

UPDATED ENVIRONMENTAL MANAGEMENT PLAN (EMP)

EIA FOR MANICA'S STORAGE, TRANSPORTATION AND
HANDLING OF CHEMICALS IN THE VARIOUS MANICA
WAREHOUSES.

APRIL 2023

EXPERTISE AND DECLARATION OF INDEPENDENCE

CONSULTANT'S EXPERTISE

I.N.K Enviro Consultants cc is the independent firm of consultants that has been appointed by the Manica Group Namibia (Pty) Ltd to undertake the environmental impact assessment process.

Immanuel N. Katali, the EIA Lead Practitioner holds a B.Arts (Honors) in Geography, Environmental Studies and Sociology and has over six years of relevant experience in conducting/managing Environmental Impact Assessments (EIAs), Socio-Economic Impact Assessments (SIA) and compiling Environmental Management Plans (EMPs) in Namibia. Immanuel is certified as an environmental practitioner under the Environmental Assessment Professionals Association of Namibia (EAPAN).

DECLARATION OF INDEPENDENCE AND DISCLAIMER

The consultant herewith declare that this report represents an independent, objective assessment of the environmental impacts associated with the amendment activities of the proposed storage of chemicals, reagents and copper concentrates.

I.N.K has prepared this report based on an agreed scope of work and acts in all professional matters as an independent environmental consultant to Manica (Pty) Ltd and exercises all reasonable skill and care in the provision of its professional services in a manner consistent with the level of care and expertise exercised by members of the environmental profession.

I.N.K does not express an opinion as to the accuracy or completeness of the information provided, the assumptions made by the parties that provided the information or any conclusions reached. I.N.K has based this Report on information received or obtained, on the basis that such information is accurate and, where it is represented to I.N.K as such, complete.

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LIST OF ACRONYMS, ABBREVIATIONS AND UNITS

DEA	Department of Environmental Affairs
ECC	Environmental Clearance Certificate
EIA	Environmental Impact Assessment
EMA	Environmental Management Act
EMP	Environmental Management Plan
I.N.K	I.N.K Enviro Consultants cc
MEFT	Ministry of Environment, Forestry and Tourism

1 INTRODUCTION

1.1 Introduction to the Proposed Project

Manica Group Namibia (Pty) Ltd (herein after referred to as Manica) currently transports chemicals and reagents from the port, where it is off-loaded from the ships, to Manica's existing Manica Logistics Centre (MLC) Warehouse, Rennies Container Depot, Rennies Warehouse and Protea Shed and vice-versa.

Manica have an approved Environmental Clearance Certificate to handle a variety of commodities whose renewal was issued in April 2020 and valid until April 2023. Manica therefore submits an ECC Renewal application to the MEFT for a decision in terms of the Environmental Management Act, 7 of 2007 and associated EIA Regulations.

An EIA amendment based on the renewed ECC was submitted in May 2021 and approval granted in October 2021. A separate amendment was further approved by MEFT in November 2023 for the inclusion of Zinc, Nickel, Chrome and Coal concentrate in bulk and breakbulk form (breakbulk refers to 1 - 2 ton sling bags or any other industry best practice, unitised packaging and the inclusion of Cobalt concentrate in breakbulk form.

I.N.K Enviro Consultants cc has been appointed by Manica as the independent Environmental Assessment Practitioner based in Namibia to undertake the EIA Amendment process.

1.2 Details of the persons who compiled this updated EMP

I.N.K Enviro Consultants cc is the independent firm of environmental consultants that has been appointed by Manica to compile the updated EMP.

Immanuel N. Katali, the EIA project manager and lead practitioner holds a B.Arts (Honours) Degree in Geography, Environmental Studies and Sociology and has over seven years of relevant experience in conducting/managing EIAs, compiling EMPs and Socio-Economic Studies. Immanuel is certified as an environmental practitioner under the Environmental Assessment Professionals Association of Namibia (EAPAN).



Figure 2: Location of the Manica Storage Facilities in the Walvis Bay Context

1.3 SHIP OFF-LOADING AND TRANSFER OF REAGENTS AND CHEMICALS

The reagents and chemicals will arrive on the ships (at the relevant bulk handling facilities' berth) in either break bulk or in containers (or in the case of sulphur bagged and later bulk).

