to use the gravel one.	M
Transporting zinc / lead concentrate	Cumulative impact from truck vibrations causing damage to buildings	L	L	P/L	Property owners should monitor and propose alternative route if buildings show signs of damage	L

Proposed Operation Activities	Potential Environmental Impact	Extent	Probability	Type / Magnitude	Mitigation Measure	Significance with mitigation
Empty vehicles returning from Lüderitz harbour to RPZC mine	Potential contamination of roads in Lüderitz Town	L	L	T / L	Ensure that procedures are in place to clean all tyres and truck walls before leaving the storage shed, using brooms, not water.	L
Operational Area 2: Lüderitz storage facility						
Discharge of concentrate from side tippers, stacking and loading of containers inside shed with front-end loader	Increase in disturbing noise levels	L	M	T / L	Ensure that all employees wear correct PPE and adhere to the health procedures, e.g. no food intake in the storage shed.	L
	Increase in dust levels	L	L	T / L		
	Smell of the concentrate	L	L	T/L	Ensure doors are shut as soon as a vehicle has entered/left the shed	
Water usage in storage shed	Pollution of surface water resources and run off into the harbour	L	L	T / L	Storage shed floor will be lined with plastic sheeting to ensure that no moisture enters the shed and no seepage enters the ground. A concrete floor and interlocks will be placed on top. Shed design is such that no contaminated run-off water will run off from shed area into harbour	L
	Contamination of groundwater resources (seawater)	n/a	n/a	n/a	n/a	
Storage shed	Negative visual impacts – View from the town towards the historic Fisheries building (the old hospital) and from that building towards town. Containers will be stacked against the shed on one side	L	H	P/M	Unavoidable. Shed design has a curved roof and neutral colour scheme to help blend in with the surroundings. Stack containers when not in use, on the western side of the shed to reduce visual impact from the town.	M
Operational Area 3: Loading of ships						
Filling of containers within the shed. Ship-loading via 90 degree revolving containers	Increase in disturbing noise levels	L	M	T / L	Ship loading equipment has low noise output.	L
	Increase in dust levels	L	M	T / L	The equipment designed to prevent dust generation and spillage.	L
	Zinc and lead concentrate spillage – onto fish produce	L	L	T/L	RPZC will commit to compensation, if proven that contamination was due to RPZC material, by a thorough	L

Proposed Operation Activities	Potential Environmental Impact	Extent	Probability	Type / Magnitude	Mitigation Measure	Significance with mitigation
					investigation by a competent independent third party. RPZC will only pay for the cost of such an investigation in the event that contamination was caused by RPZC material. In the event that investigation shows that contamination was not due to RPZC material the other party has to pay for the cost of the investigation.	
	Zinc and lead concentrate loading prevents fishing vessels from unloading their perishable products – economic loss	L	L	T/L	Namport has committed to meet the needs of all users (it is a port management issue rather than for RPZC). RPZC should notify all harbour users of its loading dates, in advance. <i>The new loading via containers allows the consigned ship to dock at any berth, including the area designated for container ships, away from the fishing vessels. The restriction using the conveyor belt has been eliminated.</i>	L
Operational Area 2 and 3						
General waste management	Emissions to land and the sea Nuisance impacts	L	L	P / L	Ensure that all storage shed operators adhere to the waste management procedures within Lüderitz Harbour.	L
Employment creation at harbour	Approximately 5 additional permanent job positions created for the contractor which will handle operations. Probably operators, clerk & supervisor. 2-3 ad hoc jobs during ship loading (contracted out).	L	H	P/ H+	Selection preference to people from Lüderitz, the Karas Region and who are Namibian, if skills can be acquired through a minimum three month training programme.	H+
Purchase of Namibian goods and services	Small contribution to GDP, increase in government revenue and to the local economy, extra revenue for Namport. Operating company, truck drivers, ship crew, consultants & RPZC personnel will spend money while in Lüderitz during ship	L	H	P/M+	Give tender preference to contractors who are Namibian and contract to buy Namibian goods and services wherever possible. Namport Lüderitz personnel will utilised as far as possible for ship loading activity	M+

Proposed Operation Activities	Potential Environmental Impact	Extent	Probability	Type / Magnitude	Mitigation Measure	Significance with mitigation
	loading, audits, visits etc. Local companies doing maintenance of shed and containers.					

Construction phase

The relevant environmental aspects during construction relate to noise, dust and other emissions, hydrocarbon-, concrete- and paint spillages and waste management. Due to the fact that it will not be a big construction project, the potential to cause significant impacts during construction is unlikely. The environmental risk associated with the construction phase is therefore low to medium. However, these aspects need to be managed carefully through the implementation of the Environment Management Plan (EMP) developed as part of the EIA. This will ensure that any of the potential impacts are avoided or minimised.

Short term employment opportunities will be created in Lüderitz which have further positive economic benefits as the temporary workforce spends earnings in the town.

Transport of zinc and lead concentrate from Aus to Lüderitz harbour

The transport of zinc and lead concentrate will increase the number of heavy vehicles on the tarred B4 from Aus to Lüderitz and through the town. The risk of environmental impacts is small and includes accidental spillage due to road accidents and road kills of wildlife. These potential impacts have to be addressed by the transport company, which should have emergency plans in place for such an eventuality.

The 15-22 trucks through the town will add to the cumulative negative impact of haulage trucks carrying Skorpion goods, petroleum and in future liquidised gas. Residents and businesses are concerned about the increased loss of Sense of Place due to noise, congestion and vibrations that additional heavy traffic brings.

There will be a potential increase in road deterioration and potholes which will have an added road maintenance cost to the Roads Authority which will be partly offset by the vehicle licensing.

A negative socio-economic aspect of the proposed project will be that TransNamib would lose the road/railway revenue of transporting zinc and lead concentrate to Walvis Bay. There will be a reduction of work for train drivers and casual workers in Aus. On the other hand, TransNamib could win the road haulage contract to Lüderitz (a tender process) and this will increase the number of jobs for road transport drivers by about 10. Also when RPZC expands the preferred tenderer, which could be TransNamib, will be required to transport more material resulting in more revenue. Exporting via Lüderitz harbour will take some pressure off the harbour in Walvis Bay where land and docking facilities are in extremely high demand.

Lüderitz storage facility and the loading of ships

All activities within the storage shed take place in an enclosed environment, hence it is important to implement all safety aspects for the construction of the shed, as well as to implement the correct Protective Personnel Equipment and health and safety procedures during operations. No water will be used in the shed for operational purposes, only for office and ablutions. Emergency procedures for spillages at any time need to be in place.

Visual, noise and smell impacts will be minimal, as the storage will take place in an enclosed shed, while loading of ships will occur approximately 10 – 15 times a year for approximately 96 hours maximum depending maximum capacity of the vessel (loading rate of 5000t per day).

Positive socio-economic impacts relate to the five direct additional jobs - operators, clerk & supervisor - and any related increase in local business and service activities generated directly and indirectly by the project. The small increase in job opportunities at the harbour and for the road haulage company will partly compensate for the loss of casual work in Aus.

Conclusions

No fatal flaw has been identified. The cumulative impact of 15 – 22 additional trucks driving through Lüderitz town centre per day is unavoidable as there is no alternative access to the port. Based on the findings of the environmental risk assessment, all the identified potential environmental impacts associated with the proposed construction and operations can be managed and reduced if the proposed mitigation measures are implemented. However, it is important that emergency plans during transporting, offloading and handling are in place.

The main changes in the first amendment EIA / EMP are:

- Confirmed use of 32t to 36t side tipper trucks to transport the ore concentrate from RPZC mine to Lüderitz harbour; (the EIA proposed either 6m reticulated 32t trucks or these 32t side-tipping trucks)
- Configuration of shed with 6 containers (a decrease from 20 containers) stacked outside when not in use;
- Ship loading via revolving containers;
- Ship does not need dedicated berth, which will accommodate the concerns raised in the original EIA by other harbour users;
- An increase of loading time to 96h from 72h and originally 48h.

The main changes in the second amendment EIA / EMP are:

- The container-to-bulk loading system attachment with 90° rotation is a better system compared to the container-to-bulk loading system with a 360° rotation mainly due to:
 - The containers can still being used via the ships gear during breakdown of the mobile harbour crane, thus ensuring that operations continue and reducing the time the vessel stays in the harbour. The ship gear using 4 x chain slings will lift the containers into the vessel where 2 x chain sling will disengage as the container is rested on the bottom of the vessel. Lifting of the container via only 2 x slings will result in a 90° rotation of the container and the material is discharged similar to the 90° rotating loading system attachment on the mobile harbour crane.
 - The load per container is higher which will result in higher loading rates for the vessel, minimizing the time the vessel is in the harbour.



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SECOND AMENDMENT TO THE COMBINED SCOPING AND ASSESSMENT REPORT

ENVIRONMENTAL IMPACT ASSESSMENT FOR THE PROPOSED ZINC & LEAD STORAGE AND LOADING FACILITY AT LÜDERITZ HARBOUR FOR RPZC

1 INTRODUCTION

On 11 December 2012 Rosh Pinah Zinc Corporation (Pty) Ltd (RPZC) obtained the Environmental Clearance Certificate (**Appendix B**) for the original EIA/EMP to commence with the project concerning the zinc and lead concentrate storage and loading facility at Lüderitz Harbour.

In the meantime, RPZC has critically reviewed the ship loading facility which received Environmental Clearance and recommends changing it from a conveyor-ship-loader-system to a container-to-bulk-system.

The container-to-bulk-system is an improvement for the operations planned at Lüderitz Harbour for the following reasons:

- Less risk of dust emissions
- Less risk of material spillages
- Less safety risk
- Less impact on other port operations – vessels do not need a allocated berth

As a result of this change in the loading system, A. Speiser Environmental Consultants cc (ASEC) was awarded project to amend the original EIA and EMP for the proposed activities at Lüderitz Harbour. The amended report will be provided to all registered interested and affected parties during the amendment process. The amendment process will be conducted following the steps described in the Environmental Management Act (No. 7 of 2007) Section 39 and the Environmental Impact Assessment Regulations: Environmental Management Act, 2007, section 19. Form 2 was submitted to MET on 05 March 2013 (**Appendix B**). The Environmental Clearance Certificate for the first amended EIA/EMP was received on 18 July 2013 (**Appendix B**).

Consequently, the containers for the ship loading have been changed from 360 degree rotating containers to 90 degree rotating containers. This will result in:

- Higher load per container ensuring less time for vessel on port, and
- Option to use “manual” system in case of breakdown on shore crane.

No environmental changes will result from this change.

The Rosh Pinah mine is situated in the Karas Region, 165 km south of Aus, which is 125km east of Lüderitz. At present RPZC (part of Glencore group as of 1 June 2012, previously Exxaro) produces 100,000t of zinc concentrate and 20,000t of lead concentrate per annum. From 2015 onwards the potential exists for production to increase to 150,000t and 25,000 per annum respectively. At present, both concentrates are transported via truck from Rosh Pinah to Ausnek (near Aus) where they are loaded onto rail trucks. The lead concentrate is transported to Walvis Bay harbour for export. Until 2011, the zinc concentrates were transported to South Africa to be processed at Zincor (part of Exxaro). Since Zincor closed, the zinc concentrate is also transported to Walvis Bay and exported.

Various options had been investigated by RPZC to transport the zinc and lead concentrate to Lüderitz and to export it from there (see Section 6.2) and Namport has approved a site within the harbour. As the export via Lüderitz has a huge economic advantage to both RPZC and Lüderitz harbour, RPZC has commissioned ASEC to undertake the **original** and the **first and second** amended Environmental Impact Assessment (EIA) for the proposed zinc and lead storage and loading facility at Lüderitz Harbour.

The site at Lüderitz harbour is slightly bigger than the original footprint and is approximately **5,958m²** (increased from **5,819m²**). The following infrastructure / investment / activities are anticipated:

- Closed storage shed that will store **30,000 – 35,000t** (an increase from **25,000 – 30,000t**) of zinc and lead concentrate;
- Approximately fifteen 32t to 36t-trucks will transport the covered ore from the mine to Lüderitz per day along only tar roads; (this may increase to **twenty** trucks per day if production increases);
- Trucks will off load within the storage shed;
- **The new proposed loading of ships will be conducted using specially designed sealed revolving containers with a specially designed spreader attachment system fitted to the mobile harbour crane which will load the zinc and lead concentrate onto the ships.**

Shipment:

- 10,000t – 15,000t ships;
- Approximately 12 ships per annum; (potential to increase to 18 per annum);
- **The loading of each ship will now take approximately 96 hours (which is an increase of 24 hours to the loading time proposed in the original EIA and 48h of the first amendment report).**

2 SCOPE AND OBJECTIVES

The original scope and objectives for this proposal were discussed between Mr. F. Boje and Mr. D. van Staden and Ms A. Speiser on 03 April 2012 and on 04 April 2012 a side visit was conducted at Namport, Lüderitz. During the site visit initial discussions were held with

EIA Second Amendment Report for the proposed zinc storage & loading facility at Lüderitz Harbour for RPZC

Namport, Mr. J. Isaak (Safety Officer) and Mr. R. Kennedy (Security, Fire fighting & Emergency).

The EIA will assess the transporting of zinc and lead concentrate from Aus to Lüderitz, its off-loading, storage and loading onto ships at Lüderitz harbour. The main objectives are to:

- describe the affected environment based on available documentation
- identify and assess the potential positive and negative impacts of zinc and lead storage and loading, including the different proposed options;
- liaise and consult with the relevant ministries to ensure that all legal requirements are met regarding the EIA;
- conduct public participation and focus group meetings at Lüderitz
- produce Environmental Management Plans for construction and operation.

The assessment focused on third parties only and did not assess health and safety impacts on workers in detail because the assumption was made that these aspects are separately regulated by health and safety legislation, policies and standards.

The scope of work for the first Amendment EIA/EMP is to amend the original EIA and EMP report to incorporate and assess the proposed changes from a conveyor-ship-loader-system to a container-to-bulk-system. The scope of work for the second Amendment EIA/EMP is to amend the first Amendment EIA/EMP report to incorporate and assess the proposed changes from a container-to-bulk-system using 360 degree rotation to a container-to-bulk-system using 90 degree rotation.

2.1 Terms of reference

Table 1 provides the Terms of Reference (EIA requirements) as requested in the Environmental Management Act and the Regulations.

