2022

ENVIRONMENTAL MANAGEMENT PLAN - Construction And Operation of Ammonium Nitrate Emulsion Plant at Walvis Bay, Farm 38, Erongo Region

ECT

Native Storage Facility

ENVIRONMENTAL MANAGEMENT PLAN

FOR NATIVE STORAGE FACILITY, FARM 38 WALVIS BAY, ERONGO REGION

PROJECT DETAILS

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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

1. INTRODUCTION

Native Storage Facility (NSF) is a 100% owed Namibian company. In 2019, the company was issued with an Environmental Clearance Certificate (ECC) for construction and operation of an Ammonium Nitrate Emulsion Plant situated on a leased portion of farm 38 belonging to Walvis Bay Municipality in the Erongo Region. 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 company subsequently set up a facility to manufacture mining explosives using inverse emulsification of Ammonium Nitrate technology. The company has in this regard obtained another leasehold portion farm 38 adjacent to the storage plant. The two establishments are approximately 800m apart due to recommended safety separation distance. Storage of materials are thus handled at the storage facility and supplied to the emulsion plant.

Widely, ammonium nitrate NH_4NO_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 manufacturing of ANE is 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 is 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 pioneer 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 in the Desert. Hence there is no significant impact on vegetation. The Namib Desert is home to many wildlife, large 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 establishments is within the UN prescribed UN3375 code of practice for the storing and handling of dangerous good. Various safety measures from best practice have been recommended.

Environmental impact and hazards associated with the project have been identified during the initial EIA and adequate and practical mitigation measures have been developed to ensure environmental protection and sustainability.

In terms of section 27 of the Environmental Management Act, 2007 (Act 7 of 2007) certain activities, including mining and quarrying, may not be undertaken without an Environmental Clearance Certificate (ECC).

The proponent has applied for and was issued with an approved Environmental Clearance Certificate in 2019, which has lapsed in 2022. The proponent appointed Environam Consultants Trading cc (ECT) to undertake the process of applying for the renewal of the ECC for the activity from the Office of the Environmental Commissioner in the Ministry of Environment, Forestry and Tourism (MEFT). The process will be undertaken in terms of the gazetted Namibian Government Notice No. 30 Environmental Impact Assessment Regulations (herein referred to as EIA Regulations) of the Environmental Management Act (No 7 of 2007) (herein referred to as the EMA). An Environmental Management Plan (EMP) is required to accompany the application for the renewal. This assignment will thus include a review and update of the initial EMP prepared for the proponent when the Environmental Impact Assessment was carried out.

An EMP is one of the most important outputs of the EA process as it synthesises all of the proposed mitigation and monitoring actions, set to a timeline and with specific assigned responsibilities. The EMP details the mitigation and monitoring actions to be implemented during the following phases of this development:

- Planning and Design – the period, prior to construction, during which preliminary legislative and administrative arrangements, necessary for the preparation of the land, are made and engineering designs are carried out. The preparation of construction tender documents forms part of this phase;
- Construction – the period during which the proponent, having dealt with the necessary legislative and administrative arrangements, appoints a contractor for the construction of services infrastructure, buildings as well as any other construction process(s) within the development areas;

- Operation and Maintenance – the period during which the development will be fully functional, operational and maintained.

It is not envisaged to decommission the development in the immediate future. However, should this be considered at the end of its useful life, the area has to be restored to *ante operam* conditions. It is recommended that a decommissioning plan should be developed within the first 24 months of the approved renewal.

2. MANAGEMENT ACTIONS

Native Storage Facility (the Developer) is ultimately responsible for the implementation of the EMP, from the planning and design phase to the decommissioning phase of this development, if the development is in future decommissioned. The developer will delegate this responsibility as the project progresses through its life cycle. The delegated responsibility for the effective implementation of this EMP will rest on the following key individuals:

- Developer's Representative;
- Environmental Control Officer; and
- Contractor (Construction and Operations and Maintenance).

2.1. DEVELOPER'REPRESENTATIVE

The Developer should assign the responsibility of managing all aspects of this development for all development phases (including all contracts for work outsourced) to a designated member of staff, referred to in this EMP as the Developer's Representative (DR). The Developer may decide to assign this role to one person for the full duration of the development, or may assign a different DR to each of the development phases – i.e., one for the planning and design phase, one for the construction phase and one for the operation and maintenance phase. The DR's responsibilities are depicted in Table as follows:

Table 2-1: DR's responsibilities

Responsibility	Project Phase
Making sure that the necessary approvals and permissions laid out in **Error! Reference source not found.** are obtained/adhered to	Throughout the lifecycle of this development
Making sure that the relevant provisions detailed in the tables in Chapter 5 are addressed during the various phases phase.	• Construction • Operation and maintenance
Suspending/evicting individuals and/or equipment not complying with the EMP	• Construction • Operation and maintenance
Issuing fines for contravening EMP provisions	• Construction • Operation and maintenance

2.2. ENVIRONMENTAL CONTROL OFFICER

The DR should assign the responsibility of overseeing the implementation of the whole EMP on the ground during the construction and operation and maintenance phases to a designated member of staff, referred to in this EMP as the Environmental Control Officer (ECO). The DR/Developer may decide to assign this role to one person for both phases, or may assign a different ECO for each phase. During the operation phase the Developer may outsource the monitoring and evaluation of the EMP to an independent Environmental Consultant. The ECO will have the following responsibilities during the construction and operation and maintenance phases of these developments:

- Management and facilitation of communication between the Developer, DR, the contractors, and Interested and Affected Parties (I&APs) with regard to this EMP;

- Conducting site inspections (recommended minimum frequency is quarterly) of all construction and/or infrastructure maintenance areas with respect to the implementation of this EMP (monitor and audit the implementation of the EMP);
- Assisting the Contractor in finding solutions with respect to matters pertaining to the implementation of this EMP;
- Advising the DR on the removal of person(s) and/or equipment not complying with the provisions of this EMP;
- Making recommendations to the DR with respect to the issuing of fines for contraventions of the EMP; and
- Undertaking an annual review of the EMP and recommending additions and/or changes to this document.

2.3. CONTRACTOR

Contractors appointed by the Developer are automatically responsible for implementing all provisions contained within the relevant chapters of this EMP. Contractors will be responsible for the implementation of this EMP applicable to any work outsourced to subcontractors. In order to ensure effective environmental management, the aforementioned chapters should be included in the applicable contracts for outsourced construction, operation and maintenance work.

The tables in **Chapter 5** detail the management measures associated with the roles and responsibilities that have been laid out in this chapter.

3. ASSUMPTIONS AND LIMITATIONS

This EMP has been drafted based on the review and update of the EMP that was developed during the scoping-level Environmental Assessment (EA) conducted for the proposed development as represented by the developer. ECT will not be held responsible for the potential consequences that may result from any alterations to the initial concept and layout.

It is assumed that construction labourers will be sourced mostly from the Walvis Bay area and that migrant labourers (if applicable) will be housed within the town of Walvis Bay.

4. APPLICABLE LEGISLATION

Legal provisions that have relevance to various aspects of this development are listed in **Table 4-1 below**. The legal instrument and applicable corresponding provisions are provided.

Table 4-1: Legal provisions relevant to this development

Legislation	Summary	Applicability
The Namibian Constitution	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".	Contact an EIA to maintain the ecological process and diversity of the project area
The Environmental Management Act	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 provide for a process of assessment and control of activities which may have significant effects on the environment; and to provide for incidental matters. The act provides a list of activities that may not be undertaken without an environmental clearance certificate. Further, the Act ensures that; (a) Potential threats are considered timeously (b) Comprehensive stakeholder's consultations are conducted and all Interested and affected parties are given an opportunity to comment on the project (c) Decisions are robust by taking into account the above-mentioned activities	Statutory requirement of the EIA and guidelines

Legislation	Summary	Applicability
Draft Pollution Control and Waste Management Bill	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 and 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.	Management of Waste, and any pollutant as a result of the construction of the emulsion plant
Atmospheric Pollution Prevention Ordinance Act No.11 of 1976)	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 pertaining to point source emissions have to obtain a registration certificate from the Department of Health.	To prevent the generation excessive noxious or offensive gasses

Legislation	Summary	Applicability
Environmental Policy framework (1995)	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.	General requirement of the EIA and guidelines
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.
Public Health Act No. 36 of 1919	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.	The proponent should ensure that the site is off limits from public.