The reagents will be off-loaded from the ship and transferred to the Manica facilities as follows:

- In break-bulk from ship

With the exception of the bulk sulphur described below (in bulk from ship), all of the reagents and chemicals will either be stored in containers or in one ton bags (or fourteen ton bags for the Sulphur)¹ that will be off-loaded from the ships with cranes onto the quay side containers will be transported and placed into stacks by Namport. All bagged and containerised reagents will be transported with flatbed trucks to the Manica facilities where they will be off-loaded from the trucks with forklifts or Reach Stackers for temporary storage prior to be transported to the Husab Mine Site and various companies/clients.

- In bulk from ship

Initially, prilled sulphur, in the form of small pellets approximately 4 - 5mm in diameter, will arrive on ship in one-ton bags and offloaded from ship via on-board crane on the quay side and then loaded onto flatbed trucks for transportation to the Manica facilities (break-bulk from ship).

In year 2-3 the bulk sulphur, in the form of small pellets approximately 4 - 5mm in diameter, will be bagged inside the port on the quay side as it gets offloaded from the ship. This will be carried out using a modified "Grab and Hopper Discharge System".

- In containers from ship

The reagents/chemicals that will be stored in containers will be off-loaded from the ships with cranes onto Namport haul trucks after which containers will be placed into a container stack. Containers will be loaded to trucks and transported to the Manica storage facilities where the reagents will be unpacked with forklifts for storage. Most of the reagents will be bagged while some will arrive in 1 m³ intermediate bulk container (IBCs) (flow bins) and pallet boxes.

The movement of the trucks from the discharge berth to the Manica storage facilities will occur periodically whenever a shipment arrives in the port.

The trucks from the discharge berth (and back) will follow the main road through the port area and port exit. Two different route options will be utilised depending on destination and the time of day:

1.4 TRANSFER OF REAGENTS AND CHEMICALS TO THE VARIOUS COMPANIES/CLIENTS

All bagged reagents and chemicals will be loaded onto interlink flatbed trucks by forklifts or cranes and transported to the various companies/clients as and when required. Interlink flatbed trucks will be used for the transport from the Manica facilities to the respective clients. The Grinding Media will however (most likely) be transported by a side tipper truck or in containers.

1.4.1 Specification and other information of the modified grab and hopper discharge system for the bulk sulphur to be bagged on the quay side

The grab will be designed specifically for the discharging of sulphur only. The unique characteristics of the grab will be considered at length and particular attention will be paid to the following areas:

Component	Recommended Specification
Bucket volume	16 m ³ .
Bucket closing	A slightly heavier than normal grab for increased closing forces will ensure that the grab closes tightly every time.
Bucket sealing	will be ensured by the unique combination of an underhanging bottom lip and side bucket seals
Clamshell bucket	Totally enclosed clamshell bucket so that the product cannot be blown off the top of the grab.
Entrapment areas	particular attention will be paid to the shape and finish of the bucket and its superstructure. It will have smooth surfaces with no sharp edges or ledges to collect sulphur on the outside of the grab.

Paint	Low friction paint to be used on the bucket to further reduce chances of carrying cargo on the outside of the grab.
Touch down opening	The grab will have to be rested in the specially designed hopper before it will open. This will ensure a gentle release of cargo and will eliminate dust.
Adjustable opening speed:	The bucket opening speed can be adjusted to ensure the optimal opening time for dust prevention.
Bucket Seals	Robust and durable construction will ensure alignment of bucket seals for the life span of the grab.

1.4.2 Specification and other information of the new/additional grab and hopper discharge system for the bulk sulphur to be bagged on the quay side

The grab will be designed specifically for the discharging of sulphur only (and taking into consideration, the future amendment to include fertilizer, wheat and maize). The unique characteristics of the grab will be considered at length and particular attention will be paid to the following areas:

Component	Recommended Specification
Bucket volume	5 m3.
Bucket closing	A slightly heavier than normal grab for increased closing forces will ensure that the grab closes tightly every time.
Bucket sealing	It will be ensured by the unique combination of an underhanging bottom lip and side bucket seals
Clamshell bucket	Totally enclosed clamshell bucket so that the product cannot be blown off the top of the grab.
Entrapment areas	Particular attention will be paid to the shape and finish of the bucket and its superstructure. It will have smooth surfaces with no sharp edges or ledges to collect sulphur on the outside of the grab.