Table 1: Requirements for EIA reports – applicable to the proposed first and second amendments to the EIA and EMP

EIA Regulation requirement	Reference in the EIA report
Details of the environmental assessment practitioner (EAP) that compiled the report and the expertise of the EAP to carry out the EIA, including CVs.	Section 3.2 and Appendix C
Description of the proposed first and second amendments of the activity.	Section 6
Description of the environment that may be affected by the activity.	Section 7

EIA Regulation requirement	Reference in the EIA report
<p>Details of public participation process: List of persons, organisations and organs of state that were registered as interested and affected parties (IAPs). A summary of comments received from and a summary of issues raised by IAPs, the date of receipt of these comments and the response of the EAP to the comments. Copies of any representations, objections and comments received from IAPs. Summary of comments received to the amended EIA and EMP from IAPS. Summary of comments received to the amended EIA and EMP from IAPS.</p>	Section 4 and Appendices D, E, F and G
<p>Description of need and desirability of proposed activity and identified potential alternatives to the proposed activity, including advantages and disadvantages that the proposed activity or alternatives may have on the environment and the community that may be affected by the activity.</p>	Section 6.6
<p>Indication of methodology used in determining the significance of potential impacts.</p>	Section 8
<p>A description and assessment of the amendments to the project identified during the amended environmental impact assessment process. None for the second amendment.</p>	Section 6.2, section 9
<p>A description of all environmental issues that were identified during the first and second amendment of the environmental impact assessment process, an assessment of the significance of each issue and an indication of the extent to which the issue could be addressed by the adoption of mitigation measures.</p>	Section 7 and 8
<p>An assessment of each identified potentially significant impact arising from the amendment to the project.</p>	Section 8
<p>A description of any assumptions, uncertainties and gaps in knowledge.</p>	None required
<p>An opinion as to whether the activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation.</p>	Section 9
<p>An environmental impact statement regarding the changes to the project due to the proposed amendments which contains:</p> <ul style="list-style-type: none"> • a summary of the key findings of the environmental impact assessment; and • a comparative assessment of the positive and negative implications of the proposed activity and identified alternatives; and • any specific information that may be required in 	Section: Executive Summary

EIA Regulation requirement	Reference in the EIA report
terms of the Act.	
Amended Management Plan Monitoring programme Audit proposal.	Appendix L: EMP report

3 APPROACH AND METHODOLOGY

3.1 Namibian Environmental legislation

Namibia's environmental impact assessment (EIA) policy of 1995 promotes accountability and informed decision making through the requirement of EIAs for listed programmes and projects.

The Environmental Management Act was gazetted on 27 December 2007 (Government Gazette No 3966) and the commencement of the Act, the list of activities that may not be undertaken without an environmental clearance certificate and the Environmental Impact Assessment regulations were promulgated on 6 February 2012 (Government Gazette No. 4878). The relevant activities listed in the regulations that require an environmental clearance certificate are provided in **Table 2** below, with comments next to each.

Table 2: Listed Activities in the EMA Regulations which might trigger an EIA.

Activity	Comment
3. MINING AND QUARRYING ACTIVITIES	
3.1 The construction of facilities for any process or activities which requires a license, right or other form of authorisation, and the renewal of a license, right or other form of authorisation, in terms of the Minerals (Prospecting and Mining Act), 1992.	The project deals with the handling and storing of zinc and lead within the Namport facilities at Lüderitz.

3.2 Approach and Methodology

With reference to the above mentioned legislation, environmental clearance and therefore an EIA will be required for the project. An EIA process typically involves a screening or initiating phase, a scoping phase and the assessment phase (including the development of an environmental management plan (EMP)).

The screening phase formed part of the scoping phase and identified that no specialist studies are likely to be required. Given that the project lies within the commercialized Lüderitz harbour and loading and storage facilities for different commodities exist, the scoping and assessment phases have been combined, which is supported by the governing legislation and was discussed with the Ministry of Environment and Tourism (MET). MET however can still decide after the combined scoping-assessment phase that further studies are required and that a more detailed EIA report needs to be developed.

The following process was followed to conduct the combined scoping-environmental assessment for the proposed zinc and lead storage and loading facility at Lüderitz Harbour:

- Submitted Form 1 to MET (10/7/2012)

- Prepared draft Scoping-Assessment report
- Prepared draft Environmental Management Plan (EMP)
- Notified stakeholders and IAPs through site notices and posters in Lüderitz, advertisements in national newspapers, and by distributing a background information document (the draft executive summary) by email
- Placed the draft Scoping/Assessment Report and EMP for review by government authorities and IAPs at the Lüderitz and Windhoek Public Libraries and on the website: www.asecnam.com from 17 August 2012 until it was replaced by this final report.
- Invited over 100 IAPs to review the document and attend a public meeting and focus group meetings in Lüderitz.

At the end of the review period, the Scoping/Assessment Report and EMP was finalized and submitted to MET. Depending on the acceptance of the report by MET and the granting of environmental clearance, the EMP for construction and operational phase will be implemented.

Alexandra Speiser of ASEC and Auriol Ashby of Ashby Associates cc compiled the scoping assessment report and their curricula vitae can be found in **Appendix C**.

Alex Speiser has 12 years of experience of EIA preparation in Namibia and is an Associated Member (AIEMA) of the Institute of Environmental Management & Assessment, UK and the Environmental Assessment Practitioners Association for Namibia. She is also a member of the Southern African Institute of Ecologists and Environmental Scientists and a member of the Chamber of Mines (Namibia).

Ms Auriol Ashby has had Namibian permanent residence since 1991 and has extensive experience in the socio-economic aspects of integrated development planning, mainly in Namibia. She focuses on the socio-economic and public participation components of EIAs, EMPs and Closure Plans for large scale mines and projects. She is a member of the South African Monitoring and Evaluation Association and the Environmental Assessment Practitioners Association for Namibia.

3.3 Amendment Process of the EIA and EMP

The first amendment process followed the process set out in Section 39 of the Environmental Management Act and Section 19 of the regulations. The process was started by submitting Form 2 to the Department of Environment providing an overview of the proposed changes to the existing project. The process to be followed is detailed in **section 4.4**. The same is applicable for the second amendment process.

4. PUBLIC CONSULTATION

4.1 Objectives of public consultation

The public consultation process aimed to ensure that all persons or organisations that may be affected or interested in the project were informed of the issues and were able to register their views and concerns. Building from there, the process provided opportunities to influence the

project design so that its benefits can be maximised and potential negative impacts be minimised.

4.2 Interested and Affected Parties

The stakeholder engagement process began with identifying interested and affected parties and stakeholders (IAPs) who have engaged with RPZC and Namport, Lüderitz in recent years and updating and broadening this list. The current list, including all those who attended the meetings, is summarised in **Table 3** and is detailed in **Appendix D**.

Table 3: Summary of Interested and Affected Parties

Category	Stakeholders
Local and Regional Authorities	Lüderitz Town Council Karas Regional Council
Key Government Ministries and Parastatals	Namport Roads Authority TransNamib Ministry of Mines and Energy Ministry of Environment and Tourism Ministry of Fisheries and Marine Resources Ministry of Agriculture, Water and Forestry Ministry of Works and Transport Ministry of Trade and Industry Ministry of Health and Social Services Ministry of Labour and Social Welfare NamWater NamPower
NGOs	Namibian Coast Conservation and Management Project (NACOMA) Benguela Current Commission Unions in fishing industry and port Earthlife Namibia Southern African Institute for Environmental Assessment (SAIEA) Namibia Environment and Wildlife Society (NEWS) Brown Hyena Research Project
Private Sector	Lüderitz fishing industry and businesses Skorpion Zinc Chamber of Mines Namibia Chamber of Commerce and Industry
Individuals	General public attending the public meetings and responding to press announcements
Media	Newspapers: <i>The Namibian</i> <i>Allgemeine Zeitung</i> <i>Die Republikein</i> <i>The Buchter News</i>

4.3 Public consultation process– original EIA Phase

The process adopted follows the guidelines to the Environmental Management Act, No. 7 of 2007.

Stakeholders were notified about the EIA process through site notices and posters in Lüderitz, advertisements in national newspapers, and by distributing the Executive Summary and introductory letter to known IAPs by email. All stakeholders and IAPs were invited to review the document and attend a public meeting in Lüderitz. Focus group meetings were held with the Lüderitz Town Council, Namport officials and Lüderitz harbour users including the fishing sector. The meetings were scheduled as follows:

Date	Time	Stakeholder	Venue
22 nd August 2012	09h30	Lüderitz Town Council	LTC Boardroom
	10h45	Namport	Namport Boardroom
	12h00	Namport Users e.g. Fishing Industry	Zum Sperrgebiet, Woermann St
	17h30	Public meeting in Lüderitz	Zum Sperrgebiet, Woermann St

All known IAPs were sent the draft Executive Summary by email and the public were invited to comment on the draft Environmental Scoping-Assessment Report through press announcements. A copy of the draft report was placed in the public library in Lüderitz and was available to download from the website: www.asecnam.com. The information sharing record is detailed in **Appendix E**.

The public and IAPs were invited to raise issues and comment on the Environmental Scoping-Assessment Report from the 15 August to 17 September 2012. They were invited to attend the stakeholder engagement meetings in Lüderitz or send comments in writing via email, fax or SMS. Minutes of the meetings and all comments received are documented in **Appendix F** and summarised in the Summary Issues and Response Report in **Appendix G**. The final Environmental Scoping-Assessment Report, with these appendices will be sent to all IAPs.

4.4 Main Issues raised by IAPs

The table below summarises the main issues raised during the EIA consultation process, which have been addressed in the final EIA report.

Table 4: Summary of issues raised during the original IAP consultations

	Lüderitz Town Council	Action By
1.	Road deterioration – Assess current status and monitor.	ASEC
2.	Source service providers from Karas Region for all project phases – if available and meet standards of RPZC as stipulated in tenders	RPZC
3.	Identify route for trucks to use.	LTC
4.	Ensure emergency plans are in place for accidents and spillage.	ASEC / RPZC
5.	LTC requests that Namport provides the new plans to the LTC.	Namport

	Namport:	Action By
1.	RPZC to notify Namport of electricity and water requirements	RPZC
2.	Spillage and emergency procedures	RPZC/ASEC
3.	RPZC to collaborate with Namport when recruiting for storage personnel – if meeting requirements	RPZC
4.	Agree on access route in the harbour	RPZC / Namport
	Lüderitz Harbour Users – including the fishing industry	
1.	Management of the port to accommodate the needs of all port users, especially the fishing industry with strict time limits – dredging, minimising users moving berths, minimising the potential for contamination.	Namport
2.	The potential for spillages during loading of ships.	RPZC/ASEC
3.	Compensation if contamination of fish occurs.	RPZC
4.	Safety regulations concerning driving around/under the conveyor belt during 48hrs of loading.	RPZC / Namport
5.	Design of conveyor belt to minimise ship movement during loading, to maximise quayside available for other users.	RPZC
	The Public:	Action By
1.	Assess cumulative impact of increasing numbers of heavy trucks in Lüderitz – Skorpion, RPZC and liquid gas.	ASEC
2.	Need to design a detailed plan / schedule for the transport of concentrate to assess real impact. Plan to include: Spacing of trucks on the road to allow other users to pass safely; Truck speeds Timing of trucks passing through the town – avoiding lunchtime school traffic & pedestrians; Parking of trucks in town blocking local users; Overnight arrangements. The plan, its monitoring, and sanctions against transgressions must be part of the tender and contract for road haulage.	RPZC
3.	To include in the haulage tender documents: Awareness training of truck drivers to wildlife hotspots and procedures to report & deal with accidents with wildlife. Clean up of burst tyres.	ASEC

4.	Commitment to re-evaluate rail option once it is operational.	RPZC
5.	Please equip the trucks with whistle devices.	ASEC
6.	Need for a detailed management plan for heavy trucks in Lüderitz: Designated route Parking restrictions Serviced, designated overnight area; Clear road signs	LTC
7.	Design the shed to minimise blocking the view and overall visual impact of the old hospital (now Ministry of Fisheries building) from the town centre.	RPZC
8.	Continuous monitoring of escaped concentrate	ASEC
9.	Give greater detail of the financial impact	RPZC / ASEC

4.4 Public consultation process – Amendment EIA Phase

All known IAPs were sent the amended draft EIA/EMP report by email and the public were invited to comment on the amended Environmental Scoping-Assessment Report through press announcements, accessing the report at the Lüderitz library, or downloading it from the website: www.asecnam.com or by contacting ASEC. The information sharing record is detailed in **Appendix H**.

The public and IAPs were invited to raise issues and comment on the Environmental Scoping-Assessment Report from the 18 March to 18 April 2013. They were invited to send comments in writing via email or fax. One comment was received during the review period and is documented in **Appendix G** and summarised in **Table 5**. The final Amended Environmental Scoping-Assessment Report, with these appendices will be sent to all IAPs.

Table 5: Summary of issues raised during IAP consultations of the amendment phase

Raised by	Issue / Comment	Action By
Erich Looser	We do applaud the efforts to minimize dust pollution as outlined in your report and we trust that all precautions will be taken to avoid any congestion of truck traffic in our main road.	No action

5. LEGAL, POLICIES AND PLANS

5.1 Legal requirements

The following is a brief overview of all pertinent legal acts, bills, laws, policies, standards and international treaties regarding the environment which will be considered while conducting the EIA and EMP for the proposed storage facility development at Lüderitz harbour.

5.1.1 Constitution of the Republic of Namibia (1990)

Article 91 (c) describes the duty to investigate complaints concerning the over-utilisation of living natural resources, the irrational exploitation of non-renewable resources, the degradation and destruction of ecosystems, and the failure to protect the beauty and character of Namibia.

Article 95 (I) states that “*the State shall actively promote and maintain the welfare of the people by adopting, inter alia, policies aimed at ... maintenance of ecosystems, essential ecological processes and biological diversity of Namibia and utilization of natural resources on a sustainable basis for the benefit of all Namibians both present and future; in particular the Government shall provide measures against the dumping or recycling of foreign nuclear and toxic waste on Namibian Territory*”.

Article 101 further states that the principles embodied within the Constitution “*shall not of and by themselves be legally enforceable by any court, but shall nevertheless guide the Government in making and applying laws. The courts are entitled to have regard to the said principles in interpreting any laws based on them*”.

5.1.2 Water Act (Act 54 of 1956)

Line Ministry: Ministry of Agriculture, Water and Forestry

(Note: the Water Resource Management Act (2004) has been promulgated but not yet implemented as the guidelines are still in draft form. However, the described procedures and stipulations are much more stringent compared with the current Water Act.)

The Act stipulates, *inter alia*, only the most important procedures, steps and requirements to obtain:

- the purification of waste water and discharge (**Section 21 (1) (2) (3) (4) (5)**);
- the use of public water for industrial purposes (**Section 11 (1) – (7)**);
- a permit to use public water for industrial purposes (**Section 12 (1) – (9)**); and
- a water abstraction permit (**Section 13 (2)**).

5.1.3 Atmospheric Pollution Prevention Ordinance (1976)

Line Ministry: Ministry of Health and Social Services

A number of sections (**5 (1), 7, 8 (1), 11 (1) (2) (3), 12 (1), 13 (1) (2) (4) (5) (6), 24 (1) and 25 (1) (2)**) relate to “Air pollution control certification”, dust control, closure certificate, etc. However, when ASEC approached the Ministry, the consultant was told that no certificates are currently being issued. The best practice would be to notify the Ministry of the anticipated emissions.

