ENVIRONMENTAL IMPACT ASSESSMENT AND ENVIRONMENTAL MANAGEMENT PLAN FOR
THE PROPOSED CONSTRUCTION AND OPERATION OF
AMMONIUM NITRATE EMULSION PLANT
AT WALVIS BAY, FARM 38,
ERONGO REGION
<table>
<thead>
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<th>DOCUMENT INFORMATION</th>
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<td><strong>Activity</strong></td>
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<tr>
<td><strong>Location</strong></td>
</tr>
</tbody>
</table>
| **Proponent**         | Native Storage Facility cc  
P.O. Box 80946 Walvis Bay |
| **Contact person**    | Mr. Thomas Jonas  
Mobile: +264 812 327 933  
Fax No: +264 886 517 450  
Email : thomasj@veya.com.na |
| **Author:** Jonas Heita, Environmental Practitioner  
**Tortoise Enviro-Consultants cc (TEC)**  
Registration: cc/2012/2523  
Vat number: 5728293015  
P.O. Box 35473, Kleine Kuppe, Windhoek  
Mobile 1: 081 253 7642  
Mobile 2: 081 256 7709  
Website: www.tec.com.na  
E-mail: info@tec.com.na |
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ABBREVIATIONS

DEA  Department of Environmental Affairs
EA   Environmental Assessment
EAP  Environmental Assessment Practitioner
ECC  Environmental Clearance Certificate
EIA  Environmental Impact Assessment
EMA  Environmental Management Act (Act No. 7 of 2007)
GPS  Global Positioning System
MET  Ministry of Environment and Tourism
AN   Ammonium Nitrate
ANE  Ammonium Nitrate Emulsion
ANS  Ammonium Nitrate Solution
ANFO Ammonium Nitrate Fuel Oil
NCM  Namibia Chamber Of Mines
NOISE New Oil Inversion System of Emulsification
NSF  Native Storage Facility
TEC  Tortoise Environmental Consultants
UN   United Nation
Executive Summary

Native Storage hereinafter referred to as the ‘proponent’ is a 100% owed Namibian company. In April 2017, the company was issued with an Environmental Clearance Certificate for storage facility of handling dangerous good situated on a leased portion of farm 38 belonging to Walvis Bay Municipality. The storage facility has been constructed and fully operational. The site is the preferred logistics storage facility in the region housing Ammonium Nitrate for international manufactures such as Orica.

The long term vision of the company is to manufacture mining explosives using inverse emulsification of Ammonium Nitrate technology. The company has successfully obtained another leasehold portion farm 38 adjacent to the storage plant. The two establishment shall be 800m apart due to recommended safety separation distance. Storage of materials shall thus be handled at the storage facility and supplied to the emulsion plant.

Widely, ammonium nitrate NH$_4$NO$_3$ (AN) is the precursor for industrial explosives due to its high oxidizing agent. The widely used one is ANFO (or Ammonium Nitrate /Fuel Oil) which consist of 94% porous AN and 6% fuel oil. Emulsion is achieved when aqueous solution of AN is mixed (emulsified) with fuel to produce ammonium nitrate emulsions (ANE). The raw material for the production of ANE includes, ammonium nitrate solution (ANS), diesel oil as the fuel blend ingredient, thiourea, urea, acetic acid, caustic soda, calcium nitrate, prilled solid ammonium nitrate and water. The proposed manufacturing of ANE would be achieved through a process called New Oil Inversion System of Emulsification (NOISE). The NOISE plant is literally a mobile plant made of 9 containers measuring 20ft placed on concrete slabs. ANE shall be manufactured by specialized mixing of the oxidizer solution, fuel blend and emulsifier. ANE becomes an explosive when mixed with other chemical, or triggers by spark, or exposed to excessive heat.
The identified impacts are as follows, and practical mitigation measures are provided in the EMP.

- Fire and Explosion Risk,
- Separation distances,
- Chemical Management,
- Waste Generation and,
- Health Risk.

The project has been welcomed by the Namibia Chamber of Mines as a precursor to the country’s Industrialization goal especially in the mining value chain. The project is secluded in the Namib Desert, where the site has one type of vegetation sparsely distributed and widely distributed in the Desert. Hence there is no significant impact on vegetation. The Namib Desert is home to many wildlife, big animals such as springboks are known to roam around the site. Although not spotted during site assessment, the company is advised to implement zero tolerance to poaching. The separation distance to the surrounding establishing are within the UN prescribed UN3375 code of practice for the storing and handling of dangerous good. Various safety measures from best practice has been recommended.

TEC believes that it has identified all environmental impact and hazards associated with the project and adequate and practical mitigation developed to ensure environmental protection and sustainability. Henceforth, TEC recommends to the Environmental Commissioner for the project to be approved and for the Environmental Clearance Certificate to be issued. It is further recommended that the ECC be issued with conditions of bi-annual environment auditing and submission of bi-annual report to monitor the environmental performance.
Chapter 1

1. Introduction

1.1. Background

The economies of African countries largely depend on extraction industries. Mineral commodities such as Diamond, Copper, Uranium, Gold, Platinum and others are buried deep in the ground and have to be extracted to realize their economic benefits. The mining operation entail mass movement of overburden soil/rocks to reach mineralization zones. This is achieved through blasting. Various explosives are used in blasting, with Ammonium Nitrate (NH4NO3) being the major blasting agent.

Native Storage hereinafter referred to as the ‘proponent’ is a 100% owed Namibian company. In April 2017, the company was issued with an Environmental Clearance Certificate for storage facility of handling dangerous good on farm 38 belonging to Walvis Bay Municipality. The storage facility has been constructed and fully operational (Fig 1) and it is the preferred logistics storage facility in the region housing Ammonium Nitrate for international manufactures such as Orica.

Figure 1. Native Storage facility for Ammonium Nitrate at Farm 38, Walvis Bay

The long term vision of the company is to manufacture mining explosives using inverse emulsification of Ammonium Nitrate technology. Hence, it now intends to establish a
containerised emulsion plant, on Farm 38 in the proximity of the storage facility. Emulsion is defined as a mixture of two or more liquids that are normally immiscible. While Ammonium Nitrate Emulsion or Gel is ammonium nitrate suspended in a liquid.