Paint	Low friction paint to be used on the bucket to further reduce chances of carrying cargo on the outside of the grab.
Remote control opening	The grab will have to be rested in the specially designed hopper before it will open. This will ensure a gentle release of cargo and will eliminate dust.
Touch down opening	The grab will have to be rested in the specially designed hopper before it will open. This will ensure a gentle release of cargo and will eliminate dust.
Adjustable opening speed:	The bucket opening speed can be adjusted to ensure the optimal opening time for dust prevention.
Bucket Seals	Robust and durable construction will ensure alignment of bucket seals for the life span of the grab and fitted with hydraulically dampened opening mechanism to ensure no spillage.
Adjustable opening speed using remote control	The bucket opening speed can be adjusted to ensure the optimal opening time for dust prevention.

By designing and building the hoppers as one system, the grab can be used as a ‘plug’ to prevent the escape of dust when the product flows into the hopper. Instead of landing the grab on heavy rails located near the top of the hopper the rails are eliminated and the sides of the hopper are suitably strengthened and rubber lined so that when the grab lands in the hopper it fits snugly and seals the void below.

Air will be displaced when the grab is opened but the gate valve used will be airtight and special vents will channel the air in a controlled manner to exhaust outlets located below the dust suppression foggers. This, in conjunction with the high sided windshields, dust suppression foggers (sprinklers), retractable outlet chute and enclosed discharge area will ensure that dust will be eliminated. Specifications include:

Specifications to Eliminate Dust

Spillage guards/wind deflectors will be fitted around the top edge of the hopper to ensure that the grab opens in a controlled environment.

Dust suppression mist curtain: the grab will drop below this mist curtain before it opens. The mist is essentially a fog which will not wet the grab and cause particles to stick to the outside.

Hopper/grab fit: this will form a plug in the hopper beneath which the grab will discharge its contents.

Heavy duty rubber landing pad will ensure a good seal between grab and hopper and also eliminate the risk of fire due to any friction between the grab and hopper.

Vents below the grab will exhaust displaced air in a controlled manner and release it back into the top of the hopper.

Hydraulically operated gate outlet valve will ensure an airtight seal below the grab.

Hopper outlet chute will lower the product in an enclosed and controlled manner into the bag and prevent dust from falling cargo.

The bag has a sleeve which will have a tight fit onto the outlet of the hopper to prevent spillage.

A weighing system will be fitted to prevent over filling of the bags and avoid spillage.

2 MANAGEMENT AND MITIGATION MEASURES

The measures required to manage and/or mitigate the potential impacts are detailed in this section. Only the operational phase is addressed below, as no construction is required (except for certain modifications required as presented in the risk assessment, also covered in the section below); and the activities and impacts associated with the decommissioning phase are not relevant as the Manica facilities will not be decommissioned upon termination of the contract with Swakop Uranium and the various companies/clients.

2.1 Operations phase

2.1.1 Traffic – inside and outside the port

The project will generate two main streams of traffic during operations as follows:

1. The movement of trucks from the discharge berth to the Manica storage facilities during offloading of a shipment. This movement will occur periodically whenever a shipment arrives in the port.
2. The daily movement of trucks from the Manica facilities to various companies/clients. This movement will occur throughout the year.

The primary areas of potential conflict identified caused by additional project generated traffic were identified and are listed below:

1. At the 3rd street intersection with Anna Mupetami road (18th Street), the right turn movement of heavy vehicles into Anna Mupetami road. Traffic moving across Anna Mupetami road towards and from the Rennies Container Terminal was also identified as a possible conflict zone, although these traffic flows are generally low.
2. The right turn movement of heavy vehicles from the C28 (D1984) onto the B2.

2.1.2 Access roads to various warehouse locations

Consideration had been given to the possibility that offloading and transportation of chemicals may be taking place after-hours.

Lighting condition throughout the immediate is very good and does not impede the movement of vehicles from within the Port's area and the immediate surrounding area. However, extremely thick mist, which is typical of Walvis Bay, makes road visibility towards the outskirts leading to the Protea shed very difficult. This should be born in mind in the event of chemicals being conveyed after-hours to the Protea Shed.

The following measures are required with regard to the management of Transportation and receipt of chemicals to given warehouses and the Namport open area (traffic-related impacts):

- Proper care should be taken when crossings railways in the vicinity of the site.