5.1.4 Labour Act, No. 11 of 2007

Line Ministry: Ministry of Labour and Social Welfare

The Act aims to “*promote and maintain the welfare of the people and ..to further a policy of labour relations conducive to economic growth, stability and productivity*”. It details basic conditions of employment, and health, safety and welfare requirements of employers.

5.1.5 Environmental Management Act, No. 7 of 2007

Line Ministry: Ministry of Environment and Tourism

The Act was gazetted on 27 December 2007 (Government Gazette No. 3966) and the Commencement of the Environmental Management Act, List of Activities that may not be undertaken without Environmental Clearance Certificate and Environmental Impact Assessment Regulations: Environmental Management Act, 2007 (Government Gazette No. 4878) were promulgated on 6 February 2012.

Section 10 (1) (General Obligations) states that: ‘*An Environmental Assessment Report shall contain, as a minimum:*

(l) where appropriate, an outline for monitoring and management programmes and any plans for post-project analysis;

(j) a description of measures to be employed for decommissioning and restoration.’

5.2 Applicable Namibian policies and draft legislation

5.2.1 Environmental Assessment Policy (1994)

Namibia’s Environmental Assessment Policy is legislated through the Environmental Management Act (see **Section 2.3.5**). Appendix B of Namibia’s Environmental Assessment Policy contains a list of activities which might require an environmental clearance from the Directorate of Environmental Affairs. It is up to the DEA to decide whether a project listed in the activities list requires an EIA.

The listed points **No. 14** (“Storage facilities for chemical products”) and **No. 16** (“Bulk distribution facilities”) are applicable to the proposed zinc and lead loading facility.

5.3 International treaties and protocols

The following International treaties and protocols have been ratified by the Namibian Government:

- Convention on International Trade and Endangered Species of Wild Fauna and Flora (CITES) (1973)
- Vienna Convention for the Protection of the Ozone Layer (1985)
- Montreal Protocol on Substances that Deplete the Ozone Layer (1987)
- Basel Convention on the Control of Transboundary Movements of Hazardous Waste and their Disposal (1989)
- Convention on Biological Diversity (1992)

- United Nations Framework Convention on Climate Change (1992)
- Kyoto Protocol on the Framework Convention on Climate Change (1998)
- World Heritage Convention (1972)
- Convention to Combat Desertification (1994)
- Stockholm Convention on Persistent Organic Pollutants (2001)

5.4 Permits

The Environmental Clearance Certificate for the original EIA and EMP was granted by the Ministry of Environment and Tourism (MET) on 11 December 2012. This report covers the proposed changes to the original EIA and EMP and Form 2 to amend the original report has been submitted to DEA on 05 March 2013 (**Appendix A**). Consequently, the Environmental Clearance Certificate for the first amended report was received on 18 July 2013 (**Appendix B**).

5.5 Legal Aspects relating to export of fish products

Description

The quay at Lüderitz harbour is used for all commodities, e.g. sulphur, fish. The potential of contamination by sulphur or in future by zinc and lead concentrate needs to be avoided at all cost to ensure that no negative impact on the fishing industry will occur. As most of the fish products are exported to Spain which is part of the European Union (information from 2007), the EU regulations regarding export / import of foodstuff are applicable. Should any foreign matter be found in a consignment, this would be sent back to the company. It further could lead to an investigation of the Lüderitz harbour to investigate if the harbour is suitable to export fish products. In the worst case scenario the harbour could be closed for export of fish products.

The consultant therefore investigated the applicable regulations to ensure that the change to zinc and lead concentrate loading will not jeopardise the currently viable export of fish products.

The Ministry of Trade and Industry provided the contact details for the SABS office in Walvis Bay. In 2007 Mr. J. Halwoodi (Chief Inspector) provided the below-listed EU regulations and informed the consultant that all Fishing Companies exporting their products have to comply with the SABS standard 005 which is based on the EU regulations 2000/C 365 E/02, 2000/C 365 E/03, 2000/C 365 E/04 and 2000/C 365 E/05. The regulations deal with hygiene of foodstuff and related matters. **Table 6** provides a summary of the relevant sections.

Table 6: Summary of relevant section regarding fish export to the EU

Regulation	Article / Annexes
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Regulation	Article / Annexes
<p>2000/C 365 E/02</p> <p>Proposal for a Regulation of the European Parliament and of the Council on the hygiene of foodstuffs</p>	<p>Article 2 - Definitions</p> <p>‘hazard’ means aphysical agent with the potential to compromise food safety.</p> <p>‘contamination’ means the presence of a substance added to the food or present in the food environment, which may compromise safety or fitness for human consumption of the food.</p> <p>Article 3 – General Obligations</p> <p>Article 4 – General and specific hygienic requirements</p> <p>Article 5 – Hazard analysis and critical control points system (HACCP)</p> <p>All food business operators shall put in place, implement and maintain a permanent procedure developed in accordance with principles of HACCP</p> <p>Article 6 – Specific food safety requirements</p> <p>Article 12 – Imports / Exports</p> <p>Foodstuff imported into the EU has to comply with Article 3 - 6</p> <p>Annex I, Chapter IX – Provision applicable to foodstuff</p> <p><i>“1. No raw materials or ingredients shall be accepted by a food business if they are known to be, or might reasonably be expected to be, contaminated with parasites,or foreign substances that, after normal sorting and / or preparatory or processing procedures hygienically applied by food businesses, they would still be unfit for human consumption.”</i></p>
<p>2000/C 365 E/03</p> <p>Proposal for a Regulation of the European Parliament and of the Council laying down specific hygienic rules for food of animal origin</p>	<p>Article 3 – General Obligation</p> <p>The Article refers to Annex II which lays out the requirements of food business operators regarding obtaining and marketing of food of animal origin.</p> <p>Article 4 – Imports from third countries</p> <p>Food of animal origin imported from third countries shall comply with the requirements laid out in Annex III.</p> <p>Annex II, Section VIII (Fishery Products), Chapter II Condition of Hygiene during and after landing</p> <p><i>“2. During unloading and landing, contamination of fishery products must be avoided.”</i></p> <p>In the following it explains how the fish shall be dealt with.</p> <p>Annex III – Importation of products of animal origin from third countries</p> <p>A detailed description what papers are needed, certificates, etc.</p>
<p>2000/C 365 E/04</p> <p>Regulation of the European Parliament and of the Council laying down detailed rules for the organization of official controls on products of</p>	<p>Annex IV – Fishery Products</p> <p>In addition to the normal control requirements, the following shall apply:</p> <p><i>“3. The following shall be declared unfit for human consumption:</i></p> <p style="padding-left: 40px;"><i>(a) fishery products which organoleptic, chemical, physical or microbiological checks show they are not fit for human consumption;”</i></p>

Regulation	Article / Annexes
animal origin intended for human consumption	
2000/C 365 E/05 Proposal of Council Regulation laying down the animal-health rules governing the production, placing on the market and importation of products of animal origin intended for human consumption	Chapter II – Imports from third countries Articles 7 to 9 refer to compliance with EU rules in the respective third country.

6. PROPOSED OPERATION

6.1 Investigated Options

Table 7 provides a brief overview of the options investigated.

Table 7: Investigated original options and newly proposed option.

Options	Positive	Negative
Pb and Zn concentrate export via Walvis Bay Bulk Terminal (WBBT) by means of road from Rosh Pinah (RP) to Aus and rail Aus to WBBT	Current process	High rail cost TransNamib rail capacity constraint WBBT capacity constraint Possibly erect shed for Zn at WBBT (capital) – long term Limited options for expansion
Pb and Zn concentrate export via WBBT by means of part road RP to Aus and rail Aus to WBBT plus part road from RP to WBBT due to rail capacity limitations	Known process	Very high road cost - not financially feasible
Export Zn & Pb concentrate through Lüderitz – revolving containers	Low risk of spillage No capital investment	Risk of high operating costs – will make project financially not viable Process new and unknown Equipment not belong to RPZC, thus highly dependent on contracting company
Export Zn & Pb concentrate through Lüderitz – revolving containers (buy containers)	Low risk of spillage Own equipment	High capital investment Container maintenance costs Risk of high operating costs – will make project financially not viable Process new and unknown

Export Zn &Pbconcentrate through Lüderitz – own shed	Low transport cost Business in south of Nam Own equipment – low risk Known process	High capital investment Long construction time
Export Zn &Pb concentrate through Lüderitz harbour – own shed and ship loading via container-to-bulk-system using 360 degree rotation	Low transport cost Low risk of spillage Business in south of Nam Own equipment – low risk Known process, but first time in Namibia	High capital investment Long construction time
Export Zn &Pb concentrate through Lüderitz harbour – own shed and ship loading via container-to-bulk-system using 90 degree rotation	Some as above Containers can still be used via the ships gear during breakdown of the mobile harbour crane, thus ensuring that operations continue and reducing the time the vessel stays in the harbour. Load per container is higher which will result in higher loading rates for the vessel, minimizing the time the vessel is in the harbour.	High capital investment

6.2 Overview of Final Option

RPZC started operating from Lüderitz harbour in December 2013. The current life of mine will run to 2025.

The new storage site at Lüderitz harbour is approximately 5,985m² and the following / investment / activities are anticipated:

- Closed storage shed that will store 30,000 – 35,000t of zinc and lead concentrate
- Approximately 15 32t to 36t-trucks will transport the covered ore from the mine to Lüderitz per day along only tar roads; (potential to increase to 22 trucks per day)
- Trucks will off load within the storage shed;
- Specially designed sealed 90 degree revolving containers will load the zinc and lead concentrate onto the ships.
- The containers can still be used via the ships gear during breakdown of the mobile harbour crane, thus ensuring that operations continue and reducing the time the vessel stays in the harbour.

Shipment requirements are:

- 10,000t – 15,000t ships;

- Approximately 12 ships per annum; (potential to increase to 18 per annum)
- Loading of the ships will take no longer than 96 hours maximum, which is 24 hours longer than proposed in the original EIA/EMP and 24h longer than stated in the first amendment report.

Information regarding the proposed layout of the storage and loading facility has been provided by Mr. D. van Staden (Engineer, RPZC). The operation of storage and loading of zinc and lead concentrate falls into three areas (**Figure 1**) namely:

- Operational Area 1: Logistics: movement of zinc and lead concentrate between RPZC and Lüderitz harbour
- Operational Area 2: Lüderitz storage facility
- Operational Area 3: Bulk zinc / lead loading and shipment.

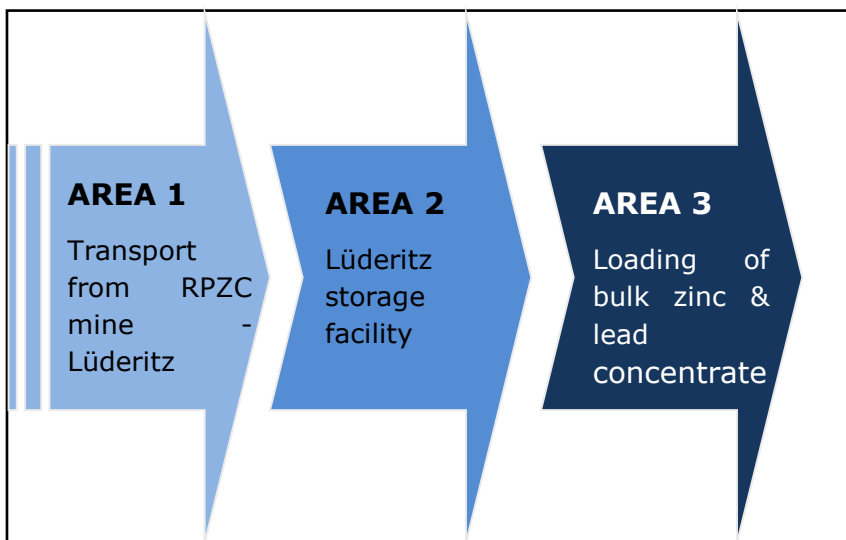


Figure 1: Process flow and operational areas of the zinc and lead concentrate storage and loading.

Please note that the transport of zinc and lead concentrate by ship has been excluded from the EIA. This will be conducted according to international legislation by the shipping agent.

6.3 Operational Area 1: Logistics: movement of zinc and lead concentrate between RPZC and Lüderitz

The zinc and lead concentrate will be loaded onto 32t to 36t side-tipping units (**Plate 1**). The trucks are covered with a fitted tarpaulin which is tightly secured to the side of the truck or buckets. At present trucks are weighed at the mine weighbridge.

The trucks will drive on the National road C13 to Aus (approximately 166 km) and continue on the National Road B4 to Lüderitz. Both roads have a tar surface. **Figure 2:** Showing roads C13 and B4 - the route to be used by trucks. **and Figure 3** shows the route the trucks will take through the town of Lüderitz to the harbour storage site.

The preferred entry into Namport is the side gate off Insel Rd, as shown in **Figure 3**. It will need some alteration to the position of the Western Gate at Insel Street and Namport has agreed to this in principle. Namport requested RPZC to submit drawings which clearly indicate the suggested modifications for their approval which is currently in process



Plate 1: Example of side tipper unit.



Figure 2: Showing roads C13 and B4 - the route to be used by trucks.