Legislation	Summary	Applicability
Water Resources Management Act (2004)	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.	There no water course, neither the area does not receive significant rainfall to cause impact on the water resource.
Water Act No, 54 of 1956	This act states that, all water resources belong to the State. It prevents pollution and promotes the sustainable utilization of the resource. To protect these resources, this act requires that permits are obtained when activities involve the following; (a) Discharge of contaminated waste 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
Petroleum Product and Energy Act No, 13 of 1990	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.	Safe handling of the hydrocarbons

Legislation	Summary	Applicability
Labour Act No. 6 of 1992	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.	No employer shall require or permit an employee to work in an environment that is deemed unfit without protective measures in place.
Regional Council Act, 1992 (Act No. 22 of 1992)	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.	Adhere to regional by laws
Soil Conservation Act No. 76 of 1969	This act promotes the conservation of soil, prevention of soil erosion.	Improper planning of construction can cause soil degradation and erosion through earth work.
Hazardous Substances Ordinance No. 14 of 1974	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.	Handling of fuel, ANE, and explosion risks

Legislation	Summary	Applicability
National Heritage Act No. 27 of 2004	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.
International 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 the 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 take responsibility of their actions. Hence in cases of pollution, the proponent bears the full responsibility to clean up the environment.	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 proponent must be responsible to clean up the environment.

5. MANAGEMENT ACTIONS

The aim of the management actions in this chapter of the EMP is to avoid potential impacts where possible. Where impacts cannot be avoided, measures are provided to reduce them.

The following tables provide the management actions recommended to manage the potential impacts rated in the scoping-level EA conducted for this development. These management actions have been organised temporally according to construction and operation project phases:

The responsible persons at the Developer's team have assessed these commitments in detail and have committed to the specific management actions where indicated in the tables below.

Section A: Staff Induction

Potential Sources of Impacts:

- Employees working without employment contracts (recipe for labour disputes)
- Lack of adequate induction to inform the workers the Do's and Don'ts
- No formal orientation process and workers are often disoriented
- Poor Communication
- No presentation of the EMP and workers are not aware of the content and risks associated with the activities / actions

Table 5-1. Mitigation measures during staff induction (Construction and Operation phases)

Environmental / Social Aspects	Objective	Mitigation Measures	Monitoring Indicator	Party responsible	Monitoring Results
Recruitment	To ensure that all workers have employment contracts (Labour Act No. 11 of 2007)	Formalize recruitment of all staff with Contracts, stating nature of employment, duration and remuneration to protect both parties and avoid labour disputes later on	Copy of staff contracts	Site Manager / Contractor	The proponent met this provision of the EMP. Native Storage has a management arrangement with Transworld Cargo (TC) where TC manages employment and payroll aspects of the operations.

Environmental / Social Aspects	Objective	Mitigation Measures	Monitoring Indicator	Party responsible
Staff induction	To ensure that all staff/ employees are conversant with the requirements of the EMP	1. Induction for all staff / employees on the provisions of the EMP before work commencement, covering but not limited to: environmental awareness, emergency response, Reporting of incidents, HIV/AIDS awareness, alcohol and substance abuse, and Safety, Health and Environment (SHE) measures 2. Staff operating equipment (such as loaders, etc.) shall be adequately trained and sensitized to any potential hazards associated with their tasks 3. Quarterly induction reviews 4. Ensure that a copy of EMP is kept on site and accessible	Induction Minutes and Attendance Register, Signed by each and every staff member Staff members appointed at a later stage should also undergo induction Quarterly minutes Availability of EMP on site	Site Manager

Environmental / Social Aspects	Objective	Mitigation Measures	Monitoring Indicator	Party responsible
	employment contracts	1. Adopt a disciplinary system to discipline staff for non-compliance, such as littering, speeding, safety risk both to themselves and to others, not using ablution facilities, etc.	Number of fines/warning issued daily/Monthly	Site Manager
Site Demarcation	To contain all project activities within the site boundaries	1. Clearly demarcate the construction site with visible marking (e.g., fence, pegs, tape etc.) 2. Construction materials must be kept at approved warehouses or within the site premises.	Temporary fencing or any other visible site demarcation in place Construction activities are contained within the project site	Site Manager

Environmental / Social Aspects	Objective	Mitigation Measures	Monitoring Indicator	Party responsible
Communication	To ensure effective communication throughout the project lifespan	1. Develop a communication strategy (Chanel and medium of communication) 2. All correspondence should be written and signed off by witnesses (e.g., Site manager and team leaders) 3. The contact numbers for the Site Manager and Team Leaders must be available onsite (displayed) in case of emergencies. 4. There must be an alarm bell for emergency communication	Communication Strategy Letters, e-mail, Notices, Minutes	Site Manager
General Notice Board	To notify and warn the public of any construction activities	1. A general notice board must be erected at the site entrance to notify the public of the activities on site.	Notice Board – Visible and Clear	Site Manager

Section B: Health and Safety

Potential Sources of Impacts:

- Inadequate training of employees or contractors on risks associated with construction and operation activities
- Safety hazards may occur if equipment is not handled in the correct manner
- Employees not receiving the correct Personal Protective Equipment (PPE) for their specific responsibilities.
- Employees not adhering to safety rules implemented at the site
- Noise generated by construction vehicles and equipment during the construction activities

Table 5-2. Aspects of Health and Safety during Construction and Operation Phases

Environmental / Social Impact	**Objectives**	**Mitigation Measures**	**Monitoring Indicator**	**Party responsible**
General Safety at Work Place	Ensure that the safety of workers is not compromised and adhere to the Health and Safety	1. Develop a Health and safety Plan (Should be part of the induction) 2. Train staff/employees on personnel safety and how to handle equipment and machinery 3. Provide protective gear for all site staff (helmets, safety straps / reflective vests, hand gloves etc.)	Health and Safety included and reflected in the Induction Minutes adequate protective gear for all staff	Site Manager

Environmental / Social Impact	Objectives	Mitigation Measures	Monitoring Indicator	Party responsible
	Regulations, Government			

Environmental / Social Impact	Objectives	Mitigation Measures	Monitoring Indicator	Party responsible
	Notice 156/1997 (GG 1617)	4. Provide sufficient fire extinguishers and train staff on how to use them and the applications thereof. 5. Assign designated area for storage of construction material so that it does not pose danger to the staff. 6. During construction, minor accidents are eminent, hence there must be a first aid kit; 7. Only qualified personnel must be allowed to operate special machines/instruments 8. No employee must be allowed to be onsite without PPE; 9. Adequate safety signs must be displayed on site.	Availability fire extinguishers training (e.g., minutes, training pic) Availability of a first aid kit on site	
	Separation distances	According to the UN3375 Code of Practice of storage and handling of		

Environmental / Social Impact	Objectives	Mitigation Measures	Monitoring Indicator	Party responsible
		explosives, a minimum distance of explosives, a minimum distance of1.3km must be maintained from human settlement		

Environmental / Social Impact	Objectives	Mitigation Measures	Monitoring Indicator	Party responsible
Road Safety	Prevent traffic hazards / inconveniences from earth moving machinery (heavy vehicles) during construction period	1. Signage to warn motorists about construction activities and presence of earth moving machinery 2. Adhere to traffic rules and speed limits both on and off the construction site. 3. Construction vehicle must have all necessary reflective signage and signal lamps	Public Complaints / Incident repo	Site Manager
Ablution	Reduce health risks and environmental pollution and ensure healthy working environment with	1. Ensure adequate, hygienic (clean) and user-friendly ablution facilities for all staff. 2. Provision of separate Male and female toilets at a ratio of 1:15 for females and 1:30 for males; 3. Appoint a cleaner or rotate cleaning responsibilities among workers.	availability, cleanliness and hygienic ablution facilities Incidents or complaints of waste discharge into the environment	Site Manager

Environmental / Social Impact	Objectives	Mitigation Measures	Monitoring Indicator	Party responsible
	appropriate toilets	4. Inspect ablution facilities regularly		