1.2. Legal Requirements

Section 27 (2) of the Environmental Management Act (Act No. 7 of 2007) hereinafter referred to as ‘EMA’, and annexure of Environmental Impact Assessment Regulation (Government Notice No. 30 of 2012), has listed activities that may not be undertaken without an Environmental Clearance Certificate table 1.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Applicability</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.1 The manufacturing, storage, handling or processing of a hazardous substance defined in the Hazardous Substances Ordinance, 1974.</td>
<td>The project shall entail the manufacturing of Ammonium Nitrate explosives</td>
</tr>
<tr>
<td>9.2 Any process or activity which requires a permit, licence or other form of authorisation, or the modification of or changes to existing facilities for any process or activity which requires an amendment of an existing permit, licence or authorisation or which requires a new permit, licence or authorisation in terms of a law governing the generation or release of emissions, pollution, effluent or waste.</td>
<td>The project requires authorization from the Ministry of Safety and Security</td>
</tr>
</tbody>
</table>

The above requires an Environmental Impact Assessment (EIA) thus the proponent has appointed Tortoise Environmental Consultancy (TEC) to undertake an environmental impact assessment and develop and Environmental Management Plan for environmental protection and sustainability.
1.3. Project Description

Explosives are the main catalyst for industrial revolution especially in exploration industries, mining and constructions where they are used for blasting. Blasting pave way for excavation. Widely, ammonium nitrate NH4NO3 (AN) is the precursor for industrial explosives due to its high oxidizing agent. The widely used one is ANFO (or Ammonium Nitrate /Fuel Oil) which consist of 94% porous AN and 6% fuel oil. Emulsion is another type of ANFO explosives. Emulsion is achieved when aqueous (soluble in water) solution of AN is mixed (emulsified) with fuel to produce ammonium nitrate emulsions (ANE). The raw material for the production of ANE includes, ammonium nitrate solution (ANS), diesel oil as the fuel blend ingredient, thiourea, urea, acetic acid, caustic soda, calcium nitrate, prilled solid ammonium nitrate and water. All raw materials shall be stored at the storage plant 800m away.
The proposed manufacturing of the ANE would be achieved through a process called New Oil Inversion System of Emulsification (NOISE). The NOISE plant is literally a mobile plant made of containers, hence there won’t be construction onsite besides the concrete slabs where the containers shall be placed. The plant will have 9 x 20 ft. containers which shall be set in a process flow for the manufacturing of ANE. A summary process flow is shown below.

**Table 2. The process for the Emulsion Plant**

<table>
<thead>
<tr>
<th>The Process Flow of the Containerised Emulsion Plant</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1)</strong> Services Container [SC] – Main Electrical DB, Compressors, Dryers and Water Pumping Station</td>
</tr>
<tr>
<td><strong>9)</strong> Gasser Container [GC] – SodiumNitrite Solution (Gasser) manufacturing</td>
</tr>
</tbody>
</table>
1.3.1. ANE manufacturing

ANE is shall be manufactured by specialized mixing of the oxidizer solution, fuel blend and emulsifier. During mixing, small droplets of the oxidizer solution is coated by the fuel blend and the emulsifier.

**Fuel Blend + Emulsifier + Oxidizer solution = Ammonium Nitrate Emulsion**

According the UN3375, ANE is a class 5.1 Oxidizer dangerous good, but not an explosive until it is sensitized.

1.3.2. Gasser Manufacturing

The Gasser batches shall be prepared in the Gasser mixing container by dissolving sodium nitrate in hot water.

1.4. Project Location

Native storage is leasing 10 hectares of portion farm 38 from the Municipality of Walvis Bay for the purposes of setting up the emulsion (Appendix 1). Farm 38 is zoned for heavy industries (Fig 2&3) and far away from residential places. Farm 38 forms part of the Walvis Bay Municipality, zoned for heavy industrial. This location was strategically chosen as Walvis Bay is the biggest transport hub in Namibia and it would be cost effective since the ammonium comes in through the port of Walvis Bay. Farm 38 of is located far from human settlement. Further, because of many uranium mines in Erongo region, the proposed plant is deemed to be strategically located for the supply of ammonium and explosive to theses mines.

The site is about 4km South East of the Namibian Defense Force (NDF) Rooikop Army base. Safety analysis were conducted in partnership with NDF, and the site was given a clearance (Appendix 2).
Table 3. The GPS coordinates for the proposed ANE plant.

<table>
<thead>
<tr>
<th>Point</th>
<th>Latitude</th>
<th>Longitude</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>-23 00 59.23</td>
<td>14 38 30.15</td>
</tr>
<tr>
<td>B</td>
<td>-23 00 57.66</td>
<td>14 38 38.19</td>
</tr>
<tr>
<td>C</td>
<td>-23 01 04.38</td>
<td>14 38 40.27</td>
</tr>
<tr>
<td>D</td>
<td>-23 02 05.94</td>
<td>14 38 32.28</td>
</tr>
</tbody>
</table>
Figure 2. Proposed site for Ammonium Nitrate Emulsification Plant
Figure 3. The lease area by Native Storage on Farm 38
1.5. Land Zonation

1.5.1. Walvis Bay Municipality

According to the Walvis Bay Municipality documentation, Farm 38 is zoned as Heavy Industrial. See attached zonation map.

1.5.2. Dorob National Park Management Plan

According to the Park Management Plan for the Dorob National Park, farm 38 falls within an area that is classified as “Low Sensitive”. The classification has been confirmed by the Namibian Coast Conservation Management (NACOMA). See attached site assessment report (Appendix 3).

1.6. The Need and Desirability for the Project

Mining is Namibia’s biggest contributor to the GDP. The Namibian Chamber of Mines has welcomed the proposal of ammonium nitrate emulsion plant stating that “the envisioned plant not only plans to supply explosives to local big mines such as Husab and Rossing, but will also create the possibility for other mines in Namibian to source explosive locally as a common consumable. It is in the consumable part of the mining supply chain where investment in upstream linkages for local production should be directed as these are required on monthly or even daily basis”.

A traditional AN emulsification plant requires huge construction involving steel pipes which results in a big footprint and possible environmental degradation. The NOISE technology was developed to meet industrial demands, as it takes time to construct an emulsion plant, and at times, the mining site would not allow for the establishment of the permanent. Other advantages includes, the technology is cost effective due to limited constructions, it recycles non-conformance ANE, hence no emulsion waste is produced.
Lastly, the National Development Plan 5 (NDP 5) of Namibian call for the country of be industrialised. A plant like this forms part of the many catalyst that propel the dream of industrialization. The project shall further provide employments, improve value of often neglected desert land, and contribute significantly to the country’s GDP.

1.7. Supporting infrastructure

1.7.1. Electricity

The site shall be connected to the National grid. An application would be made to the NAMPOWER for electricity. The area is not known as a bird habit or a migration route for the birds, hence it does not pose threat to the birds. Further the linear infrastructure cover a very short period.

1.7.2. Portable Water and Process Water

Water for human consumption would be source from the Municipality of Walvis Bay, and stored in water tanks on site. Water is also essential for the manufacturing of ANE, dilution of ANS, heating and cooling systems.