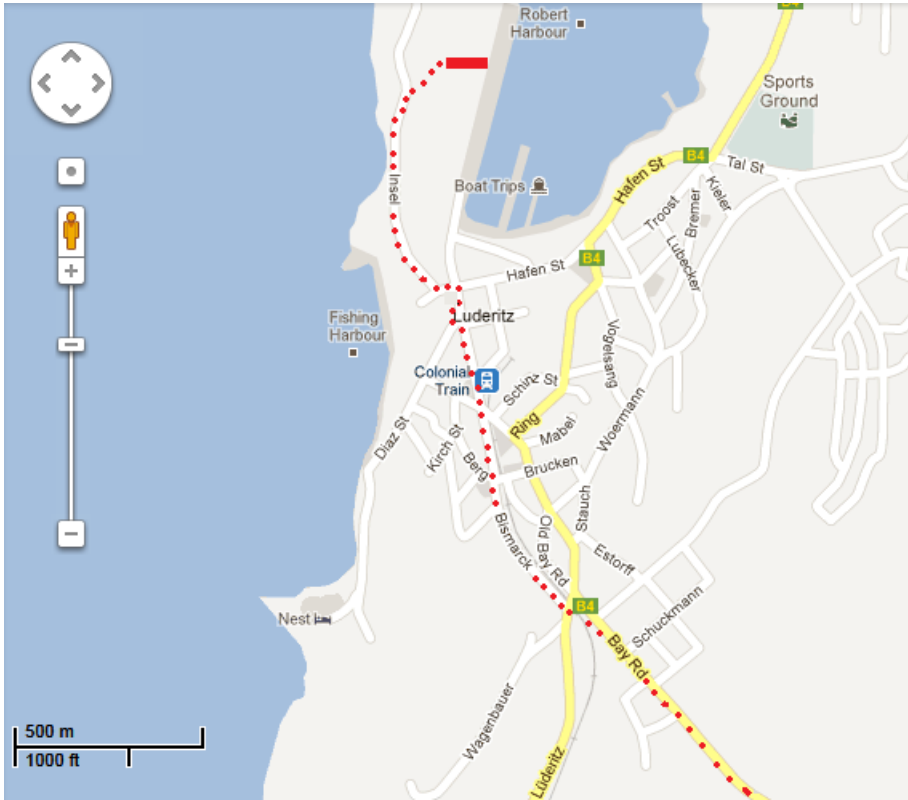


Figure 3: Proposed route through Lüderitz to storage shed

The public raised the need to design a detailed plan / schedule for the transport of concentrate to assess the impact. In response, RPZC has developed detailed schedules, considering the following variables:

- 120,000t and 180,000t of concentrate/annum
- 15 – 22 trucks per day
- 5 day and 7 day working week
- the drivers over-nighting either in Rosh Pinah or at Aus

Normal operations for the first three years will be 15 trucks per day, scheduled 7 days a week. Thus for transporting 480t per day, the first truck would leave Rosh Pinah at 05h15 and arrive in Lüderitz at 10h00. The 15th truck would arrive in Lüderitz at 13h30 and depart at 13h50, as summarized in **Table 8**. On occasion, they may need to increase to a maximum of 22 trucks per day 7 days a week, but this will only be in extreme cases for limited periods.

When tonnages increase to 180,000t per annum (not for at least three years), RPZC is likely to consider a 7 day schedule and the possible rail option. If transporting 180,000t was spread over a seven day week, only 16 trucks would be needed and they would be driving through Lüderitz between 10h00 and 14h05, Monday to Sunday, as summarized in **Table 9**.

In response to public concern over potential road accidents when schools close, the trucks passing through town during the school close period of 12h45 – 13h30 is only 3 trucks maximum. Thus there is no large increase in risk to the school children from the current town traffic during this period. They will also instruct the contractor to look into establishing a parking space for his trucks (4-5) as they enter town.

Table 8: Summary of a five day working week truck schedule.

5 Days per week	15 trucks per day (Normal)			
		From	To	Duration (hrs)
	C13 (Loaded Trucks)	05:15	11:30	6.25
	B4 (Loaded Trucks)	08:00	13:30	5.50
	Lüderitz (loaded & empty)	10:00	13:50	3.83
	B4 (Empty Trucks)	10:20	15:32	5.21
	C13 (Empty Trucks)	12:02	17:54	5.86
	22 trucks per day (Extreme)			
		From	To	Duration (hrs)
	C13 (Loaded Trucks)	05:15	13:15	8.00
	B4 (Loaded Trucks)	08:00	15:15	7.25
	Lüderitz (loaded & empty)	10:00	15:35	5.58
	B4 (Empty Trucks)	10:20	17:17	6.96
	C13 (Empty Trucks)	12:02	19:39	7.61

Table 9: Summary of a seven day per week schedule.

7 Days per week	11 trucks per day (Normal)			
		From	To	Duration (hrs)
	C13 (Loaded Trucks)	05:15	10:30	5.25
	B4 (Loaded Trucks)	08:00	12:30	4.50
	Lüderitz (loaded & empty)	10:00	12:50	2.83
	B4 (Empty Trucks)	10:20	14:32	4.21
	C13 (Empty Trucks)	12:02	16:54	4.86
	16 trucks per day (Extreme)			
		From	To	Duration (hrs)
	C13 (Loaded Trucks)	05:15	11:45	6.50
	B4 (Loaded Trucks)	08:00	13:45	5.75
	Lüderitz (loaded & empty)	10:00	14:05	4.08
	B4 (Empty Trucks)	10:20	15:47	5.46
	C13 (Empty Trucks)	12:02	18:09	6.11

6.4 Operational Area 2: Lüderitz Storage Facility

6.4.1 Storage shed configurations

The storage shed will be 90.0m long (which is a slight increase by 2.5m) and 66.5m wide, with a total footprint of 5,985m². The storage shed follows an “open plan” concept, thus one large open space to allow for maximum flexibility. No physical barriers will exist between the storage area, offloading area and driving areas.

The shed is enclosed to prevent dust escaping.

In this design all four sides of the storage shed are reinforced concrete retaining walls, which are 4 m high. The previous design of the storage shed allowed only for 3 sides of the storage shed having reinforced concrete retaining walls. The roof sheeting is alu-zinc with ventilators on top and a concrete floor. The workshop and control office with ablution facilities will be accommodated outside the storage shed. The orientation of building is diagonal to the south westerly winds. See-through sheeting will be used horizontally and vertically for natural light and artificial light for night operations.

6.4.2 Spillage containment design measures

All horizontal areas will be underlain by a 0.375mm thick plastic sheeting to prevent leakages downwards and movement of moisture upwards from the ground. Below a summary of spillage containment measures are provided:

- Storage shed will have two doors through which trucks, tractors and front end loader will enter/exit.
- Provision is made that trucks and tractors can make a full turning circle inside shed in order to enter and exit through the same door, thus keeping one door close preventing wind draught through the building if required.
- The doors will be operated manually.
- Entry/exit of trucks will be on quayside or non-quay side to allow for flexibility and minimum impact on other port operations.
- Tyre cleaning bays will be provided at both exit points to clean off any material stuck to the tyres of the equipment before exiting.
- Stockpiling will be done with front end loader inside the enclosed shed.

Figure 4 and **Plate 2** and **Plate 3** show the site of the proposed zinc and lead storage shed, approved by Namport. **Figure 5** and **Figure 6** illustrate the proposed layout and cross sections of the zinc and lead concentrate storage shed.

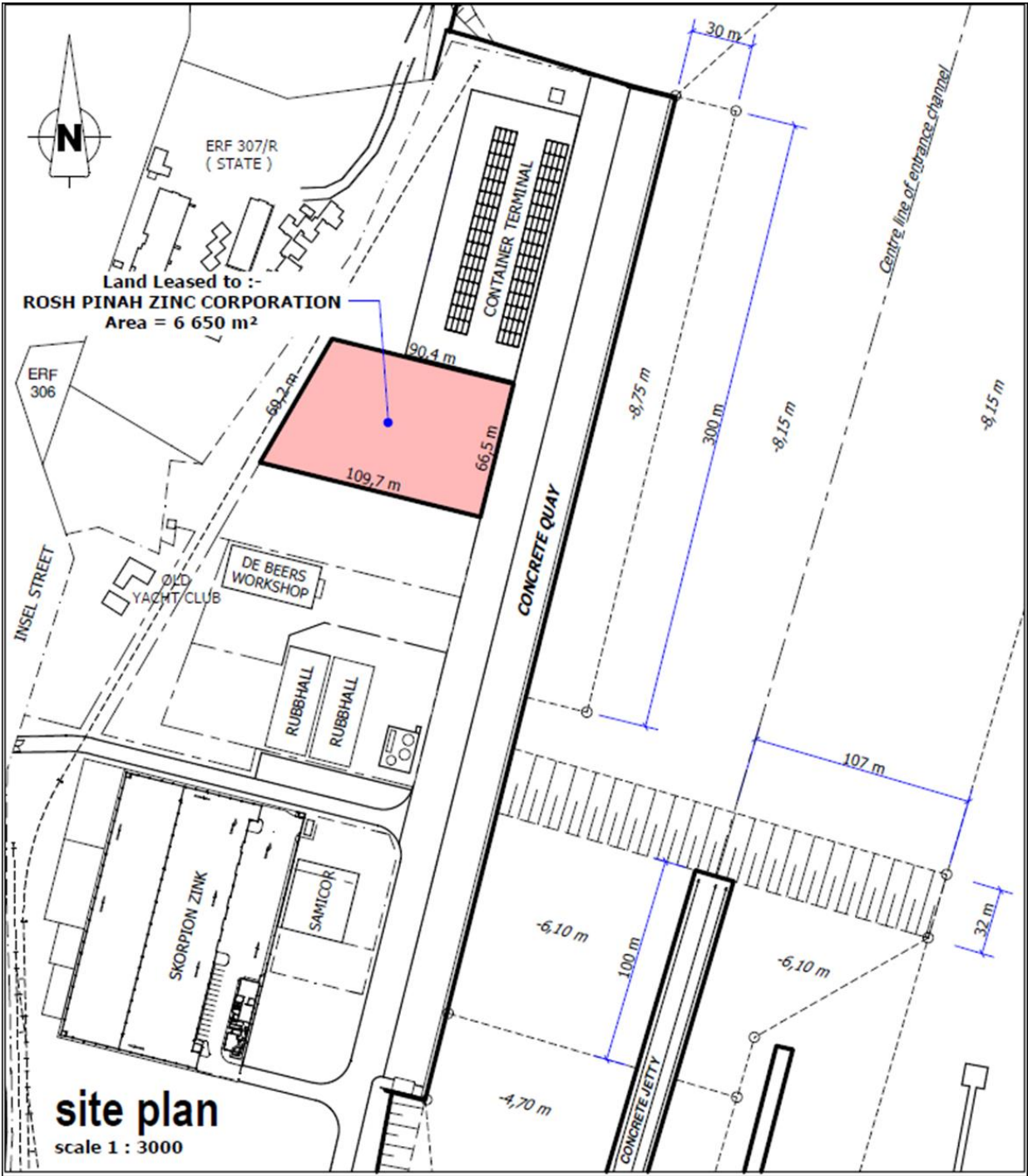


Figure 4: Site plan for the zinc and lead storage shed within Lüderitz Harbour.



Plate 2: Proposed site for storage shed and quay side.



Plate 3: Proposed site for the storage shed and possible quay side mooring site.

Runoff water from the zinc / lead storage shed is not an issue as no water will be used in the storage shed, so water consumption will be minimal – only that used for ablution and the office. Electricity requirements are 10,000 -15,000 kWh per month.

The zinc and lead concentrate will be off-loaded inside the zinc / lead storage shed.

The side tipper bins are hydraulically tipped, with the pivot point close to the base of the bin (**Plate 1**). The pivot point is usually located on the driver's side, allowing the bin to tip towards this side. For safety reasons, a hydraulic arm is activated from within the cab while the driver is seated inside.

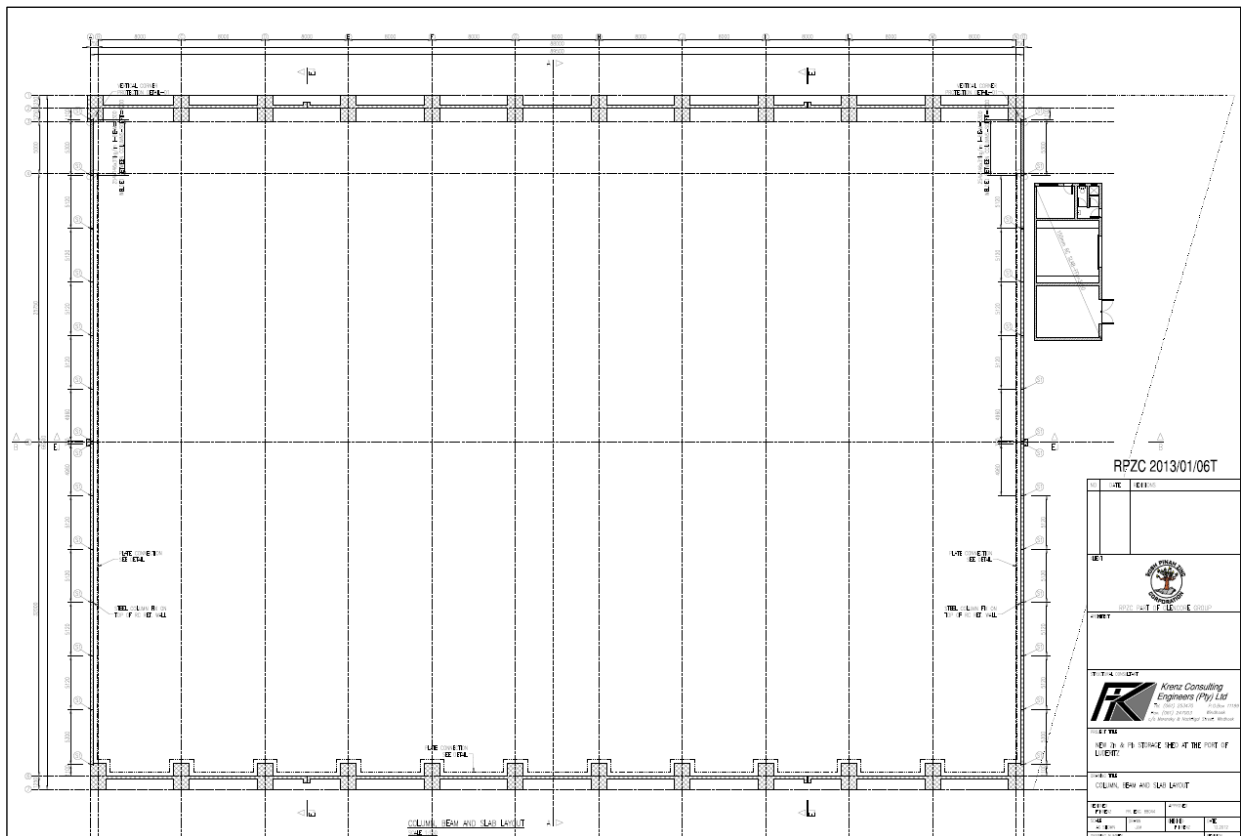


Figure 5: Revised Zinc and lead concentrate storage shed configuration (1 : 150)

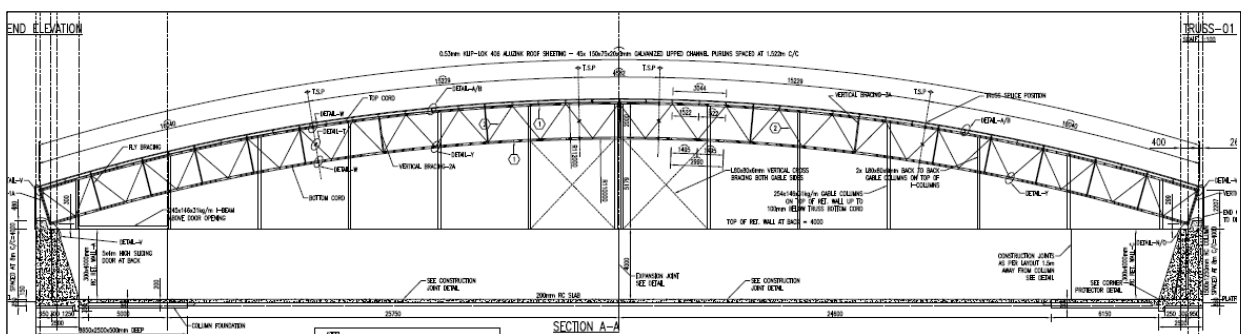


Figure 6: Revised Cross section trough zinc and lead storage shed.