Environmental / Social Impact	Objectives	Mitigation Measures	Monitoring Indicator	Party responsible

Environmental / Social Impact	Objectives	Mitigation Measures	Monitoring Indicator	Party responsible
Septic tank	Ensure no leakages and proper maintenances	1. Ensure septic tank system is installed in accordance with statutory regulation 2. The wall and floor must be concrete slabs and ensure no seepage to the ground 3. Frequent monitoring to establish the level of waste water 4. Ensure frequent emptying to prevent overflow	Records of septic spillages Records of sewerage sludge collection	Site Manager
Dust and Noise	Mitigate dust and noise impacts to both employees and the public	1. Use dust suppression measures to mitigate dust impacts, note, water is scarce resource and must be used sparingly, use alternative method such as DUSTEX. 2. Avoid working during heavy winds 3. Provide dust masks and ear muffs to all employees operating in a dusty or noisy environment	Incident Report Public Complains	Site Manager

Environmental / Social Impact	Objectives	Mitigation Measures	Monitoring Indicator	Party responsible
		4. All vehicles must be switched off when not operational, 5. During construction only work during normal working hours, do not work during the night		
Fire and Explosion Risk	To prevent fire and explosions	1. Access to the emulsion products must strictly be by authorized personnel, 2. Obtain all necessary document for manufacturing, handling and storage of explosives from relevant authorities, 3. Implement product contamination controls to prevent ANS and ANE contamination from other products, 4. Maintain a proper recording system of what is produced and	Records of Access to the ANE products Dangerous and Explosion licenses available on site, Anti-contamination protocols available on site Reconciliation records Training Minutes	Site Manager

Environmental / Social Impact	Objectives	Mitigation Measures	Monitoring Indicator	Party responsible
		reconcile with what is received by the clients 5. Staff must be properly trained on how to react and handle AN fire 6. There must be automatic fire alarm		

Environmental / Social Impact	Objectives	Mitigation Measures	Monitoring Indicator	Party responsible
		system installed at the site 7. Firefighting equipment must be on site 24hours and regularly inspected to ensure that they are working 8. Emergency response numbers must be on clear and visible space 9. There must be clear hazard signs "NO OPEN FIRE" "NO SMOKING" "SWITCH ENGINE OFF" 10. There must be drills to test staff about their readiness to fight the fire 11. Emergency evacuation must not be more than 20 minutes 12. The emergency assembly point must be 1.2 km away from the site	Automatic fire system on site Availability of firefighting equipment Displayed and visible emergency response Clear elected signs Drill reports Drill evacuation reports Visible assembly point	

Environmental / Social Impact	Objectives	Mitigation Measures	Monitoring Indicator	Party responsible
Chemical Management	To ensur of safe e handling chemical	1. There must be an emergency response plan for chemical spillages	Emergency spill kits	
Environmental / Social Impact	**Objectives**	**Mitigation Measures**	**Monitoring Indicator**	**Party responsible**
		2. Operators handling chemical must be well trained 3. There must be regular monitoring of leakages at welding intersections, pumps valves and all possible chemical leakages points 4. The loading areas of chemical must be a concrete bund 5. Diesel fuel and any other oil must be stored on a bunded structure 6. Fueling of vehicles must take place on bunded structure	Training Minutes Visible concrete bunds	

Section C: Pollution Control and Waste Management

Potential sources of impacts

- Generally, construction sites generate considerable amounts of waste, with no proper waste management and disposal systems
- Disregard of the pollution impacts (often considered insignificant e.g littering, oil spills etc)
- Poor management, storage and disposal of concrete and cement or spillages from equipment used for construction (e.g. cement mixers), and general spillage of contaminated wash or wastewater
- Oil spills (includes fuel, grease, etc)
- Leaking or broken sewerage pipes
- Storage of unwanted waste (e.g old / waste tyres) and poor disposal systems dispose ▫ Spoiled emulsions

Table 5-3. Aspects of Waste Management during Construction and Operation Phases

Environmental / Social Impact	Objectives	Mitigation Measures	Monitoring Indicator	Party Responsible
Vehicle emissions	Reduce greenhouse gas (GHG) emissions from poorly maintained or malfunctioning equipment (vehicles / machinery	1. All vehicles and equipment shall be kept in good working condition and serviced regularly (in accordance with the servicing frequency of the specific machinery), in order to prevent leakage and emission of poisonous smoke etc. 2. Switch off engines when vehicle is not operations	Vehicle servicing records Reports of smoke emissions from machinery	Site Manager
Oil Spills	Manage oil spills and leak from construction vehicles and Machinery	1. Use authorized fuel transport companies and individual that meets the required standards to transport fuel 2. Staff must be properly trained to ensure that there is no fuel spill during fuelling 3. During dispensing of fuel, the site must be demarcated with a danger tape, and it should be carried out by competent and experience personnel	Physical verification and routine monitoring	Site Manager

Environmental / Social Impact	Objectives	Mitigation Measures	Monitoring Indicator	Party Responsible
Leakages		4. Fuel tanks must be placed at concrete bund to prevent spill seepage 5. There must be an immediate spill response kit on site 6. Ensure all vehicle are well serviced and leak inspections are done 7. Provide drip trays to stationary vehicle 8. No servicing of vehicle must be done on site 9. There must be a re-fuelling area on concrete bund on site 10. Storage of fuel, oil and lubricants must be kept on bunded structure 11. If an oil spill occurs, collect the contaminated soil, store in drums and dispose at appropriate waste disposal site (e.g., Municipal disposal site) 12. Bund and concrete slabs should be installed at each point where hazardous materials are handled.		

Environmental / Social Impact	Objectives	Mitigation Measures	Monitoring Indicator	Party Responsible
		13. Contract oil recycling companies for the disposal of waste oils		
Waste Water	To prevent public exposure to waste water To avoid contamination of clean water resources	1. Waste water contaminated with grease and hydrocarbons must be collected and disposed of at approved site	Sighting of open sewer / waste water Reports / public complains	Site Manager
Storm Water		1. Install storm water surge and drainage system, to contain surface run-off from rainfall. 2. Due to low to no rainfall, consider an earth bund for storm water	Flooding onsite or in the nearby surrounding	Site Manager

Environmental / Social Impact	Objectives	Mitigation Measures	Monitoring Indicator	Party Responsible
Solid Waste	To manage solid waste both during the construction and operational phases To prevent littering, pollution,	1. Construction sites generate garbage, refuse and building rubbles. Therefore, waste generated from the construction site should be classified into different categories, e.g., Material Waste (Wood, steel, corrugated iron, etc.), Building Rubble (concrete, bricks etc.), Garden	Scattered waste, Littering and any other unsightly waste at the site (eyesore)	Site Manager

Environmental / Social Impact	Objectives	Mitigation Measures	Monitoring Indicator	Party Responsible
	contamination of water and general environmental health hazards	Waste (tree stumps, branches, etc.), Domestic Waste (Litter – cans, plastics, tissue, plastics etc.) 2. Each category should be collected separated disposed of, in the most suitable and environmentally acceptable manner 3. All waste produced on site should be contained and disposed as required by law 4. There must be sufficient skip containers at the site for building rubbles 5. There must be sufficient temporally ablution facility at the site for designated for males and female. 6. Waste generated must be disposed of at approved sites		

Environmental / Social Impact	Objectives	Mitigation Measures	Monitoring Indicator	Party Responsible
		7. No onsite burying, dumping or burning of waste material shall be permitted.		