1.7.3. Accommodation facility

There won’t be accommodation on site, all workers shall be communing from Walvis Bay and Swakopmund.

1.7.4. Sewer System

The proponent intents to install a septic tank system for handling liquid waste from the ablution facilities. Often in places where household and business are sparsely distributed, septic tanks are adopted for handling of liquid waste. Septic tanks are normally cheap and effective in treating liquid waste. Before emptying/sucking the sewage to the designated wasted sites, the sewage is naturally treated where, the suspended solids settles at the bottom, while grease and lighter oils settles on top of the water. The settled sludge
undergoes anaerobic digestion which significantly reduces the volume of the sludge and the organic matter in the liquid.

When properly handled, the septic tank system is efficient and cost effective. However, poor design, construction and maintenance constitute a health hazard. It highly recommended that the proponent follows national and International code of conduct for the installation of the sceptic tank. Some of the basic principle to consider during installation includes;

1.7.5. Roads

There is an existing gravel road that provides access to the storage facility hence no new access road would be constructed.
Chapter 2

2. Policy Legal framework

The project is subjected to following laws, but not limited to these laws only.

Table 4. Policy and legal framework governing the project

<table>
<thead>
<tr>
<th>Legislation</th>
<th>Summary</th>
<th>Applicability</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Namibian Constitution</td>
<td>The Namibian constitution is the supreme law of the country which is committed to sustainable development. Article 95(1) of the Constitution of Namibia states that:- “The State shall actively promote and maintain the welfare of the people by adopting policies aimed at … The maintenance of ecosystems, essential ecological processes and biological diversity of Namibia and utilization of living natural resources on a sustainable basis for the benefit of all Namibians, both present and future”.</td>
<td>Contact an EIA to maintain the ecological process and diversity of the project area</td>
</tr>
<tr>
<td>The Environmental Management Act</td>
<td>The Environmental Management Act No 7 of 2007 aims to promote the sustainable management of the environment and the use of natural resources and to provides for a process of assessment and control of activities which may have significant effects on the environment; and to provide for incidental matters. The acts provides a list of activities that may not be undertake without an environmental clearance certificate.</td>
<td>Statutory requirement of the EIA and guidelines</td>
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<th>Legislation</th>
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<th>Applicability</th>
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<tr>
<td><strong>Legislation</strong></td>
<td><strong>Summary</strong></td>
<td><strong>Applicability</strong></td>
</tr>
<tr>
<td>Further, the Act ensures that;</td>
<td>Further, the Act ensures that;</td>
<td>Management of Waste, and any pollutant as a result of the construction of the emulsion plant</td>
</tr>
<tr>
<td>(a) Potential threats are considered timeously</td>
<td>(a) Potential threats are considered timeously</td>
<td></td>
</tr>
<tr>
<td>(b) A comprehensive stakeholder’s consultations is conducted and all Interested and affected parties are given an opportunity to comment on the project</td>
<td>(b) A comprehensive stakeholder’s consultations is conducted and all Interested and affected parties are given an opportunity to comment on the project</td>
<td></td>
</tr>
<tr>
<td>(c) Decision are robust by taking into account the above mentioned activities</td>
<td>(c) Decision are robust by taking into account the above mentioned activities</td>
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<tr>
<td><strong>Draft Pollution Control and Waste Management Bill</strong></td>
<td>This Bill serves to regulate and prevent the discharge of pollutants to air and water as well as providing for general waste management. The Bill will repeal the Atmospheric Pollution Prevention Ordinance (11 of 1976) when it comes into force. The Bill also provides for noise, dust or odour control that may be considered a nuisance. Further, the Bill advocates for duty of care with respect to waste management affecting humans and the environment and calls for a waste management licence for any activity relating to waste or hazardous waste management.</td>
<td>To prevent the generation excessive noxious or offensive gasses</td>
</tr>
<tr>
<td><strong>Atmospheric Pollution Prevention Ordinance Act No.11 of 1976</strong></td>
<td>This Ordinance serves to control air pollution from point sources, but it does not consider ambient air quality. This ordinance is being repealed by the proposed Pollution Control and Waste Management Bill. Any person carrying out a ‘scheduled process’ which are processes resulting in noxious or offensive gases typically</td>
<td></td>
</tr>
<tr>
<td><strong>Legislation</strong></td>
<td><strong>Summary</strong></td>
<td><strong>Applicability</strong></td>
</tr>
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<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------</td>
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<tr>
<td><strong>Environmental Policy framework (1995)</strong></td>
<td>This policy subjects all developments and project to environmental assessment and provides guideline for the Environmental Assessment. Its provision mandate that Environmental Assessment take due consideration of all possible impacts and incorporate them in the development or planning stages.</td>
<td>General requirement of the EIA and guidelines</td>
</tr>
</tbody>
</table>
| **The Occupational Safety and Health Act No. 11 of 2007;** | Safety:  
A safety risk is a statistical concept representing the potential of an accident occurring, owing to unsafe operation and/or environment.  
In the working context “SAFETY” is regarded as “free from danger” to the health injury and to properties.  