6.5 Operational Area 3: Bulk zinc or lead concentrate shipment

The ship loading operation will be outsourced to a contractor, who will be contracted to implement procedures detailed in the EMP.

The proposed ship loading method will be done using the container-to-bulk process. Approximately 6 specially designed containers will circulate between the storage shed and loading site during the ship loading process. The containers will be transported on trailers pulled by tractors (Plate 4). Empty containers will be taken into the storage shed where their lids will be opened and then filled with material by front end loader.



Plate 4: Specially designed containers to transport the ore material into the vessel. The full containers will be closed and transported by tractor to the ship.

The filled containers' lids will be closed and transported to the loading site where the mobile harbour crane will be stationed. Before exiting the shed the containers and tractors with trailers will be cleaned at the cleaning bays provided.

At the loading site the containers will be lifted up, one at a time, with the mobile harbour crane (**Plate 6**) fitted with the specially designed 90° loading attachment (**Plate 5**).



Plate 5: Specially designed 90° loading attachment which will be fitted at the mobile harbour crane.



Plate 6: Example of mobile crane.

The containers will be lifted onto the bulk shipping vessel and then lowered inside the bulk vessel compartment. Once in position, the container will be rotated through 90° to discharge the material **Plate 7**. The container lids have a spring loaded mechanism, i.e. the weight of the material pushing against the lid will force the lid open. Once all material is discharged into the ship, the lids will close under the tension of the spring. The emptied container will be lifted out of the bulk compartment and lowered back onto an awaiting trailer on the quay. The empty container is then transported back to the shed for filling again. This process is continued until the bulk vessel is fully loaded. When switching between hatches there will be a slight delay for the crane to move to the new hatch. The container-to-bulk loading system attachment with 90° rotation is a better system compared to the container-to-bulk loading system with a 360° rotation mainly due to:

- The containers can still be used via the ship's gear during breakdown of the mobile harbour crane, thus ensuring that operations continue and reducing the time the vessel stays in the harbour. The ship gear using 4 x chain slings will lift the containers into the vessel where 2 x chain sling will disengage as the container is rested on the bottom of the vessel. Lifting of the container via only 2 x slings will result in a 90° rotation of the container and the material is discharged similar to the 90° rotating loading system attachment on the mobile harbour crane.
- The load per container is higher which will result in higher loading rates for the vessel, minimizing the time the vessel is in the harbour.



Plate 7: Illustration of the 90 degree tipping containers to be used for the ship loading.

During non-loading periods, approximately 6 containers will be stored next to the storage shed, but still on the area allocated to RPZC. The containers will be cleaned to remove any residual dust prior to storage. During loading the tractor trailers, transporting the containers, can make use of either the quay-side or non-quay side door, depending on the requirements of other port users at the time or wind conditions. Loading of 10,000 – 15,000t ships will take no longer than 96 hours, compared to 48 hours using the conveyor system and 72h using the containers described in the first amendment report. It is anticipated that 12 -18 ships will leave Lüderitz per annum.

The moisture content of zinc and lead concentrate is 5-8%. This moisture content assists in preventing dust. The transport moisture limit (TML) for zinc and lead concentrates is at around 8-9%. Any moisture higher than the TML might cause the risk that the bulk solids become liquid which may cause the ship to overturn.

7 ZINC CONCENTRATE

7.1 Properties of Zinc concentrate

Zinc concentrate is used in the production of zinc metal and zinc alloys.

Information regarding the RPZC zinc concentrate was obtained from the Material Safety Data Sheet (MSDS, see **Appendix J**) prepared by Ergosaf Environmental & Occupational Health Services, RSA. Zinc concentrate is a mixture of various chemical compounds (**Table 10**) and its physical and chemical properties are summarised in **Table 11**.

Table 10: Chemical compounds of zinc concentrate.

Substance	Approximate % by weight
Zinc Sulphide	86 – 92 %
Iron Sulphide	3 – 6 %
Lead Sulphide	1 – 2 %
Silica	0.2 – 0.5 %
Cadmium Sulphide	0.1 – 0.3 %

Table 11: Physical and chemical properties of zinc concentrate.

Appearance	Dark green-brown, fine grained powder
Odour	Weak organic odour from entrained flotation reagents
Physical State	Solid
pH	7.5 – 8.5
Vapour Pressure	Negligible@20°C
Vapour Density	Not Applicable
Boiling Point/Range	Not Applicable
Freezing / Melting Point / Range	Will burn first unless in an inert atmosphere
Specific Gravity	2.0 (Bulk Sp. Gr.)
Evaporation Rate	Not Applicable
Coefficient of Water / Oil Distribution	Not Applicable
Odour Threshold	Essentially insoluble
Solubility	Essentially insoluble
Percent Volatiles	9–12%(moisture)

7.2 Hazardous Identification

Flammability: Zinc concentrate is a dark green-brown, heavy, soil-like material that is not flammable or combustible under normal conditions of transport and storage. However, when heated strongly (>1000°C) in air it will burn, releasing toxic and irritating sulphur dioxide gas as well as zinc oxide and possible lead and cadmium oxide fumes. Contact with strong acids will generate flammable and highly toxic hydrogen sulphide gas (H₂S). Inhalation or ingestion of concentrate dust may produce both acute and chronic health effects. There is a possible cancer hazard due to lead, cadmium and silica content and possible reproductive hazard due to the lead content.

Biological hazard: Concentrate dust is irritating to the nose, throat and respiratory tract. Inhalation or ingestion of very high concentrations of concentrate dust may result in lead and cadmium absorption and possible intoxication.

Reproductive hazard: Possible reproductive hazard due to lead content. Pregnant women should be protected from excessive exposure to prevent lead crossing the placental barrier and causing infant neurological disorders. Lead is a suspected human carcinogen. OSHA and the EU do not currently list lead as a human carcinogen.

Health effects when inhaled or ingested: Inhalation or ingestion of very high concentrations of concentrate dust may result in lead and cadmium absorption and possible intoxication.

Symptoms include headache, nausea, vomiting, abdominal spasms, fatigue, sleep disturbances, weight loss, anaemia and leg, arm and joint pain. Prolonged exposure may also cause central nervous system damage (e.g. fatigue, headaches, tremors and hypertension), gastrointestinal disturbances, and anaemia and kidney dysfunction.

Potential Environmental Effects: Zinc concentrate is insoluble in water and its metals content have low direct bioavailability. However, extended exposure in the aquatic and terrestrial environments can lead to the release of contained metals in bio available forms. These can cause toxic impacts in organisms.

7.3 Handling and Storage

Health Precautions: Avoid dust inhalation. Practice good personal hygiene. Refrain from eating, drinking, or smoking in work areas. Thoroughly wash hands after handling and before eating, drinking or smoking in appropriate designated areas only.

Some sulphide concentrates may slowly oxidize in storage and generate sulphur dioxide as well as deplete the oxygen content of a confined space. The area must be thoroughly ventilated or self-contained breathing apparatus used if conditions warrant.

Handling (Physical Aspects): Avoid excessive heat (>1000°C). Avoid contact with acids, oxidizers and combustible materials. Minimize dust generation and accumulation.

Storage Precautions: Store in a cool, dry area.

Auto ignition: Some sulphide concentrates may oxidize and generate heat which accumulates in storage piles.

Means of Control: If heating of the concentrate is detected, the material should be sealed from air or oxygen in one of the following ways:

1. Leave the piles completely intact, do not open them up or try to spread them around.
2. Tamp or compact the surface of the piles.
3. Spray the pile with water. Resort to an organic binder only if needed because it can cause formation of hard lumps and subsequent problems for processing. Suggestions for organic binders include Aerospray 70A Binder, Coherex, Igepal CA-720 and lignin sulphonate, a pulp mill by-product.
4. For smaller piles, cover them with a tarp that will prevent exposure of the material to air.
5. If inside a building or ship's hold, keep all doors closed as much as possible.

7.4 Exposure Controls / Personal Protection

Occupational exposure limits (OEL): **Table 12** reflects the occupational exposure limits that are applicable to the chemical compounds in zinc concentrate.

Table 12: Occupational Exposure Limits of Chemical Compounds.

Substance	OEL (mg/m ³)	
	T	R
Zinc sulphide, as zinc	10	5
Iron Sulphide, as iron	5	-
Lead Sulphide, as inorganic lead	0.15	-
Silica, as crystalline	0	0.1
Silica, amorphous	6	3
Cadmium sulphide	-	0.04

Notes:

- i. - = not applicable / not available; T = total inhalable dust; R = respirable dust
- ii. Occupational Exposure Limits reflected in the Occupational Health and Safety Act (No 85 of 1993) of the Republic of South Africa

Protective Clothing: Overalls or other work clothing, glasses or goggles, and gloves are recommended to prevent prolonged or repeated direct skin and eye contact. Close-fitting safety goggles should be worn to prevent eye contact if excessive dust is generated or where any possibility exists that eye contact may occur. Workers should wash immediately when skin becomes contaminated and at the end of each work shift. Work clothing should be removed immediately if it becomes heavily contaminated and should be changed daily and laundered before reuse if there is reasonable probability that the clothing may be contaminated.

Ventilation: Use adequate local or general ventilation to maintain the concentration of zinc concentrate dust in the working environment well below the appropriate occupational exposure limits. Supply sufficient replacement air to make up for air removed by the exhaust system.

7.5 Ecological Information

Zinc concentrate is insoluble in water and its metals content have low direct bioavailability. However, extended exposure in the aquatic and terrestrial environments can lead to the release of contained metals in bio available forms. These can cause detrimental environmental effects. The mobility of zinc and lead is media dependent. They can bind with inorganic and organic ligands, reducing their mobility and bioavailability in soil and water. Bioavailability is also controlled by other factors such as pH and hardness.

Lead: Lead compounds are highly persistent in water. Dissolved lead compounds bioaccumulate in plants and animals, both aquatic and terrestrial. Lead may occur as

absorbed ions or surface coatings on sediment mineral particles or may be carried in colloidal particles in surface water. Most lead is strongly retained in soil, resulting in little mobility. Lead may be immobilized by ion exchange with hydrous oxides or clays or by chelation with humic or fulvic acids in the soil.

Zinc: Zinc in the aquatic environment can be toxic to organisms. In aquatic systems, zinc bio-accumulates in both plants and animals. Zinc also bio-accumulates in terrestrial plants, vertebrates and mammals, with plant uptake from soil, dependent on the plant species, soil pH and soil composition. In general, zinc does not bio-magnify through food chains.

7.6 Regulatory Information

ECC hazard classification: Not available.

Risk Phrase(s): R48/20/22 - Harmful – danger of serious damage to health by prolonged exposure through inhalation and if swallowed; R32 – Contact with acids liberates very toxic gas; R61 – May cause harm to the unborn child; R49 – May cause cancer by inhalation.

Safety Phrase(s): S24/25 – Avoid contact with skin and eyes; S53 -Avoid exposure - obtain special instructions before use; S45 - In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible) S22 – Do not inhale dust; S36/37 – Wear protective clothing and gloves.

National legislation: Not available.

Delayed (Chronic) Health Hazard: Reproductive Toxin.

European Union classification: Toxic.

8. LEAD CONCENTRATE

8.1 Properties of Lead concentrate

Lead concentrate is used in the production of lead metal and lead alloys.

Information regarding the RPZC lead concentrate was obtained from the Material Safety Data Sheet (MSDS, see **Appendix K**) prepared by Ergosaf Environmental & Occupational Health Services, RSA. Lead concentrate is a mixture of various chemical compounds, see **Table 13**, and its physical and chemical properties are summarised in **Table 14**.

Table 13: Chemical compounds of lead concentrate.

Substance	Approximate % by weight
Lead Sulphide	66 – 73 %
Zinc Sulphide	7 – 10 %
Iron Sulphide	12 – 8 %
Silica	0.1 – 0.2 %

Table 14: Physical and chemical properties of lead concentrate.

Appearance	Dark black-grey, fine powder
Odour	Weak organic odour from entrained flotation reagents
Physical State	Solid
pH	8.54
Vapour Pressure	Negligible @ 20°C
Vapour Density	Not Applicable
Boiling Point/Range	Not Applicable
Freezing/Melting Point/Range	Will burn first unless in an inert atmosphere
Specific Gravity	2.8 (Bulk Sp. Gr.)
Evaporation Rate	Not Applicable
Coefficient of Water/Oil Distribution	Not Applicable
Odour Threshold	No data
Solubility	Essentially insoluble
Percent Volatiles	6 – 10% (moisture)

8.2 Hazardous Identification

Main hazard: Possible cancer hazard due to lead and silica content.

Flammability: Not flammable or combustible under normal conditions of transport and storage. However, when heated strongly (>1000°C) in air it will burn, releasing toxic and irritating sulphur dioxide gas as well as possible lead and zinc oxide fumes. Contact with strong acids will generate flammable and highly toxic hydrogen sulphide gas (H₂S).

Biological hazard: Inhalation or ingestion of concentrate dust may produce both acute and chronic health effects.

Reproductive hazard: Possible reproductive hazard due to lead content. Pregnant women should be protected from excessive exposure to prevent lead crossing the placental barrier and causing infant neurological disorders. Lead is a suspected human carcinogen. OSHA and the EU do not currently list lead as a human carcinogen.

Health effects when inhaled or ingested: Inhalation of concentrate dust may result in lead absorption and possible lead intoxication.

Exposure may cause headache, nausea, vomiting, abdominal spasms, fatigue, sleep disturbances, weight loss, anaemia and pain of the limbs and joints. Prolonged exposure may also cause central nervous system damage (fatigue, headaches, tremors, and hypertension), gastrointestinal disturbances, and anaemia and kidney dysfunction.

Potential Environmental Effects: Lead concentrate is insoluble in water and its metals content have low direct bioavailability. However, extended exposure in the aquatic and

terrestrial environments can lead to the release of contained metals in bio-available forms. These can cause toxic impacts in organisms

8.3 Handling and Storage

Health Precautions: Avoid dust inhalation. Practice good personal hygiene. Refrain from eating, drinking, or smoking in work areas. Thoroughly wash hands after handling and before eating, drinking, or smoking in appropriate designated areas only.

Some sulphide concentrates may slowly oxidize in storage and generate sulphur dioxide as well as deplete the oxygen content of a confined space. The area must be thoroughly ventilated or self-contained breathing apparatus used, if conditions warrant.

Handling (Physical Aspects): Avoid excessive heat. Avoid contact with acids, oxidizers and combustible materials. Minimize dust generation and accumulation.

Storage Precautions: Store in a cool, dry area.

Auto ignition: Some sulphide concentrates may oxidize and generate heat which accumulates in storage piles.