Environmental / Social Impact	Objectives	Mitigation Measures	Monitoring Indicator	Party Responsible
		8. Ensure appropriate waste collection and removal from the site and dispose at appropriate waste disposal site. 9. There must be sufficient waste bins. Colour segregated for different waste; 10. General waste must be separated from hazardous waste; 11. Hazardous waste must be disposed of at an approved site; 12. The Waste Bin for oil cans must be clearly marked Hazardous;		

Section D: Environment

Potential Sources of impacts;

- Uncontrolled routes (everyone drives wherever they want)
- Disregard of environmental values, concerns and recommendations
- Lack of awareness amongst workers and contractors of how their actions may impact on the environment
- Soil erosion due to the clearance of vegetation, excavations
- Loss of topsoil due to lack of rehabilitation and restoration measures
- Lack of adequate storm water management and drainage systems

Table 5-4. Aspects of General Environment during Construction and Operation Phases

Environmental and Social Aspects	Objectives	Mitigation Measures	Monitoring Indicator	Party responsible
Environmental monitoring and Evaluation	Conform to the conditions of the Environmental Clearance Certificate (ECC)	An Environmental Practitioner should be appointed to monitor the implementation of the EMP, and recommend any changes to this document when necessary.	Service Level Agreement in place Submission of Bi-annual Reports to the Environmental Commissioner	Site Manager
Surface Water	To avoid any potential water contamination from the construction site (run-off) and make provision for storm water drainage	1. Although no potential of occurrence, contain any run-off from the construction site with an earth bund	Storm water drainage system in place	Site Manager

Environmental and Social Aspects	Objectives	Mitigation Measures	Monitoring Indicator	Party responsible
Ground Water	To avoid contamination of underground water	1. Staff must be properly trained to handle hydrocarbons 2. Fuelling tanks must be installed on concrete bund 3. Waste water from wash bays for cars and machinery must be disposed of at appropriated site, alternatively they must be treated before released	Training minutes Physical Observations	Site Manager

Environmental and Social Aspects	Objectives	Mitigation Measures	Monitoring Indicator	Party responsible
Ecology	Protect trees and other plants and only remove trees when necessary	1. The site is almost free of vegetation, only one species of "Dwarf Shrub" which is sparsely distributed on site 2. Poaching of animals is strictly forbidden and punishable by law 3. Only used demarcated roads, no off-road driving 4. Bright lights scare wild life, do not use them at night	Inspection report	Site Manager
Soil Erosion	To avoid soil erosion	1. Soil erosion is mainly caused by wind and rain. Hence is important that	Physical Observation	Site Manager

Environmental and Social Aspects	Objectives	Mitigation Measures	Monitoring Indicator	Party responsible
		construction stops during heavy wind and during the rainfall season. 2. Movement of heavy vehicles must be coordinated and restricted to be within the site 3. Soil compaction must be done at site to avoid wind erosion		
Rehabilitation	To ensure that all disturbed areas are rehabilitated ✓ Removal of concrete slabs ✓ Filling of septic tanks ✓ Removal of fences	1. All areas disturbed as a result of the construction activities should be cleaned up and rehabilitated 2. Inform the relevant authorities (MEFT, WB Municipality), and workers at least six months prior decommissioning 3. Contract an environmental practitioner and engineers to prepare a decommissioning plan 4. Concrete slabs must be disposed with approval from the municipality.	Physical verification	Site Manager

Environmental and Social Aspects	Objectives	Mitigation Measures	Monitoring Indicator	Party responsible
		5. The compacted place on site must softly be ripped 6. Re-introduce Dwarf Shrubs onsite		

Section E: Cultural Heritage

Table 5-5. Aspects of Cultural Heritage during Construction and Operation Phases

Environmental / Social Aspects	Objective	Mitigation measures	Monitoring Indicator	Party responsible
Heritage Resources / artefacts	Reduce the impacts of construction and associated earthworks on heritage resources / artefacts	1. Workers must be trained on the possible find of archaeological material in the area 2. Establish a "Chance Find Procedure" where if any archaeological finding (Heritage (rock painting and drawings), human remains or artefacts) is encountered; a. The activity must be stopped immediately and the operation manager of that activity be informed; b. The manager must ensure the cordoning off the area with a danger tape and take appropriate records and pictures	Sighting report/s of heritage resources / artefacts	Site Manager

Environmental / Social Aspects	Objective	Mitigation measures	Monitoring Indicator	Party responsible
		c. The manager must immediately report the findings to the National Museum (+264 61 276800) or the National Forensic Laboratory (+264 61 240461). 3. No artefacts must be removed or be interfered with prior to authorisation from the Namibian National Heritage Council (NHC) 4. Recovery of heritage remains or artefacts discovered and removal thereof should be directed by the National Museum		

Section F: Socio-Economic

Table 5-6. Aspects of Socio-Economic during Construction and Operation phases

Environmental / Social Impact	Objectives	Mitigation Measures	Monitoring Indicator	Party Responsible
Employment opportunities for Locals	Promote benefits to the local community	1. Recruit locals for unskilled labour 2. Where possible, procure materials from local suppliers	Employee structure and proportion of local employment	Proponent and Contractors
Alcohol and Drug use	Prevent alcohol and drug use at the construction site	1. Ban and warn the employees against the use of alcohol and drug at construction site 2. Provide awareness on the dangers and health impacts of alcohol and drug use 3. All employees must be screened with a breathalyser to avoid intoxicated personnel on site	Drunk / Misbehaving employees Breathalyzer report Monitor presence of alcohol at the construction site	Site Manager
Working hours	Adhere to the Labour Act No. 11 of 2007	1. Operate within the prescribed working days and hours as per the Namibian Labour laws and regulations	Verification of working hours against the labour Act	Site Manager

Environmental / Social Impact	Objectives	Mitigation Measures	Monitoring Indicator	Party Responsible
Internship for students (Construction phase only)	Provide internships to students from technical institutions (e.g. NIMT, VTC etc.)	1. Provide internships opportunities for all trades 2. Advertise for student internships with NIMT, VTC etc.	Student internship register, trade etc.	Site Manager
HIV / AIDS	Provide HIV / AIDS awareness to employees	1. Provide HIV / AIDS awareness at induction 2. Avail Condoms in Toilets at site	Availability of condoms at construction site	Site Manager
Security	Orientation of workers about security for both equipment and themselves	1. Orientate all staff about the security of equipment and themselves & provide contact numbers for Police and other emergency services e.g. Ambulance	Proof of security orientation and emergency contact numbers	Site Manager

Section G. Hazard Material Assessment of ANE production

Table 5-7. Assessment of Hazardous Materials (Source: Umwelt Pty Ltd December 2009[1])

Hazardous Material	Classification	Hazard	Comments
Ammonium nitrate solution (ANS)/oxidiser solution (OXS)	Class 5.1 Oxidiser	• Decomposition due to excessive heating and/or contamination • Explosion if decomposition gases are sufficiently confined • Toxic decomposition gases	▫ ANS and OXS are highly insensitive to friction, impact and sparks (i.e have a low explosion risk when uncontaminated)
Ammonium nitrate emulsion (ANE) meeting UN3375 classification	Class 5.1	• 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	▫ ANE are insensitive to friction and impact and also insensitive to sparks
Ammonium nitrate (AN)	Class 5.1 Oxidiser	• Toxic decomposition gases • Solid AN may explode under confined and high temperature, but is not readily detonated	▫ If high temperature and confinement are not present solid AN requires a high energy shockwave (e.g from high explosive) to detonate

[1] Orica ANE Facility and Continued Operation Environmental Assessment

Hazardous Material	Classification	Hazard	Comments
			▫ When molten it may decompose violently due to pressure or shock
Combustibles	C1 and C2 combustible will be used at the ANE Plant	▫ Combustible are difficult to ignite in the absence of a direct flame	▫ Combustibles fires as a possible source of externa heat to the AN, ANE and ANS inventories only.
Sodium Nitrate	Class 5.1 oxidiser	▫ Heat, shock, or contact with other materials may cause fire or explosive decomposition	• It is extremely toxic if ingested • For the assessment sodium nitrate is treated as having the same hazards as AN.

6. CONCLUSIONS AND RECOMMENDATIONS

The inspection revealed that the operations on site are, to the most part, carried out with high regard to environmental sensitivities and that the provisions of the Environmental Management Plan for the activities have been met to a large extent. While challenges are likely to occur in an operation of this magnitude NSF has shown willingness to confront these challenges by willingfully subjecting itself to environmental monitoring with the view to act on those aspects that have a potential to negatively impact on the environment they operate in.

It is important that the proponent submit the bi-annual reports to the Environmental Commissioner as stipulated in the conditions of the ECC in the required time frame.

It is recommended that the proponent appoints an Environmental Practitioner to monitor the implementation of the EMP, and recommend any changes to this document when necessary.