- All drivers must adhere to the speed limit of Namport, while travelling inside the port.
- Ensure implementation of a detailed safety code of conduct for transport contractor; to be closely monitored with penalties enforced if necessary.
- Ensure the trucks keep their distance from one another, to allow other road users to pass safely.
- Install tracking devices in trucks to monitor speed and location.
- Ensure that an Emergency Response Plan is in place, in event of an accident. The Manica Emergency Response Procedure (OHS-P-001) outlines what must be done in the event of an accident.
- Assisting in road safety campaigns during December holidays.
- Scheduling of trips to the mine to miss the peak hour traffic in Anna Mupetami Street.
- MSDS obtained prior to purchase/order of chemicals
- Risk assessment of area where chemicals are delivered
- Training provided for workers who receive chemical deliveries
- Rationalizing chemical storage to ensure:
 - accepting adequate quantities
 - compatibility of chemicals
 - adequate storage facilities and space available
 - all required signage and PPE are available
- Proper sign-off strategies for chemicals received, as well as condition in which received
- Safe delivery areas and equipment for offloading chemicals
- Chemical training for workers
- Use personal protective equipment as described in the MSDS
- Local induction and emergency training
- Emergency procedures in place
- Spill kits available
- First aid kits and trained first aiders/safety representatives

The following measures are not specifically for the various companies/clients/Manica to implement as it is the responsibility of the Roads Authority/Walvis Bay Municipality. However, the various companies/clients/Manica must engage with the Roads Authority or Walvis Bay Municipality to inform them about the project and the importance of implementing these measures.

- Upgrading of the Anna Mupetami/3rd Street intersection to a signalized intersection.
- Based on limited information available and taking into consideration the economic importance of the C28 route it is our opinion that upgrading of the route to bitumen standards will be feasible in the long term due to decreased road user and maintenance costs.

2.1.3 Storage and handling of reagents and chemicals: Third party health and safety - health and safety impacts and fire and explosion risks

With reference to Scoping (with assessment) Report, the hazardous chemicals/reagents that were assessed are:

- Pyrolusite (Manganese dioxide)
- Extractant
- Modifier
- Sodium Hydroxide
- Diatomaceous Earth
- Ferrous Sulphate
- Sulphur
- Lime
- Urea
- Limestone Ammonium Nitrate
- Mono Ammonium Phosphate
- Nitrogen
- Phosphorous
- Potassium
- Potassium Chloride
- Potassium Sulphate
- Calcium Ammonium Nitrate
- Lubricants
- Zinc
- Nickel
- Coal
- Chrome
- Copper

The following scenarios could lead to hazardous reagents/chemicals being released (spilled), potentially impacting third parties health and safety:

1. A bag or container being dropped or damaged on the quay side during ship-offloading and breaking open (or in the case of bulk sulphur being off-loaded by the modified grab and hopper – the volume of the grab bucket released).
2. A damaged bag(s) or Intermediate Bulk Container (IBC) spilling its content along the route while being transported between the port and the Manica Facilities

3. A bag or container being dropped or damaged during off-loading at the Manica facilities.
4. A bag, IBC or pallet box being damaged by the forklift or the sun if stored under direct sunlight for long periods at the facility.

In the very unlikely event of a (large) fire, it shall be assumed that more than one reagent is burning and that the packing material will most likely be involved in the fire. A fire is not a controlled chemical reaction (especially with a variety of reagents and chemicals and packing material); therefore, the release of toxic, corrosive combustion gases, vapours and dusts is likely.

The risk of fires or explosions during handling and transport of the reagents and chemicals is very low (especially considering that the two flammable liquids would have a flash point of app. 100°C) as long as the containers are in an undamaged state, have not been exposed due to damage to the containers by to excessive UV-radiation (sun) and the shelf life of the chemical is not expired. The flammable reagents and chemicals will only ignite if the containers have been damaged and there are sparks or heat created (mechanical or electrical) in the vicinity of the reagents and chemicals.

The following reagents/chemicals pose a fire risk:

- Extractant
- Modifier
- Sulphur
- Phosphorous
- Potassium
- Calcium Ammonium Nitrate
- Zinc
- Cobalt
- Nickel

The following chemical/reagents are not flammable. The risks were highlighted and relevant management and mitigation measures are stipulated below:

- Ferrous sulphate - in case of a surrounding fire there is a risk of thermal decomposition, for temperatures above 600°C, this may release toxic and corrosives oxides of sulphur (sulphur trioxide).
- Pyrolusite enhances combustion of other substances. It decomposes at temperatures of above 553°C resulting in manganese(III)oxide and oxygen, which further increases the fire hazard.
- Urea - Store away from Oxidizing agents Hypochlorites, Sodium nitrate. Keep in cool, dry ventilated area. Tightly closed containers.
- Limestone Ammonium Nitrate - Store away from Sulphur, urea, combustible materials, acids, hydrocarbons. Keep away from heat/ignition sources. Tightly closed containers. Cool, dry well-ventilated storage.