Means of Control: If heating of the concentrate is detected, the material should be sealed from air or oxygen in one of the following ways:

1. Leave the piles completely intact, do not open them up or try to spread them around.
2. Tamp or compact the surface of the piles.
3. Spray the pile with water. Resort to an organic binder only if needed because it can cause formation of hard lumps and subsequent problems for processing. Suggestions for organic binders include Aerospray 70A Binder, Coherex, Igepal CA-720 and lignin sulphonate, a pulp mill byproduct.
4. For smaller piles, cover them with a tarp that will prevent exposure of the material to air.
5. If inside a building or ship's hold, keep all doors closed as much as possible.
6. For smaller piles, cover them with a tarp that will prevent exposure of the material to air. If inside a building or ship's hold, keep all doors closed as much as possible.

8.4 Exposure Controls / Personal Protection

Occupational exposure limits (OEL): Table 15 reflects the occupational exposure limits that are applicable to the chemical compounds in lead concentrate.

Table 15: Occupational Exposure Limits of Chemical Compounds.

Substance	OEL (mg/m ³)	
	T	R
Lead Sulphide, as inorganic lead	0.15	
Zinc sulphide, as zinc	10	5
Iron Sulphide, as iron	5	-
Silica, as crystalline	0	0.1
Silica, amorphous	6	3

Notes:

- i. - = not applicable / not available; T = total inhalable dust; R = respirable dust
- ii. Occupational Exposure Limits reflected in the Occupational Health and Safety Act (No 85 of 1993) of the Republic of South Africa

Protective Clothing: Overalls or other work clothing, glasses or goggles, and gloves are recommended to prevent prolonged or repeated direct skin contact. Close-fitting safety goggles should be worn to prevent eye contact if excessive dust is generated or where any possibility exists that eye contact may occur. Workers should wash immediately when skin becomes contaminated and at the end of each work shift. Work clothing should be removed immediately if it becomes heavily contaminated and should be changed daily and laundered before reuse if there is reasonable probability that the clothing may be contaminated.

Ventilation: Use adequate local or general ventilation to maintain the concentration of lead concentrate dust in the working environment well below the appropriate occupational exposure limit. Supply sufficient replacement air to make up for air removed by the exhaust system.

Respirators: Where lead concentrate dust is generated and cannot be controlled to within acceptable levels by engineering means, use appropriate respiratory protection equipment (3M 8835 FFP3 type respirators for example afford protection against lead of up to twenty times the OEL.)

8.5 Ecological Information

Lead concentrate is insoluble in water and its metals content have low direct bioavailability. However, extended exposure in the aquatic and terrestrial environments can lead to the release of contained metals in bio-available forms. These can cause detrimental environmental effects. The mobility of lead and zinc is media dependent. They can bind with inorganic and organic liquids, reducing their mobility and bioavailability in soil and water. Bioavailability is also controlled by other factors such as pH and hardness.

Lead compounds are highly persistent in water. Dissolved lead compounds bio-accumulate in plants and animals, both aquatic and terrestrial. Lead may occur as absorbed ions or surface coatings on sediment mineral particles or may be carried in colloidal particles in surface water. Most lead is strongly retained in soil, resulting in little mobility. Lead may be immobilized by ion exchange with hydrous oxides or clays or by chelation with humic or fulvic acids in the soil.

8.6 Regulatory Information

ECC hazard classification: Not available.

Risk Phrase(s): R20/22 – Harmful by inhalation and if swallowed; R33 - Danger of cumulative effects; R61 – May cause harm to the unborn child; R62 – Risk of impaired fertility; R32 – Contact with acids liberates very toxic gas; R49 – May cause cancer by inhalation.

Safety Phrase(s): S22 – Do not inhale dust; S36/37 – Wear suitable protective clothing and gloves; S45 – In case of accident, or if you feel unwell, seek medical advice immediately (show the label where possible); S53 – Avoid exposure – obtain special instructions before use.

National legislation: Not available.

Delayed (Chronic) Health Hazard: Reproductive Toxin.

European Union classification: Toxic.

9. PROJECT NEED, DESIRABILITY AND ALTERNATIVES

RPZC investigated several alternatives and the pros and cons of each are shown in **Table 7** above. One project alternative is the No-Go option where the current export of zinc and lead concentrate by rail to Walvis Bay continues. The route from Aus to Walvis Bay is approximately 1,050km, compared to 125km from Aus to Lüderitz. Although the current route uses rail transport, it takes longer and uses more fossil fuel. RPZC will definitely consider using rail transport from Aus to Lüderitz once railway is up and running and will evaluate its viability at such time. (There were mixed views at the public consultation meeting whether there were fewer adverse impacts bringing the concentrate via road or rail into Lüderitz). TransNamib would lose the road/railway revenue of zinc and lead concentrate to Walvis Bay. However, they could win the road contract to Lüderitz (a tender process). Also if RPZC expands the transport requirement will increase which will mean extra revenue. Other impacts are assessed in **Section 10** and **11**.

Exporting via Lüderitz harbour will take some pressure off the harbour in Walvis Bay where land and docking facilities are in extremely high demand.

The export of zinc and lead concentrate via Lüderitz rather than Walvis Bay harbour therefore has socio-economic advantages to RPZC, Lüderitz and Namport. However there are some negative impacts which are assessed in **Section 11**.

10. BIOPHYSICAL AND SOCIAL ENVIRONMENT

10.1 Aspects considered

The environmental regulations require both a scoping and an assessment report to include “a description of the environment that may be affected by the activity and the manner in which the physical, biological, social, economic and cultural aspects of the environment may be affected by the proposed activity”.

The biophysical data have been gathered from the Environmental Management Plan for the Lüderitz Town (http://www.nacoma.org.na/Downloading/EMP_Luderitz.pdf) and the Atlas of Namibia (Mendelsohn et. al., 2002). In addition, information was obtained from the EMP for Construction of the New Quay at the Port of Lüderitz, Namibia (CSIR, 1998).

Table 16 lists the aspects usually evaluated during an EIA study. As this development takes place within the existing Lüderitz Harbour, only aspects which might have an impact on the new operation, and vice versa, are discussed in detail. Rationale is given for why each factor has been evaluated or not.

Table 16: Checklist of aspects to be addressed in an EIA.

Aspects	Rationale for aspect to be included/excluded
Climate and Air Quality	Climatic conditions are to be addressed, especially wind conditions and wind directions; trucks on dirt road section through Lüderitz.
Geology & Mineralogy	n/a
Soils	The sites are covered with concrete; the area was reclaimed in early 2000. The entire road between Rosh Pinah mine and Lüderitz is tarred. An emergency plan, should spillage occur, must be put in place
Topography	n/a. The proposed area was reclaimed from the sea when the Lüderitz harbour was upgraded.
Surface water	Should be included in the construction of the harbour offloading area n/a as brushing will be used to clean trucks and storage facility rather than water.
Groundwater	n/a
Land based Flora/ Fauna/ Avifauna	Zinc and lead will be transported between RPZC and Lüderitz harbour. All trucks will be covered with tarpaulin and the zinc and lead concentrate is handled within the enclosed storage shed. However, the impact of an accidental spillage on flora and fauna should be considered. Emergency plans must be in place should spillage occur.
Marine Fauna & Legal aspects	The transfer from the shed to the ship will take place in containers, which will be emptied within the ship compartment . Any impact on terrestrial / marine fauna will only occur after accidents, e.g. spillages at the harbour. Emergency plans must be in place should spillage occur. Ensure that potential legal impacts re export of fish products by other port users are addressed and covered.
Archaeology, Cultural & History	n/a An EIA was conducted when the land was reclaimed to extent the harbour.
Socio-economic	The harbour, fishing and tourism industries and local businesses are important aspects in Lüderitz.
Visual & Tourism	The town of Lüderitz is an important tourist attraction in southern Namibia, as well as the B4 and C13 route (Rosh Pinah to Lüderitz). Special attention should be given to visual impacts which might be caused by the shed.
Access Route from Rosh Pinah mine to Lüderitz	Road users' aspects and impact on wildlife will be considered.
Noise	Impact of trucks through the town. Off loading will occur within an enclosed shed, so the noise impact will be negligible. Increase in noise levels might occur during loading of the ships (12 – 18 times a year for 48 hours each time).

Aspects which may impact on or be impacted by the proposed project are described below.
Aspects which will not be impacted upon, identified in

Table 16, are excluded.

10.2 Climate

Description (Lüderitz)

Climatic information for Lüderitz was compiled from the CSIR (1998) report. Lüderitz falls within the cool desert climatic region of Namibia, which forms a narrow strip along the desert coastline. The prevailing wind direction at Lüderitz is south-westerly, and the wind ranges from an average of 20 knots (37km/h) during the winter months to as high as 60 knots (110km/h) during the summer months. Up to 77% of the wind directions are between south-east and south-west. Of the remaining wind directions, north-north-west has the highest occurrence (4%). According to the data used by the CSIR, the all-year data of wind speed of 4m/s, 6m/s and 16m/s are exceeded 77%, 45% and 3% of the time, respectively. The median wind velocity at Lüderitz is approximately 9m/s, with a 50% occurrence. Northerly winds seldom blow, and are very moderate, showing wind speeds below 10m/s.

Implications

The wind speed has to be taken into consideration as regards loading. The loading of the zinc and lead concentrate will be conducted according to Namport's harbour regulations. Thus wind speed and general weather conditions are incorporated into the loading procedure. [The loading of the ship with 90 degree revolving containers at the Lüderitz harbour will further minimise the potential negative impact of windblown concentrate, caused by strong winds.](#)

The Lüderitz Town Council has selected a route through the town for heavy traffic which includes a 600m – 700m section of gravel road. Residents are concerned about dust generation if the road is not tarred.

10.3 Topography

The proposed new zinc / lead concentrate storage shed is located on the reclaimed harbour area. The soils are compacted. Before construction the natural bay of Lüderitz extended in this area.

10.4 Flora / Fauna

Description

The flora along the transport route from Rosh Pinah via Aus to Lüderitz belongs to two desert vegetation biomes, the Succulent Karoo and the Southern Namib Desert. The area lies in a transition zone between winter and summer rainfall patterns. Both biomes are characterised by high plant diversity specialised to the harsh conditions. Several large fauna live in these biomes and are known to roam over the C3 and the B4 roads – notably brown hyena, oryx, springbok, ostrich and wild horses, particularly at certain hotspots such as Garub.

Implications

Drivers should be warned and emergency plans should be in place in case of accidents with wildlife and to mitigate the potential of any accidents that might result in spillages.

10.5 Marine Harbour environment

The waters of the Namibian coast support some of the greatest concentrations of marine life found anywhere in the world. This high level of biological productivity is the result of seasonable south to southeast winds which induce upwelling making available an abundant supply of nutrients in the upper layers. These nutrients together with sunlight promote blooms of phytoplankton, rich resources of zooplankton and an abundance of pelagic fish such as pilchard, anchovy and juvenile horse mackerel. These fish shoals in turn provide food for large populations of higher predators such as sharks, seals, cetaceans and seabirds.

40% of Namibian demersal (sea-floor) catches are from the southern region (CSIR 2008) and the commercial rock lobster fishery is centred around Lüderitz. It is recognised that major declines in fishery stocks have occurred over the past 40 or so years (e.g. of pilchard [=sardine], anchovy, hake, orange roughly and rock lobster), partly caused by over-exploitation (Molloy and Reinikeinen 2003). For example, orange roughly was 'discovered' in the 1990s as a deep-sea fish with high commercial value. Rapid exploitation of the stocks depleted them considerably, and the realization that it is slow-breeding and that stocks will not recover quickly came about 10 years later. The sector of the fishing industry that exploited it has dropped to less than half (Boyer et al. 2001, Mendelsohn et al. in prep.).

Environmental factors have also been important in the demise of the fishing industry, such as the Benguela el Niño events in 1984/85 and 1994/95, causing intrusion of warm water from Angola which led to less upwelling and many fish moving away from their spawning grounds (Mendelsohn et al. 2002). The combined effect has been a substantial loss of Namibia's marine resources, and the fishing industry remains vulnerable to future 'shocks' that will likely recur.

Implications

Although the ship will be loaded using 90 degree revolving containers, emergency plans must be in place should spillage occur. Ensure that potential legal impacts re export of fish products by other port users are addressed and covered.

10.6 Social / Economic

10.6.1 Demographics

Lüderitz is situated in the Karas Region which is the largest of Namibia's regions (161,086 km²) and is the most arid. According to the preliminary 2011 Census results, 76 000 people live in the region (about 3.5% of the national population). While the number of households in the region has increased from 15,481 in 2001 to 21,300 in the 2011, the average size of household in the region has decreased from 4.1 to 3.5. The population is fairly balanced regarding gender, with only a thousand more men than women (38,500 male compared to 37,500 females).

In 2011, over 12,500 people lived in Lüderitz of whom 6,300 are estimated to be male and slightly fewer are females (6,200)¹.

Aus had a population of 700 inhabitants in 2001. The population is made up of a mixture of Namibian ethnic and cultural groups, including Nama/Damara, Owambo, and other language groups, speaking mainly Afrikaans. Means of livelihood for the community are from the major

¹NPC. 2012. *Preliminary 2011 Population Census*

employers - TransNamib, the Roads Contractors Company, the Police and a lodge on the neighbouring farm (Klein Aus Vista); and from subsistence livestock farming, old age pensions, cash remittances, maintenance grants, drought relief and informal and formal small businesses. Wages and salaries are also received from working on commercial farms. The area has facilities like a clinic and school situated in the settlement. It has an environmental school which is visited by school going youth for their orientation and team building exercise.²

In-migration to the Karas Region has been greatly influenced by mining, irrigation, fishing and industrial type developments. Only 60% of the people living in the Karas Region were born there³, often resulting in higher unemployment for the local people. Employment is dominated by men (two-thirds versus one-third for women) in almost all kinds of work. About 61% of all employed persons work in the private sector while the government employs about 27%, and a small proportion work in other sectors⁴.

10.6.2 Education and Health

Lüderitz has three primary schools, the Diaz Junior Secondary School and Nautilus Secondary School. The Benguela Community Skills Development Centre (COSDEC) offers basic technical skills courses in Early Childhood Development, Food Preparation, Basic needlework, Hospitality, Bricklaying & plastering, Office Administration and Plumbing.

There is a state hospital in Lüderitz, as well as a clinic. Private medical facilities exist, and are of a high quality.

Lüderitz has the highest HIV prevalence in the 25-49 year age group in Karas Region and of the 3 main coastal towns of Swakopmund, Walvis Bay and Lüderitz (**Table 17**)⁵. This may be as result of the high number of sailors spending time in Lüderitz and an active sex trade as a result thereof.⁶

Table 17: Change in HIV prevalence among pregnant women in Lüderitz.