It is also recommended that the proponent commissions a decommissioning plan within 12 months after approval of the application for the renewal of the ECC.

7. PHOTOPLATE

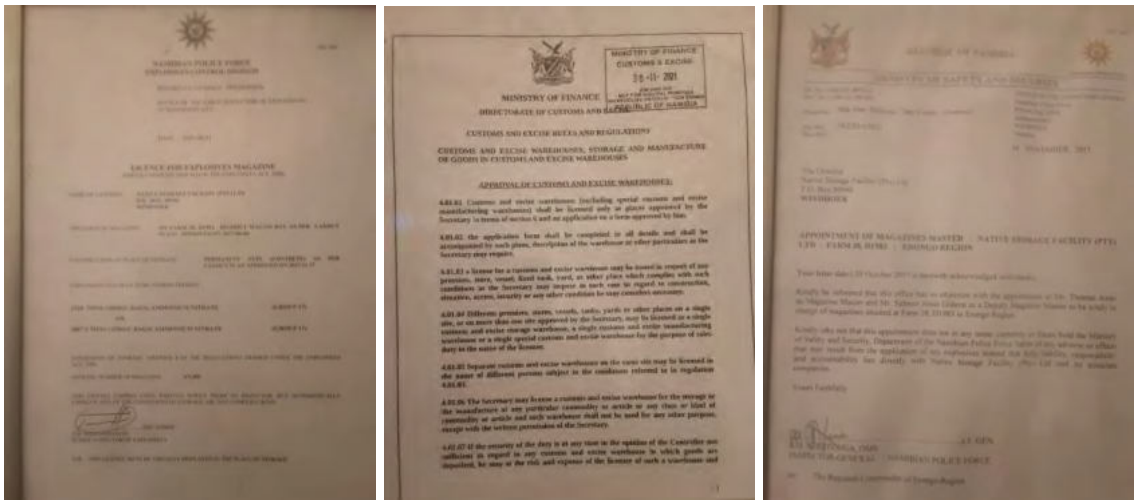

Figure 1: Dangerous and Explosion Licenses available on site

Figure 2: Ammonium Nitrate Emulsion Storage Tank

Figure 3: Self-bunded Diesel Fuel Tank and Signage

Figure 4: Ammonium Nitrate Emulsion Production Facility

Figure 5: Waste and Wastewater Management Facilities

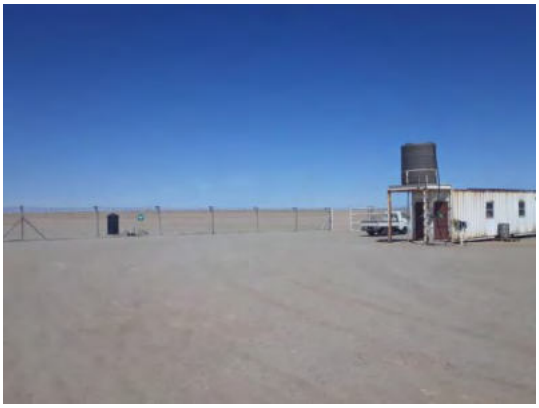

Figure 6: Storage Magazines and Admin Facilities

8. REFERENCES

Tortoise Environmental Consultants (TEC), 2019. ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONSTRUCTION AND OPERATION OF EMULSION PLANT AT WALVIS BAY, FARM 38, ERONGO REGION.

9. APPENDIX A – PREVIOUS ENVIRONMENTAL CLEARENCE CERTIFICATE

ECC – 0065

Serial: L2r3Md65

REPUBLIC OF NAMIBIA

MINISTRY OF ENVIRONMENT AND TOURISM

OFFICE OF THE ENVIRONMENTAL COMMISSIONER

ENVIRONMENTAL CLEARANCE CERTIFICATE

ISSUED

In accordance with Section 37(2) of the Environmental Management Act (Act No. 7 of 2007)

TO

Native Storage Facility cc
P.O.Box 80946, Walvis Bay, Walvis Bay, Namibia

TO UNDERTAKE THE FOLLOWING LISTED ACTIVITY

The proposed construction and operation of an ammonium Nitrate Emulsion plant at Walvis Bay, Farm 38, Erongo Region.

DEPUTY ENVIRONMENTAL COMMISSIONER

Issued on the date: 2019.07.26

Expires on this date: 2022.07.26

(See conditions printed over leaf)

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This certificate is printed without erasures or alterations

10. APPENDIX B – WATER QUALITY GUIDELINES

THE WATER ACT, 1956 (ACT 54 OF 1956) AND ITS REQUIREMENTS IN TERMS OF WATER SUPPLIES FOR DRINKING WATER AND FOR WASTE WATER TREATMENT AND DISCHARGE INTO THE ENVIRONMENT

1. INTRODUCTION

The provisions of the Water Act are intended, amongst other things, to promote the maximum beneficial use of the country's water supplies and to safeguard water supplies from avoidable pollution.

The drinking water guidelines are not standards as no publication in the Government Gazette of Namibia exists to that effect. However the Cabinet of the Transitional Government for National Unity adopted the existing South African Guidelines (461/85) and the guidelines took effect from 1April 1988 under the signature of the then Secretary for Water Affairs.

The sections of the Water Act that relate to the discharge of industrial effluents are:
- Section 21(1) which states that
-- The purification of waste water shall form an integral part of water usage and
-- that purified effluents shall comply with the General Standard Quality restrictions as laid out in Government Gazette R553 of 5 April 1962 and
- Section 21(2) which further stipulate that this purified effluent be returned as close as possible to the point of abstraction of the original water.
Where a local authority has undertaken the duty of disposing of all effluents from an industrial process the provisions of Section 21(1) and 21(2) apply to the local authority and not the producer of the effluents. If there is difficulty in complying with these provisions then the applicant may apply for an exemption from the conditions in terms of Section 21(5) and 22(2) of the Water Act. The Permanent Secretary after consultation with the Minister may grant the issuance of a Waste Water Discharge Permit under Sections 21(5) and 22(2) subject to such conditions as he may deem fit to impose.

After independence, the Government of the Republic of Namibia decided that for the interim the existing guidelines will continue to be valid and to remain in use until a proper study has been conducted and new standards have been formulated (Article 140 of Act 1 of 1990).

2. GUIDELINES FOR THE EVALUATION OF DRINKING-WATER QUALITY FOR HUMAN CONSUMPTION WITH REGARD TO CHEMICAL, PHYSICAL AND BACTERIOLOGICAL QUALITY

Water supplied for human consumption must comply with the officially approved guidelines for drinking-water quality. For practical reasons the approved guidelines have been divided into three basic groups of determinants, namely:

- Determinants with aesthetic / physical implications: TABLE 1.
- Inorganic determinants: TABLE 2.
- Bacteriological determinants: TABLE 3.

2.1 CLASSIFICATION OF WATER QUALITY

The concentration of and limits for the aesthetic, physical and inorganic determinants define the group into which water will be classified. See TABLES 1 and 2 for these limits. The water quality has been grouped into 4 quality classes:

- Group A: Water with an excellent quality
- Group B: Water with acceptable quality
- Group C: Water with low health risk
- Group D: Water with a high health risk, or water unsuitable for human consumption.

Water should ideally be of excellent quality (Group A) or acceptable quality (Group B), however in practice many of the determinants may fall outside the limits for these groups.
If water is classified as having a low health risk (Group C), attention should be given to this problem, although the situation is often not critical as yet.
If water is classified as having a higher health risk (Group D), urgent and immediate attention should be given to this matter.

Since the limits are defined on the basis of average lifelong consumption, short-term exposure to determinants exceeding their limits is not necessarily critical, but in the case of toxic substances, such as cyanide, remedial measures should immediately be taken.

The overall quality group, into which water is classified, is determined by the determinant that complies the least with the guidelines for the quality of drinking water.