- Mono-Ammonium Phosphate - Store away from alkalis and caustic materials, copper and its alloy, acids. Keep in tightly closed containers. Cool, dry well-ventilated storage. Protect from moisture.
- Nitrogen - Keep away from heat/sunlight
- Lubricants - Store away from heat/ignition sources. Keep away from combustible materials.
- Chrome - Not listed as a hazardous material and does not exhibit any characteristics of hazardous materials, including toxicity, according to OSHA 29 CFT 1910.1200. Chromite is fairly inert and is a common agricultural product and does not present any hazard to environmental pollution in its natural form.

This section details management measures pertaining not only to the hazardous reagents and chemicals, but all of the reagents and chemicals proposed to be handled and stored by Manica at their facilities.

2.1.3.1 Management measures relating to all reagents and chemicals (but more specifically the hazardous reagents/chemicals) to be handled and stored

- Regular housekeeping and safety inspections/audits to be conducted by management personnel to ensure continuous compliance with safe operating procedures and safety standards.
- “Firewatch” staff will be identified and trained.
- Full building Inspections will be carried out by Safety Reps as part of a monthly program. Daily walk-rounds must be carried out to identify any potential issues
- The reagents and chemicals shall only be stored in original containers being undamaged and sealed.
- Containers, bags, etc. must be handled carefully and stored accordingly to the manufacturer’s specifications.
- Damaged containers, bags, etc. shall be sealed/repared immediately with appropriate material.
- Broken/damaged bags must be correctly handled & repaired to avoid contamination of the road and other third parties’ facilities.
- A Standard Operating Procedure (SOP) must be developed for bag and container handling.
- After truck discharge, bags must be inspected to ensure they are not damaged in transit to site and no reagents/chemicals have or will be released.
- The storage of hazardous substances indoors (MLC Warehouse) will be carried out in well ventilated, cool and dry.
- Should deterioration of bags occur due to UV light or any other cause, the bags shall be sealed/repared immediately with appropriate material.

- Storage shall be carried out in facilities with appropriate bunding, specifically relating to the liquids.
- Ensure systems are in place to maintain stringent housekeeping standards.
- Employees must receive initial training prior to commencing work with hazardous substances and be adequately supervised until they are trained and found competent.
- Provide annually rigorous re-fresher safety training to employees to ensure that they remain familiar with the dangers associated with the various hazardous chemicals and reagents. In-house training program being developed for employees.
- Manica, various companies/clients will arrange insurance policies with adequate cover to protect third parties against incidents for which Manica, Swakop Uranium and/or various companies/clients is legally liable and such policies will be in line with best practice for Namibian mining/ processing/ and exporting companies.
- Keep the various companies/clients chemicals/reagents away from the other products being stored in the MLC warehouse to avoid any contamination. (refer to specific hazardous substance storage prohibitions below).
- The off-loading area at the Rennies Container Terminal should have a wall or other type wind-screen (with minimum height of 6 feet) between them and the neighboring facilities. This will act as a wind-break reducing the potential for material to be entrained and blown outside of the facility boundary.
- Temporary wind screens should be stored on site to be placed around a spill to further reduce the wind speeds and reduce the potential for wind-blown material in the event of a spill.
- Ensure controls are in place, such as, but not limited to:
 - regular inspection is undertaken of NamPort lifting gear on quayside;
 - correct inspection of bags prior to filling by dockside personnel is undertaken;
 - there are suitable off-loading procedures;
 - there is control of ignition sources on quayside during unloading of sulphur.
- Manica to undertake an audit of transportation operations to ensure that proper controls are in place.
- A sprinkler system / deluge system must be installed. It is at the discretion of the client whether or not to install a live connection to the police / fire services, but the important aspect is that a fire / smoke can be detected by the system and any fires put out.
- Manica to ensure that there is segregation of incompatible materials (further details to follow in sections 2.1.2.1 to 2.1.2.12).