	15-24 year age group				25-49 year age group			
	2004	2006	2008	2010	2004	2006	2008	2010
Lüderitz	11.9	14.8	10.4	4	28.2	28.9	26.2	27.3

It was pointed out several times during consultations that Lüderitz only has a volunteer fire brigade.

²Namibia Development Trust. *Country Pilot Partnership in Karas*. www.ndt.org.na/wp-content/uploads/South-Newsletter-CPP.pdf

³NPC. 2007. Karas Regional Poverty Profile

⁴PLANUNG+UMWELT / SAIEA. 2011. *Strategic Environmental Assessment for the Karas Integrated Regional Land Use Plan*. Republic of Namibia: MLR.

⁵MHSS. 2010. *Report on the 2010 National HIV Sentinel Survey*

⁶NACOMA. 2010. *The Environmental Management Plan for the Town of Lüderitz*

10.6.3 Lüderitz Port

Namport started operating in Lüderitz in 1994 with its main focus on fishing/marine services and handling cargo. The large Skorpion zinc mine at Rosh Pinah that produced its first metal in May 2003 has increased the port's operations as it ships out zinc and copper and imports bulk sulphur.

In 2010, Namport handled 345,000t of cargo and received an average of 93 vessels per month. Initially the Port of Lüderitz catered for the fishing industry, but since 2003/2004 significant volumes are handled for the mining industry. The main strategic focus of the Port is to cater for fishing, mining and agronomic industries in Southern Namibia⁷.

The proposed site will be located on the port's reclaimed land, which was constructed at the beginning of the millennium. An EIA for the construction of the new quay at the Port of Lüderitz was conducted by CSIR in 1998.

The port of Lüderitz is the only port in the world that has no rail connection with the interior. The port is also hampered by being only 8.75 metres deep for 300m from the northern end of the quay, which is relatively shallow, so that large ships cannot access harbour facilities. This depth can currently accommodate a container and a zinc vessel at any given time at the berth. Namport developed expansion plans for the harbour in 1998 which included an option to extend the port using Shark Island in the future. It will only be able to extend the quay when "orders are in the book." However, Namport is optimistic that business opportunities exist in the region for the port. The following examples were given:⁸

1. Continuing business with the Skorpion mine.
2. Importing liquefied gas
3. A potential zinc mine in the Northern Cape that is three times the size of the Scorpion mine
4. Incoming fuel for the region
5. Fruit export from the Orange river basin

The RPZC zinc / lead storage and off-loading facility is one such business opportunity. During the public consultations, the fishing industry raised vocal concern that the harbour management shuffles them around and they sometimes have to wait outside the harbour before docking. During the tuna season, 4 to 5 ships moor next to each other as space is limited.

The fishing industry is regulated to offload their catch within certain time limits and their main concern is that with increased harbour use by other sectors, they will be marginalised and lose their catch.

Namport has replied and guarantees berths to local fishing companies as follows:

"We would to inform you that Namport will always render full service to local and international port users. The following will apply to the local fishing boats or others when the Zinc, Zinc concentrate or Sulphur vessel is alongside. Berth will be provided as follows:

- *Berth will be allocated as per port regulations 23 and 26(1,2)*
- *Berth will be provided to any fishing boats wanting to discharge / load fish or load ice (fishing apparatus) for their operations*
- *Fishing vessels for an emergencies or repairs"*

⁷Information in this section was taken from NamPort's Handbook (2011).

⁸A. Speiser Environmental Consultants 2009. *Social Aspects of the New Rail Access to Lüderitz Harbour*, Scoping Report.

It is noted that the Environmental Management Plan for Lüderitz (NACOMA 2010) did not plan for increased use of the harbour and its implications on road and rail traffic volumes.

10.6.4 Other Infrastructural developments

The Lüderitz Waterfront Development Company has already built several developments on the eastern side of the port including shops, restaurants and offices. It is now promoting Phase 2, to the east of the existing Waterfront development. The proposed N\$400 million development complex will include a new luxury hotel overlooking the harbour, residential units and a retail component.

The Aus – Lüderitz railway reconstruction has been lagging since 2001. The initial date of official completion was August 2003. The Roads Contractor Company (RCC) and Salz Gossow were the contractors on the project and delays have been blamed on the regular changes of managers responsible for the contract, a general lack of co-ordination, stretching from the top management down to the labour force on site as well as the condition of plant.⁹The Ministry of Works and Transport has affirmed that the railway be completed within the next 30 months.

10.6.5 The Lüderitz economy

The main source of income in 80% of households in Lüderitz is derived from wages and salaries¹⁰. The fisheries sector has been the economic backbone of Lüderitz. The commercial fisheries target mostly the deep-sea species (hake, orange roughly and monkfish), and species associated with the coastline (rock lobster, seals and guano)¹¹. There are two fish processing plants in Lüderitz which preserve and package fish products mainly for export to Europe. This and the servicing of fishing fleets are the main economic activities in the town. Small boats that characterise subsistence fisheries elsewhere in southern Africa are not used in Lüderitz because of the hazardous, high energy coastline (Nacoma 2009).

For roughly the last two decades there have been diminishing stocks of important species such as hake and rock lobster, and thus the fisheries sector is in steady decline.

Mariculture, the growing and harvesting of marine products such as seaweeds, abalone, oysters and rock lobster, are growing industries in Lüderitz Bay, and show economic potential. While their development is promoted, their vulnerability to occasional natural marine events such as red tides and low oxygen water must be noted. Big pollution events have not occurred in Namibian waters; an oil-spill or equivalent accidental spill could be disastrous for this sector.

Marine diamond mining occurs in a narrow strip adjacent to the coast from Chameis to Lüderitz, in the mid-water area between ~50 - 120 m depth (CSIR 2008b). The mining activities are similar to those in deeper water but involve divers, airlift trenching tools and dredges, operating from small boats and from shore.

http://www.klausdierks.com/Namibia_Rail/annexure2.htm

¹⁰NPC. 2003. *2001 Population and Housing Census*

¹¹PLANUNG+UMWELT / SAIEA. 2011. *Strategic Environmental Assessment for the Karas Integrated Regional Land Use Plan*. Republic of Namibia: MLR.

Lüderitz is an important tourist attraction in southern Namibia, mainly due to the history of the town, especially around the German colonial era, as well as its importance as a diamond and fishing centre. The majority of visitors to the town are international tourists, of which Germans make up about 80%. Its attractions include historical architecture, the old diamond town of Kolmanskop, the Diaz Cross on the Lüderitz Peninsula and the Sperrgebiet National Park. There are strict restrictions regarding entering the Sperrgebiet but these are in the process of being reduced and monitored, making this area an important potential resource to the Lüderitz tourism market. The Strategic Environmental Assessment for the Karas Region foresees that towns such as Lüderitz, Aus, Oranjemund and Rosh Pinah will become key nodes in terms of tourism development¹².

Implications

It is important that the fishing and tourism industries do not suffer detrimental impacts from the operation. Special attention should be given to minimise visual, smell and noise impacts and road safety.

10.6.6 Access route from Aus to Lüderitz

Description

The number of trucks used to transport the zinc and lead concentrate will stay the same as currently. However, the type of vehicles might change to side tippers. The trucks will not be offloaded at Ausnek as currently, but will proceed to Lüderitz harbour, thus the volume of traffic will increase along the B4 road by approximately 15 to 22 trucks per day. All trucks will return empty to Rosh Pinah.

11 HIGH-LEVEL ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT

11.1 Assessment methodology

The assessment follows mainly Namport's System Procedure – Environmental Impact Assessment. However, to comply with the Environmental Regulation (MET, 2012) some additional assessment criteria have been included.

The effect on the environment –

- Positive
- Negative

Type:

- Permanent (P)
- Temporary (T)

Magnitude:

- Low (L)
- Medium(M)
- High (H)

Extent:

- Local (L)
- Regional (R)

¹²Ibid

- International (I)

Probability:

- Low (L)
- Medium (M)
- High (H)

11.2 Impact identification and Assessment for Construction and Operation

Impact assessments were conducted on environmental impacts arising from the construction of the zinc / lead storage facility and from activities in the three operational areas of the proposed project:

- Operational Area 1: Logistics: movement of zinc and lead concentrate between RPZC and Lüderitz harbour
- Operational Area 2: Lüderitz storage facility
- Operational Area 3: Bulk zinc / lead concentrate loading and shipment

Table 18: Potential environmental aspects and impacts associated with the construction phase of the proposed project.

Construction Activities	Aspect (Effect)	Potential Environmental Impact	Extent	Probability	Type / Magnitude	Relevance of Potential Impact	Mitigation Measure	Significance with mitigation
Operational Area 2: Lüderitz storage facility								
<ul style="list-style-type: none"> • Foundation excavations • Compacting bases 	Soil resources and land capability (n/a)	Loss of soil resources and land capability through physical disturbance	L	H	n/a	Not applicable – the proposed area has been reclaimed when the Lüderitz harbour was upgraded	n/a	
	Biodiversity (n/a)	Loss of biodiversity through general disturbance and physical destruction	L	H	n/a		n/a	
<ul style="list-style-type: none"> • Use of construction vehicles, earth moving equipment and cranes 	Noise (negative)	Increase in disturbing noise levels (nuisance)	L	H	T / L	Other operations at Namport already result in increased noise levels. The additional construction activities will have a temporary cumulative effect of low magnitude.	Construction should be only carried out during day-time.	L
<ul style="list-style-type: none"> • Use of Generators 	Dust and other air emissions (negative)	Increase in dust levels (nuisance & health impacts)	L	H	T / M – H	Current operations at Namport already contribute to the current air quality environment, while the proposed construction will have a temporary cumulative effect on air quality.	Use water to minimize dust.	L-M
	Oil and diesel spillages (negative)	Pollution of surface water, potential run-off into harbour	L	L	T / L	No natural water courses are located within the vicinity of the Lüderitz Harbour; however the run-off of pollution as well as spillages into the sea may occur.	Shed design is such that no polluted run-of water will come from shed. Have emergency procedures in place regarding accidental hydrocarbon spills	L

Construction Activities	Aspect (Effect)	Potential Environmental Impact	Extent	Probability	Type / Magnitude	Relevance of Potential Impact	Mitigation Measure	Significance with mitigation
		Contamination of groundwater resources (seawater)	n/a	n/a	n/a	Not applicable. The land was reclaimed therefore there is no groundwater but seawater. Any minor (potential) oil and diesel spillages during construction will have no or insignificant impact as the area has been compacted and seepage is therefore highly unlikely.	n/a	
<ul style="list-style-type: none"> General building activities (i.e. painting, grinding, welding, concrete mixing, etc.) 	Spillage of paint, concrete, etc. (negative)	Pollution of surface water resources and run off into harbour	L	L	T / L	No natural water courses are located within the vicinity of the Lüderitz Harbour however the run-off of pollution as well as spillages into the sea may occur.	Have emergency procedures in place regarding accidental spills	L
		Contamination of groundwater resources	n/a	n/a	n/a	Not applicable as there is no groundwater. Any minor spillages of paint or cement during construction will have no (insignificant) impact as the area has been compacted and seepage is therefore highly unlikely.	n/a	
<ul style="list-style-type: none"> Waste management (hazardous & non-hazardous) 	Waste not disposed of correctly (negative)	Emissions to land and the sea Nuisance impacts	L	L	T / L	Namport is ISO14001 (Environmental Management System) certified and all contractors have to adhere to the ISO14001 standards when working within the harbour. However, construction waste could cause impacts if not properly managed.	Ensure that all contractors adhere to the waste management procedures within Lüderitz Harbour. Put requirement into tender document.	L

Construction Activities	Aspect (Effect)	Potential Environmental Impact	Extent	Probability	Type / Magnitude	Relevance of Potential Impact	Mitigation Measure	Significance with mitigation
• Employment	Socio-economic	Positive impact – short term job creation of about 20-30 jobs for 6 months.	R	H	T / H+	Employment opportunities are good as unemployment is high	Recruit local labour	H+
• Purchase of Namibian goods and services	Economic	Small contribution to GDP, government revenue & to the local economy	R	H	T / M+	Positive economic benefit. Construction company & workers will spend money while in Lüderitz.	Give tender preference to contractors who are from Lüderitz, the Karas Region and who are Namibian and contract to buy Namibian goods and services wherever possible.	M+
• Temporary workforce	Social ills	Temporary construction workforce could bring risks to local population	L	H	T/H	Only relevant if workers come from outside Lüderitz. Cumulative impact which already exists in Lüderitz.	All contractors must have an HIV policy, workplace programme and must provide proof of implementation with invoicing. Work with LTC, MHSS & NGOs to coordinate measures.	M
• Traffic due to construction activities	Road safety	Additional traffic carrying construction materials through the town	L	H	T/H	Lüderitz town centre is very close to the harbour	Keep LTC & NamPol traffic department informed of activities. Include awareness of road safety in tender documents.	M

Table 19: Potential environmental aspects and impacts associated with the proposed activities & facilities for the operational phase.