Health:  
Occupational Health is aimed at the promotion and maintenance of the highest degree of physical, mental and social wellbeing of workers in all occupations. This is done by ensuring that all work-related hazards are prevented and where they occur, managed. | Handling of dangerous good, fire and explosion risk  
In order to maintain good and healthy standards, at the work place, cleanliness, adequate sanitary facilities, protection against dangerous substances as well as education and training of both workers and management is necessary. |
<table>
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<tr>
<th>Legislation</th>
<th>Summary</th>
<th>Applicability</th>
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<tbody>
<tr>
<td><strong>Public Health Act No. 36 of 1919</strong></td>
<td>The Act serves to protect the public from nuisance and states that no person shall cause a nuisance or shall suffer to exist on any land or premises owned or occupied by him or of which he is in charge any nuisance or other condition liable to be injurious or dangerous to health.</td>
<td>The proponent should ensure that the site is off limits from public.</td>
</tr>
<tr>
<td><strong>Water Resources Management Act (2004)</strong></td>
<td>This Act provides a framework for managing water resources based on the principles of integrated water resources management. It provides for the management, development, protection, conservation, and use of water resources. Furthermore, any watercourse on/or in close proximity to the site and associated ecosystems should be protected in alignment with the listed principles.</td>
<td>There no water course, neither the area does not receive significant rainfall to cause impact on the water resource.</td>
</tr>
</tbody>
</table>
| **Water Act No, 54 of 1956** | This act states that, all water resources belongs to the State. It prevents pollution and promotes the sustainable utilization of the resource. To protect this resources, this act requires that permits are obtained when activities involve the following;  
(a) Discharge of contaminated into water sources such as pipe, sewer, canal, sea outfall and  
(b) Disposal of water in a manner that may cause detrimental impact on the water resources | Prohibition of contaminated water in the water body |
<table>
<thead>
<tr>
<th>Legislation</th>
<th>Summary</th>
<th>Applicability</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Petroleum Product and Energy Act No, 13 of 1990</strong></td>
<td>This Act provides a framework for handling and distribution of petroleum products which may include purchase, sale, supply, acquisition, possession, disposal, storage or transportation thereof.</td>
<td>Safe handling of the fuel</td>
</tr>
<tr>
<td><strong>Labour Act No. 6 of 1992</strong></td>
<td>This Act aims to regulate labour in general and includes the protection of the health, safety and welfare of employees. The 1997 Regulations relating to the Health and Safety of employees at work sets out the duties of the employer, welfare and facilities at the workplace, safety of machinery, hazardous substances, physical hazards, medical provisions, construction safety and electrical safety.</td>
<td>No employer shall require or permit an employee to work in an environment that is deemed unfit without protective measures in place.</td>
</tr>
<tr>
<td><strong>Regional Council Act, 1992 (Act No. 22 of 1992)</strong></td>
<td>The Regional Councils Act legislates the establishment of Regional Councils that are responsible for the planning and coordination of regional policies and development. The main objective of this Act is to initiate, supervise, manage and evaluate development at regional level.</td>
<td>Adhere to regional by laws</td>
</tr>
<tr>
<td><strong>Soil Conservation Act No. 76 of 1969</strong></td>
<td>This act promotes the conservation of soil, prevention of soil erosion.</td>
<td>Improper planning of construction can cause soil degradation and erosion through earth work.</td>
</tr>
<tr>
<td><strong>Hazardous Substances Ordinance No. 14 of 1974</strong></td>
<td>This ordinance gives provision to control the handling of hazardous substance in all circumstances, such as manufacturing, imports and exporting of these to ensure human and environmental safety.</td>
<td>Handling of fuel, ANE, and explosion risks</td>
</tr>
<tr>
<td>Legislation</td>
<td>Summary</td>
<td>Applicability</td>
</tr>
<tr>
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</tr>
<tr>
<td>National Heritage Act No. 27 of 2004</td>
<td>The Act makes provision for the protection and conservation of places and objects of heritage significance and the registration of such places and objects. Part V Section 46 of the Act prohibits removal, damage, alteration or excavation of heritage sites or remains, while Section 48 sets out the procedure for application and granting of permits such as scrapping and excavation may unearth archaeological material.</td>
<td>Fuel retail facilities are well documented in Namibia. However, fuel contains Volatile Organic Compounds (VOCs) which may be cancerous and their amount that causes cancer are poorly documented. Therefore, precaution must be taken when dispensing fuel to vehicles. In the event of an accident, where spillage may occur, the establishment owner must be responsible to clean up the environment.</td>
</tr>
</tbody>
</table>
| Word’s Best Practises             | **Precautionary Approach Principle**  
This principle is worldwide accepted when there is a lack of sufficient knowledge and information about the possible threats to the environment. Hence if the anticipated impacts are greater, then precautionary approach is applied. In this project, there are no eminent uncertainty however in cases when they arise, this approach should be applied.  
**Polluter Pays Principle**  
This principle ensures that proponents takes responsibility of their actions. Hence in cases of pollution, the proponent bears the full responsibility to clean up the environment. |
Chapter 3

3. Public Participation Process

Public consultation is a requirement by law (EMA No 7 of 2007) to be incorporated into an EIA process, hence it is a fundamental part of the EIA. Public consultation ensure robust decision making by involving Interested and Affected Parties (I&APs). The PPP has therefore been structured to provide I&APs an opportunity to gain more information on the proposed project and for them to provide inputs through the review of documents/reports, and to flag any issue of concern during the PPP process.

3.1. Background Information Document

During planning, a site visit was undertaken on 12 January 2019 to study the affected environment and the surrounding. A Background Information Document (BID) was produced and distributed to registered I&APs (Appendix 4).

3.2. Site Notices

A site notice was placed at the Walvis Bay community hall on 12 January 2019 the day of the initial site visit to notify the Walvis Bay community about the proposed project for them to comment, raise concerns and input about the project (Appendix 5). Further, presentation were made to the Walvis Bay Municipal Council during the application of the land lease.

3.3. Newspaper Adverts

Two local newspapers The Namibian and New Era, were used to invite the public to a public meeting register as IA&Ps. The adverts were published on 9th & 16th January 2019 (Appendix 6).

3.4. Public Meeting

A public meeting was conducted on 19th January 2019 at Walvis Bay, which was poorly attended. An environmental officer from the Municipality remarked that, “Walvis Bay
community is well aware of the project, hence it was not anticipated to attract many people” (Appendix 7). Nonetheless the meeting took place with a blessing by the Honorable Councilor who is the Chairperson of the Council’s Management committee. The comments are shown in table 5 below.

Table 5. Comment and response from the public meeting

<table>
<thead>
<tr>
<th>Name</th>
<th>Organization</th>
<th>Tel</th>
<th>Comment</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Johannes N. Shilunga</td>
<td>81 Seventy Eight Investments</td>
<td>0812441181</td>
<td>Congratulated the project proponent for bringing the project to Namibia. Commended that the project brings development. Encourage the participation of local people in the project</td>
<td>Comment Noted and appreciated. The recruitment process shall consider residents of Walvis Bay</td>
</tr>
<tr>
<td>Hon Lilo Niilenge</td>
<td>Walvis Bay local Authority Councilor and Chairperson of the Management Committee</td>
<td>0812799799</td>
<td>Commented that, she and the Walvis Bay Council is aware of the project. Presentation were done to the council during request to lease land. The council welcomes the project, and commented that, the project must look into the social upliftmend of our people</td>
<td>Comment Noted. Jonas Thomas for Native applauded the willingness of WB council to in availing land for business.</td>
</tr>
<tr>
<td>Thomas Jonas</td>
<td>Native Storage</td>
<td>0812327933</td>
<td>Gave clarity that the emulsion are not explosive until they are induced at the mining site</td>
<td>Comment noted</td>
</tr>
<tr>
<td>Mathew Shaulwah</td>
<td>NDF</td>
<td>0812023377</td>
<td>Welcomed the project.</td>
<td>Comment Noted</td>
</tr>
</tbody>
</table>

3.5. Stakeholder comments and participation

Many interested parties register via email, mainly requesting for a BID. A draft scoping report was send to them, and comments are shown in table 6 below.
Chapter 4

4. Affected Bio-Physical and Socio-Economic Environment

4.1. The environmental setting of Walvis

Walvis Bay is a coastal town, whose weather conditions is influenced by the cold Benguela Current of the Atlantic Ocean and a hot dry Namib Desert. Like any other coastal town of Namibia, there is little rain, lower temperatures, less radiation and sunshine, strong eastern winds, high humidity and frequent fog. The project is located in the Namib Desert, the world’s desert made up sand deposits. A summary of the environmental setting is shown in table below.