- Manica to ensure an offsite emergency plan is generated with relevant emergency responders.
- Manica to ensure an onsite emergency plan is generated.
- Clear channels of communication must be opened between Manica and the various Municipal Departments responsible for the health and safety of the residents of Walvis Bay. The Emergency Response Plans and Risks Assessments must complement and correlate with the existing Municipal plans and structures.
- No foodstuffs will be stored within this facility.

2.1.3.2 Additional Management Measures for the Handling, Storage and Disposal of Chemicals and Reagents

Storage

- Risk assessments to determine appropriate storage arrangements and packaging requirements
- Use of chemical segregation:
 - chemical bunds
 - lockable cages
 - drip trays
- Ensure incompatible chemicals stored at different facilities
- Cool, dry, well ventilated storage facilities
- Wherever possible, chemicals stored in their original containers/packaging. Where this is not appropriate a risk assessment is undertaken to ensure correct packaging and labelling
- Hazchem signage where required
- Time sensitive chemicals dated and monitored through scheduled workplace inspections
- Use personal protective equipment described in the MSDS
- Training for workers responsible for storing and accessing chemicals
- Access to chemical storage restricted to authorized workers only
- Local induction and emergency training
- Emergency procedures in place
- Spill kits available
- First aid kits and trained first aiders/safety representatives
- Appropriate fire extinguishers available

Handling

- Risk assessments to determine chemical properties and appropriate handling arrangements
- Compatible equipment used with chemicals
- Adequate ventilation

- Chemicals in small sized containers to reduce weight
- Chemicals labeled
- Use lifting aids and trolleys for larger items
- Use personal protective equipment described in the MSDS
- Training for workers using chemicals
- Access to chemical storage restricted to authorized workers only
- Adequate supervision with regards to level of training and experience
- Local induction and emergency training
- Emergency procedures in place
- Spill kits available
- Buddy system
- First aid kits and trained first aiders/safety representatives

Disposal

- Chemicals labeled and disposed of in appropriate containers
- Removed by EPA licensed contractor
- Risk assessment of area where chemicals are disposed
- Restricted access where appropriate
- Local induction and emergency training.
- Emergency procedures in place
- Spill kits available
- First aid kits and trained first aiders/safety representatives
- Appropriate drainage system

When considering upgrade of the fire detection and prevention measures in the warehouse, it is understood that sprinkler system is installed within part of the warehouse. It is possible that this can be utilised after inspection and maintenance to allow storage of the chemicals and substances most at risk from fire, or from which the most risk to the local population and environment can arise, within the section of the warehouse protected by the sprinkler system.

As mentioned above, a sprinkler or deluge system is required. A detailed assessment of the existing fire suppression system (sprinkler system) within the warehouse is required to determine whether it is capable of being made functional. If the existing sprinkler system is not functional the assessment is to determine what needs to be done to fix the existing system or if it cannot be fixed the assessment should define what will replace it. In either case, whether the existing system can be utilised or a new system installed, the fire detection and suppression system used must conform with international standards. Whether the existing sprinkler system can be utilized or a new system installed, the final fire detection and suppression system implemented must include an alarm system to warn workers in the

warehouse of the danger of the fire. Depending on the system to be implemented, the designer of the system must give consideration to the following (and other relevant) standards, as appropriate:

- ISO 6182 - parts 1 to 8 ('Automatic sprinkler systems')
- ISO 7240 - part 1 to 29 (Fire detection and alarm systems)
- ISO 12239 (smoke alarms)

In addition, it is necessary to ensure the segregation of incompatible chemicals within the warehouse (see further details below).

Table 1: Chemical Compatibility Table

CHEMICAL	Urea	LAN/CAN	MAP	Nitrogen	Phosphorus	Potassium	KCL/MOP	SOP	Lubricants	Copper Concentrate	Sulphur	Magnesium Nitrate	Caustic Soda	Copper	Flocculant
Future Chemicals															
Urea	Green														
Limestone/Calcium Ammonium Nitrate (LAN/CAN)	Red	Green													
Mono-Ammonium Phosphate (MAP)	Green	Red	Green												
Nitrogen	Green	Green	Green	Green											
Phosphorus	Green	Red	Green	Green	Green										
Potassium	Green	Green	Green	Green	Green	Green									
Potassium Chloride (KCL/MOP)	Green	Red	Green	Green	Green	Green	Green								
Potassium Sulphate (SOP)	Green	Red	Green	Green	Green	Green	Green	Green							
Lubricants	Green	Red	Red	Green	Red	Red	Red	Red	Green						
Copper Concentrate	Green	Green	Red	Green	Green	Green	Green	Green	Green	Green					
Current Chemicals (as observed)															
Sulphur	Red	Red	Red	Green	Red	Green	Red	Red	Green	Green	Green				
Magnesium Nitrate	Red	Green	Green	Green	Red	Red	Red	Green	Red	Green	Red	Green			
Caustic Soda	Green	Green	Red	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green		
Copper	Green	Green	Red	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	
Flocculant	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green