TABLE 1: DETERMINANTS WITH AESTHETIC / PHYSICAL IMPLICATIONS

DETERMINANTS	UNITS*	LIMITS FOR GROUPS			
		A	B	C	D**
Colour	mg/l Pt***	20			
Conductivity	mS/m !at 25 °C	150	300	400	400
Total hardness	mg/l $CaCO_3$	300	650	1300	1300
Turbidity	N.T.U****	1	5	10	10
Chloride	mg/l Cl	250	600	1200	1200
Chlorine (free)	mg/l Cl	0,1- 5,0	0,1 – 5,0	0,1 – 5,0	5,0
Fluoride	mg/l F	1,5	2,0	3,0	3,0
Sulphate	mg/l SO_4	200	600	1200	1200
Copper	µg/l Cu	500	1000	2000	2000
Nitrate	mg/l N	10	20	40	40
Hydrogen Sulphide	µg/l H_2S	100	300	600	600
Iron	µg/l Fe	100	1000	2000	2000
Manganese	µg/l Mn	50	1000	2000	2000
Zink	mg/l Zn	1	5	10	10
pH****	pH-unit	6,0 – 9,0	5,5 – 9,5	4,0 – 11,0	4,0 – 11,0

* In this and all following tables “l” (lower case L in ARIAL) is used to denote dm^3 or litre
** All values greater than the figure indicated.
*** Pt = Platinum Units
**** Nephelometric Turbidity Units
***** The pH limits of each group exclude the limits of the previous group

TABLE 2: INORGANIC DETERMINANTS

DETERMINANTS	UNITS	LIMITS FOR GROUPS			
		A	B	C	D*
Aluminium	µg/l Al	150	500	1000	1000
Ammonia	mg/l N	1	2	4	4
Antimonia	µg/l Sb	50	100	200	200
Arsenic	µg/l As	100	300	600	600
Barium	µg/l Ba	500	1000	2000	2000
Beryllium	µg/l Be	2	5	10	10
Bismuth	µg/l Bi	250	500	1000	1000
Boron	µg/l B	500	2000	4000	4000
Bromine	µg/l Br	1000	3000	6000	6000
Cadmium	µg/l Cd	10	20	40	40
Calcium	mg/l Ca	150	200	400	400
Calcium	mg/l $CaCO_3$	375	500	1000	1000
Cerium	µg/l Ce	1000	2000	4000	4000
Chromium	µg/l Cr	100	200	400	400
Cobalt	µg/l Co	250	500	1000	1000
Cyanide (free)	µg/l CN	200	300	600	600
Gold	µg/l Au	2	5	10	10
Iodine	µg/l I	500	1000	2000	2000
Lead	µg/l Pb	50	100	200	200
Lithium	µg/l Li	2500	5000	10000	10000
Magnesium	mg/l Mg	70	100	200	200
Magnesium	mg/l $CaCO_3$	290	420	840	840
Mercury	µg/l Hg	5	10	20	20
Molybdenum	µg/l Mo	50	100	200	200
Nickel	µg/l Ni	250	500	1000	1000
Phosphate	mg/l P	1	See note below	See note below	See note below
Potassium	mg/l K	200	400	800	800
Selenium	µg/l Se	20	50	100	100
Silver	µg/l Ag	20	50	100	100
Sodium	mg/l Na	100	400	800	800
Tellurium	µg/l Te	2	5	10	10
Thallium	µg/l Tl	5	10	20	20
Tin	µg/l Sn	100	200	400	400
Titanium	µg/l Ti	100	500	1000	1000
Tungsten	µg/l W	100	500	1000	1000
Uranium	µg/l U	1000	4000	8000	8000
Vanadium	µg/l V	250	500	1000	1000

* All values greater than the figure indicated.

Note FOR Table 2 on phosphate: Phospates are not toxic and essential for all life-forms. Natural water will, however, seldom contain phosphate; it is generally seen as an indicator of pollution and is usually accompanied by other pollutants. Wherever drinking water is combined with or consists wholly of reclaimed or recycled water, it may be expected to contain phosphate. The general guideline for a concentration level to be aimed at is 1 mg/l as P. But in many cases this may be difficult to achieve technically. For this reason the Department will allow a phosphate concentration level of up to 5 mg/l as P in water intended for human consumption. Please refer also to the "Note on Phosphate" under Section 3: General Standards for Waste/Effluent.

2.2 BACTERIOLOGICAL DETERMINANTS

The bacteriological quality of drinking water is also divided into four groups, namely:

- Group A: Water which is bacteriological very safe;
- Group B: Water which is bacteriological still suitable for human consumption;
- Group C: Water which is bacteriological risk for human consumption, which requires immediate action for rectification;
- Group D: Water, which is bacteriological unsuitable for human consumption.

TABLE 3: BACTERIOLOGICAL DETERMINANTS

DETERMINANTS	LIMITS FOR GROUPS			
	A**	B**	C	D*
Standard plate counts per 1 ml	100	1000	10000	10000
Total coliform counts per 100 ml	0	10	100	100
Faecal coliform counts per 100 ml	0	5	50	50
E. coli counts per 100 ml	0	0	10	10

* All values greater than the figure indicated.
** In 95% of the samples.

NB If the guidelines in group A are exceeded, a follow-up sample should be analysed as soon as possible.

2.3 FREQUENCY FOR BACTERIOLOGICAL ANALYSIS OF DRINKING-WATER SUPPLIES

The recommended frequency for bacteriological analysis of drinking water is given in Table 4.

TABLE 4: FREQUENCY FOR BACTERIOLOGICAL ANALYSIS

POPULATION SERVED	MINIMUM FREQUENCY OF SAMPLING
More than 100 000	Twice a week
50 000 – 100 000	Once a week
10 000 – 50 000	Once a month
Minimum analysis	Once every three months

3 GENERAL STANDARDS FOR WASTE / EFFLUENT WATER DISCHARGE INTO THE ENVIRONMENT

All applications in terms of Section 21(5) and 22(2), for compliance with the requirements of Section 21(1) and 21(2) of the Water Act (Act 54 of 1956) that purified water shall comply with the General Standard as laid out in Government Gazette Regulation R553 of 5 April 1962.

TABLE 5 GENERAL STANDARDS FOR ARTICLE 21 PERMITS (EFFLUENTS)

DETERMINANTS	MAXIMUM ALLOWABLE LEVELS
Arsenic	0,5 mg/l as As
Biological Oxygen Demand (BOD)	no value given
Boron	1,0 mg/l as B
Chemical Oxygen Demand (COD)	75 mg / l as O
Chlorine, residual	0,1 mg/l as Cl_2
Chromium, hexavalent	50 µg/l as Cr(VI)
Chromium, total	500 µg/l as Cr
Copper	1,0 mg/l as Cu
Cyanide	500 µg/l as CN
Oxygen, Dissolved (DO)	at least 75% saturation**
Detergents, Surfactants, Tensides	0,5 mg/l as MBAS – See also Note 2
Fats, Oil & Grease (FOG)	2,5 mg/l (!gravimetric method)
Fluoride	1,0 mg/l as F
Free & Saline Ammonia	10 mg/l as N
Lead	1,0 mg/l as Pb
Oxygen, Absorbed (OA)	10 mg / l as O*
pH	5,5 – 9,5
Phenolic Compounds	100 µg/l as phenol
Phosphate	1,0 mg/l as P - See also Note 1
Sodium	not more than 90 mg/l Na more than influent
Sulphide	1,0 mg/l as S
Temperature	35°C
Total Dissolved Solids (TDS)	not more than 500 mg /l more than influent
Total Suspended Solids (TSS)	25 mg/l
Typical faecal Coli.	no typical coli should be counted per 100 ml
Zinc	5,0 mg/l as Zn

* Also known as *Permanganate Value* (or *PV*).
** In Windhoek the saturation level is at approx. 9 mg/l O_2.

Note (1) on phosphate: Phospates are not toxic and essential for all life forms. Natural water will seldom contain phosphate; it is generally seen as an indicator of pollution and is usually accompanied by other pollutants. Wherever drinking water is combined with or consists wholly of reclaimed or recycled water, it may be expected to contain phosphate. There is no general guideline for phosphate contained in the Regulation 553. But generally it is assumed that eutrophication or algal bloom in dams is promoted by nutrient concentrations as low as 0,01 mg/l as P; generally a phosphate concentration limit for dams of 0,1 mg/l is recommended. All water that is consumed and subsequently discharged, will eventually end up in rivers, dams or

groundwater – that is why for potable water, a concentration level of 1 mg/l as P is aimed at.
But, again, in many cases of waste and effluent treatment, this may be difficult to achieve technically, or the required waste and effluent treatment infrastructure is not available; as the required infrastructure is sophisticated and expensive. The current situation calls for a compromise and for this reason, this Department will judge each application individually on its merits and allow, in certain cases, a phosphate concentration level of up to 15 mg/l as P in any effluent or waste stream to be discharged into the environment. This regulation is subject to be reviewed every two years, calculated from the date of approval of this document.