Proposed Operation Activities	Aspect (Effect)	Potential Environmental Impact	Extent	Probability	Type / Magnitude	Relevance of Potential Impact	Mitigation Measure	Significance with mitigation
Operational Area 1: Transport of zinc and lead concentrate from Aus to Lüderitz harbour								
<ul style="list-style-type: none"> Transporting zinc / lead concentrate from RPZC mine to Lüderitz using trucks 	<p>Increased number of heavy vehicles – Road Safety (negative)</p>	<p>About 15 additional 32t vehicles daily on National Road B4 from Aus to Lüderitz and through the town. (Potential to increase to 22 trucks per day). Cumulative impact of trucks for Skorpion, petroleum (~20) and liquid gas.</p>	R	H	P/M	<p>Lüderitz town centre is very close to the harbour and separating heavy traffic from pedestrians and local traffic is unavoidable.</p>	<p>Ensure implementation of a detailed safety code of conduct for transport contractor; to be closely monitored with penalties enforced if necessary.</p> <p>Notify NamPol traffic department and the public of transport schedule.</p> <p>Minimise trucks as per schedule during lunch hour and when school closes.</p> <p>Ensure there are procedures in place should the schedule be severely disrupted.</p> <p>Ensure the trucks keep their distance from one another, to allow other road users to pass safely.</p> <p>Ensure that emergency plans are in place, in event of an accident.</p> <p>RPZC commits to re-evaluate rail option once it is operational.</p>	L
	Reduced biodiversity	Increase in road kills involving wildlife	R	M	P/M	<p>Brown hyena, oryx, ostrich, wild horses cross the B4 with current accident rates are 20-25 road-kills.</p>	<p>Operations plan will avoid night driving</p> <p>Awareness training of truck drivers to wildlife hotspots and procedures to report & deal with accidents with wildlife.</p> <p>Tender documents will specify to fit warning whistles on trucks</p>	L
	Loss of Sense of Place in historic	Heavy traffic and parked trucks in town centre during	L	H	P/H	<p>Detrimental to residents and tourists' sense of place.</p>	<p>Specify in tender documents no parking and overnight staying of drivers in town</p>	M

Proposed Operation Activities	Aspect (Effect)	Potential Environmental Impact	Extent	Probability	Type / Magnitude	Relevance of Potential Impact	Mitigation Measure	Significance with mitigation
	part of town	day and night. Noise and fumes from trucks					centre. Specify in tender documents that road contractor must look into establishing a standing place for his trucks at entrance to Lüderitz.	
	Spillages onto road due to leakages at tarpaulin (negative)	Biodiversity (Flora) Soil contamination Pollution of surface water resources Burst tyres on verges	R	L	T / L	Spillages can accumulate and contaminate soil, plants and water courses on road verges.	Side tipper trucks are enclosed; therefore the potential for spillages only arises when the tarpaulins are not fitted correctly. Maintenance of side tipper units and tarpaulins to be carried out on a regular basis, as per preventative maintenance schedule Ensure that the route is regularly checked regarding spillages Clean-up procedures to be put in place Include procedure for picking up burst tyres.	L
• Transporting zinc / lead concentrate from Aus to Lüderitz via trucks	Road accidents (negative)	Contamination fauna, soil and water courses	L	L	T / M		Ensure that emergency plans are in place	L
	Loss of rail business for TransNamib (negative)	TransNamib will lose road/railway revenue of zinc and lead concentrate to Walvis Bay but it could win road contract to Lüderitz (tender process). Reduced employment in Aus for casual workers as transfer of goods from road to rail will cease.	R	H	P/M	Reduced work for train drivers and casuals in Aus who currently transfer load from road to rail.	The road haulage contractor (could be TransNamib), will increase number of jobs for road transport drivers by about 10 drivers. The road haulage contractor (could be TransNamib), will increase number of jobs for road transport drivers. If RPZC expands material to be transported will increase which will lead to increased	M

Proposed Operation Activities	Aspect (Effect)	Potential Environmental Impact	Extent	Probability	Type / Magnitude	Relevance of Potential Impact	Mitigation Measure	Significance with mitigation
							revenues and jobs	
	Deterioration of road surfaces on B4 & in Lüderitz town	Accidents avoiding potholes. Higher maintenance costs, especially on 600 – 700m gravel section.	R	H	P/M	Cumulative impact	None. LTC, not RPZC, is the owner of the road and is thus responsible. An alternative tar road is available but LTC have requested RPZC to use the gravel one.	M
	Vibrations caused by trucks	Damage to buildings	L	L	P/L	Cumulative impact	Suggest that property owners should monitor and propose alternative route if buildings show signs of damage	L
• Empty vehicles returning from Lüderitz harbour to RPZC mine	Contamination of tyres, truck walls. (negative)	Potential contamination of roads in Lüderitz Town	L	L	T / L	When trucks leave the storage shed fine zinc and lead concentrate is transferred to the harbour area and roads in Lüderitz Town. Could also lead to spillage into the sea during rain events.	Ensure that procedures are in place to clean all tyres and truck walls before leaving the storage shed, using brooms, not water.	L
Operational Area 2: Lüderitz storage facility								
• Discharge of zinc / lead concentrate from the side tipper trucks, stack and load containers within the shed with front-end loader.	Noise (noise from the front end loaders)	Increase in disturbing noise levels	n/a	n/a	n/a	The unloading of trucks will occur within the enclosed storage shed.	Ensure that all employees wear correct PPE and adhere to the health procedures, e.g. no food intake in the storage shed. Ensure doors are shut as soon as a vehicle has entered/left the shed.	L
	Dust generation (negative)	Increase in dust levels	L	L	T / L	Concentrate is moist so no dust is generated. Only a PPE issue as off-loading will occur within the enclosed storage shed.		
	Smell (negative)	Increase in sulphide smell	L	L	T/L	Sample concentrate had a sulphide odour which is not hazardous but unpleasant.		
• Water usage	Surface water	Pollution of surface water	L	L	T /	Potential run-off of zinc and lead	Shed design includes a concrete floor and	L

Proposed Operation Activities	Aspect (Effect)	Potential Environmental Impact	Extent	Probability	Type / Magnitude	Relevance of Potential Impact	Mitigation Measure	Significance with mitigation
in storage shed	run-off (negative)	resources and run off into the harbour			L	concentrate into the adjacent area and into the sea.	underneath lining to avoid rising moisture and seepage. Shed design is such that no contaminated run-off water will run off from shed area into harbour	
	Seepage into groundwater (negative)	Contamination of groundwater resources (seawater)	n/a	n/a	n/a	Not applicable. The land was reclaimed (compacted fill and liners), therefore seawater is the equivalent to groundwater. It is unlikely for any seepage to occur.	n/a	
• All proposed infrastructure	Visual	Negative visual impacts	L	H	P/M	The view from the Department of Fisheries building on the original shoreline will be somewhat obscured but they can still look over the shed. View from the town towards the historic Fisheries building (the old hospital)	Unavoidable. Shed design has a curved roof and neutral colour scheme to help blend in with the surroundings.	M
Operational Area 3: Loading of ships								
• Ship-loading via 90 degree revolving containers	Noise (negative)	Increase in disturbing noise levels	L	M	T / L	Loading of ships will only occur for max. Of 96 hrs approximately 12 - 18 times per annum. Cumulative impact of harbour activities but they are however located away from the residential areas.	Ensure the equipment is well maintained to prevent noise generation.	L
	Dust generation (negative)	Increase in dust levels	L	M	T / L	The zinc and lead concentrate has 5 – 8% water content and thus there is little fine dust.	The equipment designed to prevent dust generation and spillage.	L

Proposed Operation Activities	Aspect (Effect)	Potential Environmental Impact	Extent	Probability	Type / Magnitude	Relevance of Potential Impact	Mitigation Measure	Significance with mitigation
	Zinc and lead concentrate spillage – into the sea (negative)	Impact on marine environment	L	L	T / L	<p>During the loading process zinc and lead concentrate spills into the sea will only occur during an accident, e.g. container not correctly secured on the crane.</p> <p>Zinc and lead concentrate is insoluble in water and its metal content has low direct bioavailability.</p>	<p>Ensure that loading procedure is followed.</p> <p>Ensure that emergency procedures are in place.</p>	L
	Zinc and lead concentrate spillage – onto fish produce (negative)	Economic impact on fishing industry	L	L	T/L	<p>During the loading process zinc and lead concentrate spills are highly unlikely as transport in enclosed containers from the shed to the ship.</p>	<p>RPZC will commit to compensation, if proven that contamination was due to RPZC material, by a thorough investigation by a competent independent third party. RPZC will only pay for the cost of such an investigation in the event that contamination was caused by RPZC material. In the event that investigation shows that contamination was not due to RPZC material the other party has to pay for the cost of the investigation.</p>	L
	Zinc and lead concentrate loading	Zinc and lead concentrate loading prevents fishing vessels from unloading their perishable products – economic loss	L	L	T/L	<p>Access to the harbour quays is essential for the fishing economy.</p>	<p>Namport has committed to meet the needs of all users (it is a port management issue rather than for RPZC).</p> <p>RPZC should notify all harbour users of its loading dates, in advance.</p> <p>RPZC will minimise moving the loading ship along the quay and disrupting other port users.</p> <p>The new loading via containers allows the consigned ship to dock at any berth. The</p>	L

Proposed Operation Activities	Aspect (Effect)	Potential Environmental Impact	Extent	Probability	Type / Magnitude	Relevance of Potential Impact	Mitigation Measure	Significance with mitigation
							restriction using the conveyor belt has been eliminated.	
Operational Area 2 and 3								
<ul style="list-style-type: none"> General waste management 	Waste not disposed of correctly (negative)	Emissions to land and the sea Nuisance impacts	L	L	P / L	Namport is ISO14001 (Environmental Management System) certified and all contractors have to adhere to the ISO14001 standards when working within the harbour. However, the construction waste can cause impacts if not properly managed.	Ensure that all storage shed operators adhere to the waste management procedures within Lüderitz Harbour.	L
<ul style="list-style-type: none"> Employment creation at harbour 	Socio-economic (Positive)	Approximately 5 additional permanent job positions created for the contractor which will handle operations. Probably operators, clerk & supervisor. 2-3 ad hoc jobs during ship loading (contracted out).	L	H	P/ H+	Employment opportunities are good as unemployment is high	Selection preference to people from Lüderitz, the Karas Region and who are Namibian, if same skills & qualifications are available or if skills can be acquired through a minimum three month training programme.	H+
<ul style="list-style-type: none"> Purchase of Namibian goods and services 	Economic (Positive)	Small contribution to GDP, increase in government tax revenue and to the local economy. Extra revenue for Namport.	L	H	P/ M+	Operating company, truck drivers, ship crew, consultants & RPZC personnel will spend money while in Lüderitz during ship loading, audits, visits etc. Local companies doing maintenance of shed and containers .	Give tender preference to contractors who are Namibian and contract to buy Namibian goods and services wherever possible.	M+

11.3 Discussion/assessment of relevant aspects & impacts

11.3.1 Construction phase

With reference to **Table 18**, the relevant environmental aspects during construction relate to noise, dust and other emissions, hydrocarbon-, concrete- and paint spillages and waste management. Due to the fact that it will not be a very big construction project, the potential to cause significant impacts during construction is unlikely. The environmental risk associated with the construction phase is therefore low to medium. However, these aspects need to be managed carefully through the implementation of an Environment Management Plan (EMP) to be developed as part of the EIA. This will ensure that any of the potential impacts are avoided or minimised.

Short term employment opportunities of 20 – 30 jobs will be created in Lüderitz for about 6 months which have further positive economic benefits as the temporary workforce spends earnings in the town. These impacts can be enhanced by contracting a local construction company or by employing local residents if suitable skills are available in Lüderitz or the Karas Region. RPZC already has a policy which gives tender points to local companies. This will also reduce health risks from bringing in temporary male construction workers without their families. Nevertheless, RPZC should ensure that all contractors must have an HIV /AIDS policy and workplace programme and must provide proof of implementation with all invoicing. RPZC should keep LTC & NamPol traffic department informed of activities.

11.3.2 Operational Area 1: Transport of zinc and lead concentrate from Aus to Lüderitz harbour

The transport of zinc and lead concentrate will increase the number of heavy vehicles on the tarred B4 from Aus to Lüderitz and through the town. The risk of environmental impacts is small and includes accidental spillage due to road accidents and road kills of wildlife. These potential impacts have to be addressed by the transport company, which should have emergency plans in place for such an eventuality.

The 15-22 trucks through the town will add to the cumulative negative impact of haulage trucks carrying Skorpion goods, petroleum and in future liquidised gas. Residents and businesses are concerned about the increased loss of Sense of Place due to noise, congestion and vibrations that additional heavy traffic brings.

There will be a potential increase in road deterioration and potholes which will have an added road maintenance cost to the Roads Authority which will be partly offset by the vehicle licensing.

A negative socio-economic aspect of the proposed project will be that TransNamib would lose the road/railway revenue of transporting zinc and lead concentrate to Walvis Bay which is about N\$43mil per year, which would negatively affect the amount of work for train drivers and other rail workers. It would substantially reduce work available for TransNamib casual workers in Aus who currently handle the zinc and lead concentrate transfer from road to rail at Aus, however, the transfer of Skorpion Zinc loads will continue at Aus. (TransNamib currently employs 58 permanent & 25 casuals in Aus). On the other hand, TransNamib could win the road haulage contract to Lüderitz (a tender process) which is estimated at N\$27 mil per year and would increase the number of jobs for road transport drivers. Exporting via Lüderitz harbour will take some pressure off the harbour in Walvis Bay where land and docking facilities are in extremely high demand.

11.3.3 Operational Areas 2 and 3: Lüderitz storage facility and loading of ships

With reference to **Table 19**, the relevant environmental aspects during operations relate to management of the storage shed and loading of ship consignments. All ships used to transport zinc and lead concentrate will meet international safety standards.

All activities within the storage shed take place in an enclosed environment, hence it is important to implement all safety aspects mentioned in the MSDS (**Appendix J and K**) for the construction of the shed, as well as to implement the correct Protective Personnel Equipment (PPE). No water will be used in the shed for operational purposes, only for office and ablutions. Nevertheless, a closed drainage system around the shed collecting any runoff water from the shed needs to be in place. The contaminated water needs to be collected in a designated tank and treated accordingly.

Loading of ships will be carried out using specially designed sealed revolving containers with a specially designed spreader attachment system fitted to the mobile harbour crane which will load the zinc and lead concentrate onto the ships. As the zinc and lead concentrate has a water content of 5 – 8 % the occurrence of fine dust is insignificant. The containers are sealed and only open within the ship compartment, no spillage should occur. During loading of the ship water sprayers will be installed within the compartment to contain all potential fine dust. Nevertheless, an emergency procedure for spillages during loading needs to be in place.

Visual, noise and smell impacts will be minimal, as the storage will take place in an enclosed shed, while loading of ships will occur approximately 12– 18times a year for approximately 72 hours.

Positive socio-economic impacts relate to the five direct additional jobs - operators, clerk & supervisor- and any related increase in local business and service activities generated directly and indirectly by the project. The small increase in job opportunities at the harbour and for the road haulage company will partly compensate for the loss of casual work in Aus. However, alternative job opportunities are fewer in Aus than in Lüderitz. For all jobs during construction and operations, preference will be given to local people if they have the same skills and qualifications or if the skills can be acquired through a short training programme such as for three months.

12 CONCLUSION

No fatal flaw has been identified. The cumulative impact of 15 – 22 additional trucks driving through Lüderitz town centre per day is unavoidable as there is no alternative access to the port. Based on the findings of the environmental risk assessment, all the identified potential environmental impacts associated with the proposed construction and operations can be managed and reduced if the proposed mitigation measures are implemented. However, it is important that emergency plans during transporting, offloading and handling are in place.

The main changes in the amendment EIA / EMP are:

- Confirmed use of 32t to 36t side tipper trucks to transport the ore concentrate from RPZC mine to Lüderitz harbour;
- Configuration of shed with 6 containers stacked outside when not in use;
- Ship loading via 90 degree revolving containers;
- Ship does not need dedicated berth, which will accommodate the concerns raised in the original EIA by other harbour users.
- An increase of loading time to 96h from 72h (first amendment report) and from 48h (initial report).
- The containers can still being used via the ships gear during breakdown of the mobile harbour crane, thus ensuring that operations continue and reducing the time the vessel stays in the harbour. The ship gear using 4 x chain slings will lift the containers into the vessel where 2 x chain sling will disengage as the container is rested on the bottom of the

vessel. Lifting of the container via only 2 x slings will result in a 90° rotation of the container and the material is discharged similar to the 90° rotating loading system attachment on the mobile harbour crane.

- The load per container is higher which will result in higher loading rates for the vessel, minimizing the time the vessel is in the harbour.

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