Table 6. The environmental Setting of Walvis Bay and the surrounding areas.

<table>
<thead>
<tr>
<th>Environmental Aspects</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>Average Max 24°C in March and 19°C in September Average Min 16°C in Feb and 9°C in August</td>
</tr>
<tr>
<td>Rainfall</td>
<td>The coastal areas receive little rainfall, with Walvis Bay having an average annual rainfall of 15mm.</td>
</tr>
<tr>
<td>Fog</td>
<td>Desert life is more supported by fog other than rainfall. About 146 fog-day are recorded at Walvis Bay. These record are only made when ground visibility is reduced to 1000 m or less.</td>
</tr>
<tr>
<td>Wind</td>
<td>Strong Easterly wind of up to 1000m/hour</td>
</tr>
<tr>
<td>Sunshine</td>
<td>The entire coast of Namibia has an average of less than 5 hours of sunshine per year. However, the proposed site get more than average sunshine</td>
</tr>
</tbody>
</table>
4.2. Biodiversity

4.2.1. Flora

As mentioned earlier, the climatic condition in desert does not support high vegetation. The area is sparsely vegetated with one plant species the common dwarf shrubs *Arthraerua leubnitziae* on site Figure 4.

![Arthraerua leubnitziae](image)

**Figure 4.** The “Dwarf Shrub” *Arthraerua leubnitziae* the only plant species on site

Like most places in the central Namib, there no rich vegetation and it is sparsely distributed. The site for the emulsions plant shall be 800m away from the current storage plant, hence the storage plant can be seen in the background.

According to the Park Management Plan for the Dorob National Park, farm 38 falls within an area that is classified as “Low Sensitive”. The classification has been confirmed by the Namibian Coast Conservation Management (NACOMA). See attached site assessment report.
4.2.2. Fauna

Ecology studies of the Namibia Desert has indicated that, vegetation and animal life seem to be absent during the day while in actual fact, a lot of life goes on during the night. Which is simply an arid survival of biodiversity. During the day, the temperature are extremely hot, plant animal hide in various place, some burry themselves under the sand. In general, the Desert is home insects, snakes, geckos, mice, ants, beetles, spider and bigger animals such as springboks Ostriches and Oryx. The site and the surrounding area are frequented by springboks and Jackals. There are numerous human activities in the surrounding and animals are accustomed to anthropogenic activities. Hence the project is not a threat to the avifauna. However, emphasis must be put in anti-poaching mechanisms when wildlife is spotted. Threaten species such as Rhino and Desert Elephant are mostly found far north and no records of them at the project site or surrounding areas.

4.3. Geology

4.3.1. Soils

The Namib Desert is home to sand dunes. Most areas do not have much of soil but exposed bedrocks of Precambrian metamorphites such as micaschists, quartzites and marbles. This is mostly linked to wind erosion. Arable soils are limited to river valleys and flood plans.

4.3.2. Topography and Drainage

The area is flat and receive little to no rainfall, hence there is no influence by drainage. About 11km south of the project lies the famous Kuiseb River, whose flow is influence by inland rainfall.
4.4. Hydrology

4.4.1. Surface and Ground water

There are no permanent water bodies in the area and in Namib Desert in general. As mentioned above there is Kuiseb River 11km south of the project, which is an Ephemeral River that only flows when the inland receives good above average rainfall. The project is about 25km east of the Atlantic Ocean.

Water for the project shall be supplied with water tankers, from Walvis Bay Municipality. NamWater supplies the municipality with water from alluvial aquifers in the Kuiseb River. The project may explore ground water, but necessary legal requirement must be fulfilled.

4.5. Population Demography

Erongo Region had a total population of 150 809\(^1\). Walvis Bay is the biggest coastal town in Erongo and in Namibia. It has a population of 62 096, mostly attracted to the well-established fishing industry, transport to Namibian’s landlocked neighbor and many other industries.

\(^1\) 2011 Population Census
Chapter 5

5. Project Alternatives

5.1. Project Implementation vs No Project

The project implementation would satisfy the need and desirability of the project mentioned above. The no project would disadvantage the opportunity of economic growth and the industrialization plan for the country. The community would be denied employment opportunity to improve their livelihood.

5.2. Site Alternative

The Namib Desert is a sensitive pristine environment. Comprehensive work done on the management and sustainability has been done by the NACOMA project. The project area is not classified as sensitive, and the proposed project would be containerised, hence the footprint shall be limited. Further, the storage facility which is meant to supply raw materials is already in existence, 800m away. And lastly, the biggest open pit mines are located in Erongo Region.
Chapter 6

6. Impact Identification and Assessment

Under this section, environment and social components relating to the project were identified, evaluated and practical mitigation measures proposed. The Department of Environmental Affairs (DEA) had set out criteria for impact assessment as indicated in Table 7.

Table 7. The impact assessment criteria (DEA 2008)