2.1.4 Soils

Should hydrocarbon leaks and spills occur (from vehicles and/or machinery) this could result in contamination of the site(s). The following measures will be implemented in order to manage this potential impact:

- All machinery and vehicles will be adequately maintained so as to prevent leaks and spills.
- Should any leaks and hydrocarbon spills occur, these will be contained and cleaned up immediately and disposed of at the Walvis Bay Hazardous waste facility.
- Carefully manage the storage and handling of hydrocarbons and other hazardous materials.
- Ensure that surface runoff is controlled and impacts on water resources are prevented.
- Spill kits will be readily available (i.e. in vehicles or close to transfer positions).

2.1.5 Water (surface and groundwater)

The measures presented in sections 2.1.2 and 2.1.3 are also relevant to this section, as impacts on groundwater and surface water (and the sea) could also be avoided/minimized.

The following measures will be implemented in order to manage the potential impacts associated with the storage of the reagents in the Rennies Container Terminal (i.e. outside area):

- The area in which the sulphur and pyrolusite will be stored will be bounded by bunding and will have an impermeable surface/liner.
- An additional measure would be to place the bags which are stored outside at the Rennies Container Terminal onto wooden pallets to raise them above the ground, to protect them from storm-water generated in the area.
- Weighted covers (tarpaulin or plastic sheeting) to be placed over the bags to prevent rainfall from falling onto the product and possible contact rainwater ponding below the bags after storms.
- Any spillage on site to be cleaned up as soon as seen, to prevent rainwater contact.

The following measures will be implemented in order to manage the potential impacts associated with the storage of the reagents in the MLC Warehouse:

- Ensure the roof and floor of warehouse are in sound condition. In terms of this, the section of the Warehouse Roof that is damaged, needs to be fixed. Furthermore, repairs to warehouse infrastructure, if leaks are found.

Storm-water protection measures should be investigated, with the initial investigation being a survey of levels at both sites with respect to the street level. If it is found that the floor level in the warehouse or the ground at the container site are less than 300 mm above the street level, plans should be made for the construction of a berm surrounding the site, to prevent inflow of storm-water generated in the

surrounding streets. In the Rennies Container Terminal a survey should be undertaken to identify if there are any high or low parts of the site, and if identified a policy should be implemented such that Swakop Uranium and the various companies/clients reagents products are only stored in the higher parts, to reduce the risk of product damage from storm-water generated on site during intense storms.

2.1.6 Biophysical environment

Under normal (operating) conditions there will be no release of any of the chemicals/reagents into the environment, as it will all be contained. During the off-loading from the ship; transportation to the Manica storage facilities; unpacking; storing; or loading onto interlink flatbed trucks, incidences or accidents may occur where some of the chemicals/regents are spilled. In all these incidences, the spilled reagents/chemicals could end up in the sea.

Management and mitigation measures (in additional to those presented in section 2.1.2 and 2.1.4):

- Clean-up procedures to be put in place.
- Ensure that the transport route is regularly checked for spillages.
- The area in which the sulphur and pyrolusite will be stored will be bounded by bunding and will have an impermeable surface/liner.
- Ensure that all staff operating on site receive training regarding the requirements of this EMP and the Manica Emergency Response Plan.

2.1.7 Socio economic impacts

Emissions from the operations could result in the contamination of the neighboring sites and their products, thereby impacting them economically. The management and mitigation measures in the preceding sections will be implemented in order to manage this risk.

2.1.8 Noise

In order to protect the amenity of the local residents some good site practice methods should be employed and are described below:

- Machinery would be subject to regular maintenance.

2.1.9 Air quality

Exhaust emissions, chemical and reagent emissions as well as dust generation could occur during the off-loading from the ships or during stacking in the warehouse or transport to and from the warehouse. Dust and emissions from the chemicals and reagents will be managed through the implementation of the management measures included in Section 2.1.2. Exhaust emissions and dust generated by vehicles on site will be managed as follows:

- Vehicles will be well maintained so as to minimise exhaust emissions.