Note (2) on detergents, surfactants and ten sides: The MBAS (or methylene blue active substances) – test does not encompass all surface active compounds currently, commercially available. The limit given is therefore only a guideline. Many of the cleaning agents are toxic to biological life-forms in rivers and dams.
It should be taken into consideration that some commercial products interfere with the effective removal of oil, fat and grease by grease and fat traps, by breaking up such long-chain molecules into shorter ones. These cleaning agents thus effectively allow such components to pass through the traps and land into sections of a treatment plant further down the line and interfere with the process there.
Many cleaning agents contain very powerful disinfectants, and/or biocides. Such substances may interact with biological treatment processes. They may reduce the effectiveness of such treatment or 'kill' it completely, if they land in septic tanks, biofilters or even activate-sludge plants. Their activity may be attenuated by dilution.

4. AUTHORIZATION

Herewith, the Guidelines for the Evaluation of Drinking Water for Human Consumption with regard to Chemical, Physical and Bacteriological Quality, as well as the General Standards for Article 21* Permits, amended for detergents, surfactants, ten sides, as well as phosphates, are confirmed and remain in force until further notice.

Issued under my hand with the authority vested in my office, within the Ministry for Agriculture, Water and Rural Development,

PERMANENT SECRETARY
Dr V Shivute

WINDHOEK, **DATE STAMP**

11. APPENDIX C - ENVIRONMENTAL MONITORING REPORT (2019-2022)

MONITORING REPORT

FOR NATIVE STORAGE FACILITY, FARM 38 WALVIS BAY, ERONGO REGION

2019 - 2022

PROJECT DETAILS

PROPONENT:

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Signature

29/09/2022

Date

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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

1. INTRODUCTION

Native Storage Facility (NSF) is a 100% owed Namibian company. In 2019, the company was issued with an Environmental Clearance Certificate (ECC) for construction and operation of an Ammonium Nitrate Emulsion Plant situated on a leased portion of farm 38 belonging to Walvis Bay Municipality in the Erongo Region. 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 company subsequently set up a facility to manufacture mining explosives using inverse emulsification of Ammonium Nitrate technology. The company has in this regard obtained another leasehold portion farm 38 adjacent to the storage plant. The two establishments are approximately 800m apart due to recommended safety separation distance. Storage of materials are thus handled at the storage facility and supplied to the emulsion plant.

Widely, ammonium nitrate NH_4NO_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 manufacturing of ANE is 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 is 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 pioneer 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 in the Desert. Hence there is no significant impact on vegetation. The Namib Desert is home to many wildlife, large 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 establishments are within the UN prescribed UN3375 code of practice for the storing and handling of dangerous good. Various safety measures from best practice have been recommended.

Environmental impact and hazards associated with the project have been identified during the initial EIA and adequate and practical mitigation measures have been developed to ensure environmental protection and sustainability.

In terms of section 27 of the Environmental Management Act, 2007 (Act 7 of 2007) certain activities, including mining and quarrying, may not be undertaken without an Environmental Clearance Certificate (ECC).

In compliance with section 27 of the Environmental Management Act, 2007 (Act 7 of 2007), Native Storage Facility (the proponent) has obtained an ECC in 2019 for their operations. This has since expired and an application for a renewal will be made. The ECC contains conditions that have to be adhered to during the period of its validity; in particular, it calls for regular environmental monitoring and evaluations on environmental performance to be conducted, as well as the setting and monitoring of targets for improvement. As part of this exercise bi-annual reports have to be submitted to the Office of the Environmental Commissioner for the duration of the ECC.

In order to compile the bi-annual reports, environmental monitoring inspections should be conducted on regular basis. It has to be mentioned that the proponent has not implemented this activity over the period 2019-2022. Native Storage Facility has thus appointed Environam Consulting Trading (ECT) CC as environmental consultants to undertake the monitoring and evaluation exercise for the period covering 2019 to 2022. This will then serve as support for the application of the renewal of the ECC.

The Environmental Management Plan (EMP) developed for the proponent makes provision for management actions. It is the management actions contained in the EMP that form the basis of monitoring report with special focus on the activities contained in the "Mitigation Measures" columns. In preparation for this report, ECT conducted extensive monitoring exercises on 12 August 2022.

The inspections comprise of two main parts, the first consisting of verbal feedback on the various identified impacts and mitigation measures as delineated in the EMP, with the second part taking the form of a visual inspection and verification throughout the storage and production site.

2. MANAGEMENT ACTIONS

The Environmental Management Plan (EMP) for this development has been compiled with the aim of identifying the management actions necessary to avoid potential negative environmental impacts where possible. Where impacts cannot be avoided, measures are provided to reduce the significance of these impacts. The section below provides a summation of the observations during the inspection exercises carried out for this period. The following tables delineate those impacts, and a synopsis of the observations will be provided in the column titled "MONITORING RESULTS". Note will also be taken that while the EMP has included construction and operational stages, this report is focussed on the operational phase only as the facility is in full production.

For the monitoring and evaluation exercise of 12 August 2022, we engaged the Deputy Magazine Master, Mr Salmon Jonas and Mr Kai Schnaitmann of Transworld Cargo. The mitigation measures and the level of compliance thereof have been flagged or scored by means of three (3) main colours i.e., green, orange and red. A legend provides the meaning of the different colours (see below). A green flagged remark indicates high level of compliance to the EMP and these areas should be maintained or even improved. Particular attention should be given to remarks marked orange and red, with the red being more critical as they indicate non-compliance.

LEGEND	
COMPLYING	
ONGOING ACTIVITIES, COMPLYING FOR THE MOST PART	
NON-COMPLYING, NEEDS ATTENTION	

Section A: Staff Induction

Potential Sources of Impacts:

- Employees working without employment contracts (recipe for labour disputes)
- Lack of adequate induction to inform the workers the Do's and Dont's
- No formal orientation process and workers are often disoriented
- Poor Communication
- No presentation of the EMP and workers are not aware of the content and risks associated with the activities / actions

Table 1. Mitigation measures during staff induction (Construction and Operation phases)

Environmental / Social Aspects	Objective	Mitigation Measures	Monitoring Indicator	Party responsible	Monitoring Results
Recruitment	To ensure that all workers have employment contracts (Labour Act No. 11 of 2007)	Formalize recruitment of all staff with Contracts, stating nature of employment, duration and remuneration to protect both parties and avoid labour disputes later on	Copy of staff contracts	Site Manager / Contractor	The proponent met this provision of the EMP. Native Storage has a management arrangement with Transworld Cargo (TC) where TC manages employment and payroll aspects of the operations.

Environmental / Social Aspects	Objective	Mitigation Measures	Monitoring Indicator	Party responsible	Monitoring Results
Staff induction	To ensure that all staff / employees are conversant with the requirements of the EMP	1. Induction for all staff / employees on the provisions of the EMP before work commencement, covering but not limited to: environmental awareness, emergency response, Reporting of incidents, HIV/AIDS awareness, alcohol and substance abuse, and Safety, Health and Environment (SHE) measures 2. Staff operating equipment (such as loaders, etc.) shall be adequately trained and sensitized to any potential hazards associated with their tasks 3. Quarterly induction reviews 4. Ensure that a copy of EMP is kept on site and accessible	Induction Minutes and Attendance Register, Signed by each and every staff member Staff members appointed at a later stage should also undergo induction Quarterly minutes Availability of EMP on site	Site Manager	The proponent met this provision of the EMP.