<table>
<thead>
<tr>
<th>Risk Event</th>
<th>Rating</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Impact type</strong></td>
<td>0</td>
<td>No Impact</td>
</tr>
<tr>
<td></td>
<td>+VE</td>
<td>Positive</td>
</tr>
<tr>
<td></td>
<td>-VE</td>
<td>Negative</td>
</tr>
<tr>
<td><strong>Probability</strong></td>
<td>The likelihood that an impact may occur under the following analysis</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Improbable (Low likelihood)</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Low probability</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Probable (Likely to occur)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Highly Probable (Most likely)</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Definite (Impact will occur regardless of the applied mitigation measure)</td>
<td></td>
</tr>
<tr>
<td><strong>Confidence level</strong></td>
<td>The confidence level of occurrence, based on available knowledge</td>
<td></td>
</tr>
<tr>
<td>L</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>Medium</td>
<td></td>
</tr>
<tr>
<td>H</td>
<td>High</td>
<td></td>
</tr>
<tr>
<td><strong>Significance (Without Mitigation)</strong></td>
<td>0</td>
<td>None (Based on the available information, the potential impact is found to not have a significant impact)</td>
</tr>
<tr>
<td></td>
<td>L</td>
<td>Low (The presence of the impact’s magnitude is expected to be temporal or localized, that may not require alteration to the operation of the project)</td>
</tr>
<tr>
<td>Mitigation</td>
<td>The applied measure / alternative to reduce / avoid an impact</td>
<td></td>
</tr>
<tr>
<td>------------</td>
<td>------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>Medium (The impact is expected to be of short term moderate and normally regionally. Often, such impacts require alteration to the or alternative method of mitigation is implemented)</td>
<td></td>
</tr>
<tr>
<td>H</td>
<td>High (The impact is definite, can be regional or national and in long term. The impact could have a NO go implication unless the project is re-designed or proper mitigation can practically be applied)</td>
<td></td>
</tr>
<tr>
<td><strong>Significance</strong></td>
<td><strong>With Mitigation</strong></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>None (Based on the available information, the potential impact is found to not have a significant impact)</td>
<td></td>
</tr>
<tr>
<td>L</td>
<td>Low (The impact’s magnitude is expected to be temporal or localized, that may not require alteration to the operation of the project)</td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>Medium (The impact is expected to be of short term moderate and normally regionally. Often, such impacts require that the projects be altered to mitigate the impact or alternative method of mitigation is implemented)</td>
<td></td>
</tr>
<tr>
<td>H</td>
<td>High (The impact is definite, can be, local, regional or national and in long term. The impact could have a NO go implication unless the project is re-designed or proper mitigation can practically be applied)</td>
<td></td>
</tr>
<tr>
<td><strong>Duration</strong></td>
<td>Time duration of the impacts</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Immediate</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Short-term (0-5 years)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Medium-term (5-15 years)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Long-term (more than 15 years)</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Permanent</td>
<td></td>
</tr>
<tr>
<td><strong>Scale</strong></td>
<td>The geographical scale of the impact</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Site specific</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Local</td>
<td></td>
</tr>
</tbody>
</table>
Social and Environmental impacts were considered for the construction and operational phase of the project. The potential impacts were further grouped into environmental and social impacts, with social impacts that are more directly affecting humans.

6.1. Construction Phase

The construction of the project shall only consist of the installation of the foundations for the containers. There will be a parking areas and an office building. The identified impacts during the construction phase were as follows;

6.1.1. Employment (During both project phases)

The employment of workers should consider those from Walvis bay, and Kuiseb river community especially for general work.

- At least the workforce must be from Erongo Region, unless otherwise there is a lack of expertise.
- Adhere to the Namibian labour act

**IMPACT: Employment**

<table>
<thead>
<tr>
<th>CONSTRUCTION PHASE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impact type</td>
</tr>
<tr>
<td>Scale</td>
</tr>
<tr>
<td>Duration</td>
</tr>
</tbody>
</table>

6.1.2. HIV/AIDS (During both project phases)

Namibia is ranked sixth in the world in terms of HIV/AIDS prevalence whereby Erongo region is ranked highest in the region. The influx of employees as a result of the project construction and operation in search for jobs could enhance prostitution and the spread of HIV.
**Mitigation Measure**

- The Ministry of Health and Social Services provides free condoms to all public amenities and health care centers. Further it offers confidential testing, counselling and treatment including free access to anti-retroviral medication (NPC, 2011). Hence all washrooms must have condoms at all time.
- The developer must arrange for HIV prevention induction for employees and a register thereof shall be kept.

### IMPACT: HIV/AIDS

<table>
<thead>
<tr>
<th>OPERATIONAL PHASE</th>
<th>-VE</th>
<th>Probability</th>
<th>Definite</th>
<th>Mitigation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Impact type</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Scale</strong></td>
<td>Local</td>
<td>Confidence level</td>
<td>High</td>
<td>Without M</td>
</tr>
<tr>
<td><strong>Duration</strong></td>
<td>Duration of the project</td>
<td></td>
<td>Medium</td>
<td>With M</td>
</tr>
</tbody>
</table>

### 6.1.3. Biodiversity

The site is sparsely vegetated and desert animals such as springboks frequent the area but not their habitat. The available “Dwarf shrub” is not threatened, it is widely distributed in the entire Namib Desert. Shrubs in places where the foundation would laid shall be removed.

**Mitigation**

- Only remove shrubs that are on demarcated site for the construction of the foundation and roads within the site
- Poaching of animals is strictly forbidden and punishable by law
- Off road driving is not allowed
- Bright light during the night is not allowed

### IMPACT: Biodiversity

<table>
<thead>
<tr>
<th>CONSTRUCTION PHASE</th>
<th>-VE</th>
<th>Probability</th>
<th>Definite</th>
<th>Mitigation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Impact type</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Scale</strong></td>
<td>Local</td>
<td>Confidence level</td>
<td>High</td>
<td>Without M</td>
</tr>
<tr>
<td><strong>Duration</strong></td>
<td>Short term</td>
<td></td>
<td>M</td>
<td>Low</td>
</tr>
</tbody>
</table>
6.1.4. Dust

Natural, dust level in the Namib are higher due to high winds, but would be exacerbated by the movement of vehicles and digging of trenches for construction.

- Vehicle speed must be kept low as possible, 10-20km/h
- Apply dust suppression method, such as water spray to suppress dust;
- Workers must wear adequate PPE to prevent them from dust exposer

<table>
<thead>
<tr>
<th>IMPACT: Dust</th>
<th>CONSTRUCTION PHASE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impact type</td>
<td>-VE</td>
</tr>
<tr>
<td>Scale</td>
<td>Local</td>
</tr>
<tr>
<td>Duration</td>
<td>Short term</td>
</tr>
</tbody>
</table>

6.1.5. Noise

Construction vehicles makes excessive noise above the recommended level that pose health risk to the worker and nuisance animals.

*Mitigation Measures*

- Only work during normal working hours, do not work during the night
- Provide workers with earmuffs
- Vehicle engines must be shut down when it is not in use
- Vehicles and machines must be well serviced to avoid unnecessary noise emission

<table>
<thead>
<tr>
<th>IMPACT: Noise</th>
<th>CONSTRUCTION PHASE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impact type</td>
<td>-VE</td>
</tr>
<tr>
<td>Scale</td>
<td>Local</td>
</tr>
<tr>
<td>Duration</td>
<td>Short term</td>
</tr>
</tbody>
</table>

6.1.6. Health

The health of the employees and public is protected under the Labour law. Developer must ensure compliance with the constitutional requirement. Therefore;
- Employees must NOT be exposed to noise levels above the required -85dB (A) limit over a period of 8 hours. Should the noise level be higher than 85dB (A), the employer must implement a hearing conservation program such as noise monitoring;
- The area is normally very hot during the day, employees must be provided with adequate safe drinking water;
- There must be suitable, clean and user-friendly ablution facilities for all staff;
- Provision of separate Male and female toilets at a ratio of 1:15 for females and 1:30 for males;
- Employ a cleaner or rotate cleaning responsibilities amongst workers to ensure hygiene;
- Inspect ablution facilities regularly for cleanliness;
- No defecation should be tolerated in any place other than provided toilets

<table>
<thead>
<tr>
<th>IMPACT: Health</th>
<th>CONSTRUCTION PHASE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impact type</td>
<td>Probability</td>
</tr>
<tr>
<td>Scale</td>
<td>Local</td>
</tr>
<tr>
<td>Duration</td>
<td>Short term</td>
</tr>
</tbody>
</table>

6.1.7. Safety

During the construction phase, the safety of employees are protected under the provision of the Labour Act of 2007. It is the responsibility of the proponent to ensure that the working environment of the employees is favorable and compliant to all safety constitutional frameworks.