2.1.10 Emergency Response

2.1.10.1 Emergency response tools and equipment

The placement of organograms at offices indicating the key responsible persons and actions to be followed in the event of emergency was generally found to be well implemented. However, recommendations are provided below to ensure emergency response procedures involving the offloading, transporting and storage of chemicals are carried out effectively.

Recommendations

- Ensure portable fire extinguishers and fire hose reels are distributed and placed throughout Manica's site.
- Ensure all fire equipment are in good condition and regularly serviced by external fire equipment maintenance company.
- Ensure emergency showers are available at most of the storage areas but provision of additional emergency showers pending the implementation of storage recommendations for the new list of chemicals, may be necessitated.
- Ensure symbolic safety signage and demarcation have an in-depth overview and should be effectively displayed at all locations.
- Ensure that, due to the lack of sufficient water supply for firefighting purposes, a small team of First Responder members should be provided with emergency response equipment. The First Responder Team and equipment should comprise the following most essential equipment and manpower:
 - Responder personnel: x 4 (Fire Fighting training and certification will be provided by Walvis Bay Fire Department)
 - Response trailer: 1
 - Portable fire pump: 1
 - Fire hoses: 23m x 45mm: 4
 - Fire nozzles c/w shut-off valve: 2
 - Foam Branch (Nozzle): 2
 - Foam, 25 L drums: 4
 - First Responders to be fitted with Acid/Fireproof overalls.
- That the available systems be utilised and made fully operational.

2.1.10.2 Emergency Response Communication

The effectiveness of emergency response was tested by ascertaining the duration of time taken to establish actual contact with the Walvis Bay Fire Department.

The result of this exercise was unsatisfactory as direct communication with the Fire Department was only established after 26 minutes.

Recommendations

- Ensure a flyer-type of list is provided by the Municipality of Walvis Bay to Manica which contains general contact numbers.

- Confirm and communicate role of Security Company in initiating Emergency Response and communicate formal policy to all employees. Provide company-own (with company Logo) emergency contact numbers at all offices for Emergency Services, Ambulance, Hospital etc.
- All key offices areas to conduct table-top exercises to ensure understanding of Emergency call-out procedures.
- That the respective EH&S Managers formally meet set-up a collective response strategy.

3 RESPONSIBILITIES

This section describes the roles and responsibilities for implementing the actions plans contained in this EMP.

3.1 Manica General Managers, Managers and Operations Managers

The General Managers, Managers and Operations Managers have overall responsibility for environmental management on the storage and handling of the chemicals and reagents and associated facilities and for ensuring this EMP is implemented. To assist them, Manica will have a Safety, Health and Environmental (SHE) Officer (i.e. responsible person) that will be dedicated to managing and monitoring the environmental issues associated with the activities.

3.2 SHE Responsible person(s)

The SHE Responsible Person will be responsible for assisting the General Managers, Managers and Operations Managers in all environmental issues, and specifically to ensure that the commitments as set out in this EMP are implemented

In addition to the above, the SHE Responsible Person is responsible for ensuring that all persons involved comply with this EMP.

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

- Regular inspections and auditing compliance to this EMP and any other relevant legal requirements e.g. permits, authorisations, conditions of the Environmental Clearance Certificate.
- Conduct environmental awareness training during induction training and on an ad hoc basis thereafter.
- Ensure compliance to this EMP and permits and authorisations issued to Manica by relevant authorities. Ensure responsibilities and target dates are developed for each one of the commitments in this EMP. This will be through one of the following mechanisms:
 - Design requirements; or
 - Specific work instructions and procedures; or
 - Action plans (as required by the Integrated Management System).
- Ensure that contractor staff is controlled through the implementation of appropriate security measures.
- Carefully manage the storage and handling of hydrocarbons and other hazardous materials.
- Monitor for excessive dust and noise and implement control measures if necessary.
- Implement a waste management strategy.

- Monitoring of maintenance equipment and machinery.
- Ensure the maintenance of hygienic conditions of sanitation facilities.
- Implement an environmental awareness plan.
- Installation of emergency plans (fire, evacuation etc.) and first-aid procedures.
- Control of traffic safety and road conditions.
- Ensure that surface runoff is controlled and impacts on water resources are prevented.