**Mitigation Measures**

- Developer must establish an employee safety plan;
- Ensure that every employee went through an induction course about safety;
- Employees must be equipped with all necessary Personal Protective Equipment (PPE). These includes, Helmet, Overall, Safety Shoes, Safety Glasses, Gloves, Welding shield, Earmuff etc;
• During construction, minor accident are eminent, hence there must be a first aid kit;
• Only qualified personnel must be allowed to operate special machine/instruments
• No employee must be allowed to be onsite without PPE;
• Adequate safety signs must be displayed on site.

<table>
<thead>
<tr>
<th>IMPACT: Safety</th>
<th>CONSTRUCTION PHASE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impact type</td>
<td>-VE</td>
</tr>
<tr>
<td>Scale</td>
<td>Local</td>
</tr>
<tr>
<td>Duration</td>
<td>Short term</td>
</tr>
</tbody>
</table>

6.1.8. Oil spills

Construction vehicles use huge volume of fuel, oils and lubricants hence there is a potential of leakages. To prevent leakages, adhere to the following mitigation measures;

• All vehicles must be well serviced
• Refueling on site must be done on a concrete bunded structure with a spill catchment trays
• Storage of hydrocarbons must be done on concrete bunds
• Provide drip trays on stationary vehicles
• Provide a hydrocarbon spill clean-up kits in case of eventuality
• Contract oil recycling companies for collection of used oils

<table>
<thead>
<tr>
<th>IMPACT: Oil Spills</th>
<th>CONSTRUCTION AND OPERATIONAL PHASE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impact type</td>
<td>-VE</td>
</tr>
<tr>
<td>Scale</td>
<td>Local</td>
</tr>
<tr>
<td>Duration</td>
<td>Duration of the project</td>
</tr>
</tbody>
</table>

6.1.9. Land degradation

The movement of heavy vehicle loosen the soil and becomes susceptible to wind erosion and consequently land degradation.
• All vehicles must use designated access roads, and within the construction site, NO off-road driving.

6.1.10. Archaeology

The impact is negligible however “a chance find must be implemented to ensure compliance to the constitutional requirement.

Mitigation Measures

• Workers must be trained on the possible find of archaeological material in the area
• Establish a “Chance Find Procedure” where if any archaeological finding (Heritage (rock painting and drawings), human remains or artefacts) is encountered;
  o The activity must be stopped immediately and the operation manager of that activity be informed;
  o The manager must ensure the cordonning off the area with a danger tape and take appropriate records and pictures
  o The manager must immediately report the findings to the National Museum (+264 61 276800) or the National Forensic Laboratory (+264 61 240461).

<table>
<thead>
<tr>
<th>IMPACT: ARCHAEOLOGY</th>
<th>CONSTRUCTION PHASE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impact type</td>
<td>-VE</td>
</tr>
<tr>
<td>Scale</td>
<td>Local</td>
</tr>
<tr>
<td>Duration</td>
<td>Short term</td>
</tr>
</tbody>
</table>

6.1.11. Traffic

Traffic to and from the site shall use the main road to Walvis Bay Airport. During construction, the transportation of construction materials such as sand and gravel pose risk to other road user if not handled properly.
Mitigation

- Trucks carrying sand and aggregate must be covered to avoid material flying off
- Truck must maintain a five kilometer in-between distance to avoid traffic congestion
- Trucks must be fitted with reflected and revolving flashing head lights
- Transportation of construction material at night is not allowed

6.2. Operational Phase

During the operation phase, the possible identified impacts were as follows;

6.2.1. Fire and Explosive Risk

Ammonium Nitrate is highly combustible, hence a risk of fire is eminent if not handled properly. The ANE only becomes an explosive if induced at the blasting / mine site or contaminated or due to excess heating. The site is located in the desert with no vegetation, hence bush fire is not a risk to the plant.

Mitigations

- Access to the emulsion product must strictly be by authorized personnel
- Obtain all necessary document for manufacturing, handling and storage of explosives from relevant authorities
- Implement product contamination controls to prevent ANS and ANE contamination from other products
- Maintain a proper recording system of what is produced and reconcile with what is received by the clients
- Staff must be properly trained on how to react and handle AN fire
- There must be automatic fire alarm system installed at the site
- Firefighting equipment must be on site 24hours and regularly inspected to ensure that they are working
• Emergency response numbers must be on clear and visible space

• There must be clear hazard signs “NO OPEN FIRE” “NO SMOKING” “SWITCH ENGINE OFF”

• There must be drills to test staff about their readiness to fight the fire

• Emergency evacuation must not be more than 20 minute

• The emergency assembly point must be 1.2 km away from the site

<table>
<thead>
<tr>
<th>Impact type</th>
<th>OPERATIONAL PHASE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scale</td>
<td>-VE</td>
</tr>
<tr>
<td>Probability</td>
<td>Probability</td>
</tr>
<tr>
<td>Confidence level</td>
<td>Definite</td>
</tr>
<tr>
<td>Duration</td>
<td>Without M</td>
</tr>
<tr>
<td>Duration of the project</td>
<td>High</td>
</tr>
</tbody>
</table>

6.2.2. Separation Distances

To ensure safety to public and in accordance with the law. Further, due to potential of explosion, ANE plant are operated within certain separation distance from settlements or national installation. In this case, the nearest installation is a Walvis airport, the Rooikop Army base and a Quarry. According to the UN3375 Code of Practice of storage and handling of explosives, a minimum distance of 1.3km must be maintained from human settlement. There is no human settlement in a radius of 2km.
6.2.3. Chemicals Management

The storage and handling of chemicals is done at the storage facility, which already has an ECC and an EMP in place. However due consideration must be applied when handling chemicals.

Mitigations

- There must be an emergency response plan for chemical spillages
- Operators handling chemical must be well trained
- There must be regular monitoring of leakages at welding intersections, pumps valves and all possible chemical leakages points
- The loading areas of chemical must be a concrete bund
- Diesel fuel and any other oil must be stored on a bunded structure
- Fueling of vehicles must take place on bunded structure

Figure 5. Separation distances
The hazardous material assessment of the production of ANE is given table below

Table 8. Assessment of Hazardous Materials (Source: Umwelt Pty Ltd December 2009²)

<table>
<thead>
<tr>
<th>Hazardous Material</th>
<th>Classification</th>
<th>Hazard</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ammonium nitrate solution (ANS)/oxidiser solution (OXS)</td>
<td>Class 5.1 Oxidiser</td>
<td>Decomposition due to excessive heating and/or contamination, Explosion if decomposition gases are sufficiently confined, Toxic decomposition gases</td>
<td>• ANS and OXS are highly insensitive to friction, impact and sparks (i.e have a low explosion risk when uncontaminated)</td>
</tr>
<tr>
<td>Ammonium nitrate emulsion (ANE) meeting UN3375 classification</td>
<td>Class 5.1</td>
<td>Decomposition due to excessive heating and/or contamination, Sensitivity to accidental decomposition/detonation is increased by the presence of energetic sensitizing materials or chemical contaminants</td>
<td>• ANE are insensitive to friction and impact and also insensitive to sparks</td>
</tr>
<tr>
<td>Ammonium nitrate (AN)</td>
<td>Class 5.1 Oxidiser</td>
<td>Toxic decomposition gases</td>
<td>• If high temperature and confinement are</td>
</tr>
</tbody>
</table>

² Orica ANE Facility and Continued Operation Environmental Assessment
<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Solid AN may explode under confined and high temperature, but is not readily detonated</td>
<td>not present solid AN requires a high energy shockwave (e.g from high explosive) to detonate</td>
<td>When molten it may decompose violently due to pressure or shock</td>
</tr>
<tr>
<td>Combustibles</td>
<td>C1 and C2 combustible will be used at the ANE Plant</td>
<td>Combustible are difficult to ignite in the absence of a direct flame</td>
<td>Combustibles fires as a possible source of external heat to the AN, ANE and ANS inventories only.</td>
</tr>
<tr>
<td>Sodium Nitrate</td>
<td>Class 5.1 oxidiser</td>
<td>Heat, shock, or contact with other materials may cause fire or explosive decomposition</td>
<td>It is extremely toxic if ingested</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>For the assessment sodium nitrate is treated as having the same hazards as AN.</td>
</tr>
</tbody>
</table>

6.2.4. Storm Water

The chances of a storm is almost zero at this area, however, in case of 1:100, a storm water management such as an earth bund and drainages may be constructed.
6.2.5. Waste Generation

In general, the production cycle of ANE does not produce waste. ANE that do not meet the standard is fed back into the process. However, other waste from complementary services shall be generated during the operation of the project. Stationary waste from offices, workshop waste such as paints, used containers, broken part / equipments and sewerage.

**Mitigation**

- Develop a waste management plan for various waste
- Contract a waste management contractor for waste collection
- Dangerous waste must be disposed of at Walvis Bay dumpsite at the hazardous cell
- Bags and containers used for the storage of dangerous good, must be disposed using accredited waste contractor
- Skip bins must be made of small mesh to avoid general waste being blown away by wind
- A septic tank system must be used on site (Various Septic Tank management exist).

<table>
<thead>
<tr>
<th>IMPACT: GENERAL WASTE MANAGEMENT</th>
<th>OPERATIONAL PHASE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impact type</td>
<td>Probability</td>
</tr>
<tr>
<td>Scale</td>
<td>Local</td>
</tr>
<tr>
<td>Duration</td>
<td>Duration of the project</td>
</tr>
</tbody>
</table>

6.2.6. Employment

Namibia has one of the highest unemployment in the world. The project is anticipated to create sustainable employment for both professional and general workers. To ensure local economic empowerment.
6.2.7. Improved land value

Although Namibia enjoys the pristine environment, especially along the coast, an environmental friendly project like this would add value to the land and improve the livelihood of the people.

6.2.8. Contribution to country GDP

The project is expected to contribute to country’s GDP through taxes.

6.2.9. Health

The decomposition of ANS cause Nitrogen Oxide (NOx) which is a noxious gas.

Mitigation

- Ensure adequate monitoring of noxious gases

6.2.10. Traffic

The impact of traffic during the operation is negligible as an average of 5 trucks maybe transporting ANE from the site to the mines. However, ANE must be transported in accordance with the laws regulating the transport of dangerous good.
Chapter 7

7. Decommissioning plan

The project decommissioning will entail the following activities

- Removal of concrete slabs
- Filling of septic tanks
- Removal of fences

The container shall not be dismantled, however cleaning of equipment pose risk of environmental contamination.

Mitigation

- Inform the relevant authorities (MET, WB Municipality), and workers at least six months prior decommissioning
- Contract an environmental practitioner and engineers to prepare a decommissioning plan
- Concrete slabs must be disposed with approval from the municipality.
- The compacted place on site must softly be ripped
- Re-introduce Dwarf Shrubs onsite
Chapter 8

8. Conclusions and Recommendations.

8.1. Conclusions

The proposed project is a milestone in the industrial development of Namibia. It has been hailed as the Namibian Chamber Of Mines as a catalyst in value addition in the mining sector. The project shall be using the latest containerised technology, unlike conventional plant with huge foot prints and negative environmental impacts. Major identified impact such as fire and explosion can be mitigation with high 100% confidence. The area is perfectly selected because it is 25km from Walvis Bay town or residential areas. The area meets the required separation distance by the UN Code Practice of UN3375 and A.S 2187.1.

This project is complementary to the existing and operational Native Storage facility that mainly store Ammonium Nitrate. The ANE production plant shall be 800 m south of the storage plant. TEC believes that, the above impact assessment is adequate. Hence with full implementation of the EMP, the project would be environmentally sustainable.

8.2. Recommendations

TEC recommends to the Environmental Commissioner for the issuance of the Environmental Clearance Certificate with the following condition.

- During operations, the project must submit bi-annual environmental performance reports.
- The scope of this EIA did not include the transportation of Emulsion to end user within Namibia and abroad. The proponent must develop an Environmental Management Plan for the transportation of products.
Chapter 9

9. Reference

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9.1. Appendices

**Appendix 1.** Lease Advert and Lease Agreement
Appendix 2. Safety Clearances, NDF and MSS
Appendix 3. NACOMA area classification or Assessment
Appendix 4. Background Information Document
Appendix 5. Site Notices
Appendix 6. Newspaper Adverts
Appendix 7. Public Meeting Register
Appendix 8. Environmental Management Plan
Appendix 9. Environmental Clearance Certificate for the Storage Facility
Appendix 10. Orica Australia and Hanwha Safety and Emergency Plans
Appendix 11. Curriculum Vitae for Environmental Practitioner