Environmental / Social Aspects	Objective	Mitigation Measures	Monitoring Indicator	Party responsible	Monitoring Results
	employment contracts	1. Adopt a disciplinary system to discipline staff for non-compliance, such as littering, speeding, safety risk both to themselves and to others, not using ablution facilities, etc.	Number of fines/warning issued daily/Monthly	Site Manager	The proponent met this provision of the EMP.
Site Demarcation	To contain all project activities within the site boundaries	1. Clearly demarcate the construction site with visible marking (e.g. fence, pegs, tape etc.) 2. Construction materials must be kept at approved warehouses or within the site premises.	Temporary fencing or any other visible site demarcation in place Construction activities are contained within the project site	Site Manager	The proponent met this provision of the EMP.
Environmental / Social Aspects	**Objective**	**Mitigation Measures**	**Monitoring Indicator**	**Party responsible**	**Monitoring Results**

Environmental / Social Aspects	Objective	Mitigation Measures	Monitoring Indicator	Party responsible	Monitoring Results
Communication	To ensure effective communication throughout the project lifespan	1. Develop a communication strategy (Chanel and medium of communication) 2. All correspondence should be written and signed off by witnesses (e.g. Site manager and team leaders) 3. The contact numbers for the Site Manager and Team Leaders must be available onsite (displayed) in case of emergencies. 4. There must be an alarm bell for emergency communication	Communication Strategy Letters, e-mail, Notices, Minutes	Site Manager	The proponent met this provision of the EMP.
General Notice Board	To notify and warn the public of the construction activities	1. A general notice board must be erected at the site entrance to notify the public of the activities on site.	Notice Board – Visible and Clear	Site Manager	The proponent met this provision of the EMP.

Section B: Health and Safety

Potential Sources of Impacts:

- Inadequate training of employees or contractors on risks associated with construction and operation activities
- Safety hazards may occur if equipment is not handled in the correct manner
- Employees not receiving the correct Personal Protective Equipment (PPE) for their specific responsibilities.
- Employees not adhering to safety rules implemented at the site
- Noise generated by construction vehicles and equipment during the construction activities

Table 2. Aspects of Health and Safety during Construction and Operation Phases

Environmental / Social Impact	**Objectives**	**Mitigation Measures**	**Monitoring Indicator**	**Party responsible**	**Monitoring Results**
General Safety at Work Place	Ensure that the safety of workers is not compromised and adhere to the	1. Develop a Health and safety Plan (should be part of the induction) 2. Train staff/employees on personnel safety and how to handle equipment and machinery 3. Provide protective gear for all site staff (helmets, safety straps / reflective vests, hand gloves etc.)	Health and Safety included and reflected in the Induction Minutes adequate protective gear for all staff	Site Manager	The proponent met this provision of the EMP.

Environmental / Social Impact	Objectives	Mitigation Measures	Monitoring Indicator	Party responsible	Monitoring Results
	Health and Safety Regulations, Government				

Environmental / Social Impact	Objectives	Mitigation Measures	Monitoring Indicator	Party responsible	Monitoring Results
	Notice 156/1997 (GG 1617)	4. Provide sufficient fire extinguishers and train staff on how to use them and the applications thereof 5. Assign designated area for storage of construction material so that it does not pose danger to the staff. 6. During construction, minor accident are eminent, hence there must be a first aid kit; 7. Only qualified personnel must be allowed to operate special machine/instruments 8. No employee must be allowed to be onsite without PPE; 9. Adequate safety signs must be displayed on site.	Availability fire extinguishers training (e.g. minutes, training pic) Availability of the first aid kit on site		The proponent met this provision of the EMP.

Environmental / Social Impact	Objectives	Mitigation Measures	Monitoring Indicator	Party responsible	Monitoring Results
		10. According to the UN3375 Code of Practice of storage and handling of explosives, a minimum distance of			

Environmental / Social Impact	Objectives	Mitigation Measures	Monitoring Indicator	Party responsible	Monitoring Results
	Separation distances	1.3km must be maintained from human settlement			The proponent met this provision of the EMP.
Road Safety	Prevent traffic hazards / inconveniences from earth moving machinery (heavy vehicles) during construction period	1. Signage to warn motorists about construction activities and presence of earth moving machinery 2. Adhere to traffic rules and speed limits both on and off the construction site. 3. Construction vehicle must have all necessary reflective signage and signal lamps	Public Complaints / Incident repo	Site Manager	The proponent met this provision of the EMP. Noted that the project is in the operational phase.

Environmental / Social Impact	Objectives	Mitigation Measures	Monitoring Indicator	Party responsible	Monitoring Results
Ablution	Reduce health risks and environmental pollution and ensure healthy working environment with appropriate toilets	1. Ensure adequate, hygienic (clean) and user-friendly ablution facilities for all staff. 2. Provision of separate Male and female toilets at a ratio of 1:15 for females and 1:30 for males; 3. Appoint a cleaner or rotate cleaning responsibilities among workers. 4. Inspect ablution facilities regularly	availability, cleanliness and hygienic ablution facilities Incidents or complaints of waste discharge into the environment	Site Manager	The proponent met this provision of the EMP.

Environmental / Social Impact	Objectives	Mitigation Measures	Monitoring Indicator	Party responsible	Monitoring Results

Environmental / Social Impact	Objectives	Mitigation Measures	Monitoring Indicator	Party responsible	Monitoring Results
Septic tank	Ensure no leakages and proper maintenances	1. Ensure septic tank system is installed in accordance with statutory regulation 2. The wall must be concrete slabs and ensure no seepage to the ground 3. Frequent monitoring to establish the level of waste water 4. Ensure frequent emptying to prevent overflow	Records of septic spillages Records of sewerage sludge collection	Site Manager	The proponent met this provision of the EMP. While the proponent has partly met the provisions of this objective. It is strongly encouraged to consider the upgrade of the existing septic tank system to one that is concrete slabbed all around (walls and floor). A great example can be taken from the one installed at the manufacturing plant area.

Environmental / Social Impact	Objectives	Mitigation Measures	Monitoring Indicator	Party responsible	Monitoring Results
Dust and Noise	Mitigate dust and noise impacts to both employees and the public	1. Use dust suppression measures to mitigate dust impacts, note, water is scarce resource and must be used sparingly, use alternative method such as DUSTEX. 2. Avoid working during heavy winds 3. Provide dust masks and ear muffs to all employees operating in a dusty or noisy environment	Incident Report Public Complains	Site Manager	The proponent met this provision of the EMP.

Environmental / Social Impact	Objectives	Mitigation Measures	Monitoring Indicator	Party responsible	Monitoring Results
		4. All vehicles must be switched off when not operational, 5. During construction only work during normal working hours, do not work during the night			The proponent met this provision of the EMP. Noted that the project is in the operational phase.

Environmental / Social Impact	Objectives	Mitigation Measures	Monitoring Indicator	Party responsible	Monitoring Results
Fire and Explosion Risk	To prevent fire and explosions	1. Access to the emulsion products must strictly be by authorized personnel, 2. Obtain all necessary document for manufacturing, handling and storage of explosives from relevant authorities, 3. Implement product contamination controls to prevent ANS and ANE contamination from other products, 4. Maintain a proper recording system of what is produced and reconcile with what is received by the clients 5. Staff must be properly trained on how to react and handle AN fire 6. There must be automatic fire alarm	Records of Access to the ANE products Dangerous and Explosion licenses available on site, Anti-contamination protocols available on site Reconciliation records Training Minutes	Site Manager	The proponent met this provision of the EMP.

Environmental / Social Impact	Objectives	Mitigation Measures	Monitoring Indicator	Party responsible	Monitoring Results
		system installed at the site 7. Firefighting equipment must be on site 24hours and regularly inspected to ensure that they are working 8. Emergency response numbers must be on clear and visible space 9. There must be clear hazard signs "NO OPEN FIRE" "NO SMOKING" "SWITCH ENGINE OFF" 10. There must be drills to test staff about their readiness to fight the fire 11. Emergency evacuation must not be more than 20 minutes 12. The emergency assembly point must be 1.2 km away from the site	Automatic fire system on site Availability of firefighting equipment Displayed and visible emergency response Clear elected signs Drill reports Drill evacuation reports Visible assembly point		The proponent met this provision of the EMP.

Environmental / Social Impact	Objectives	Mitigation Measures	Monitoring Indicator	Party responsible	Monitoring Results
Chemical Management	To safe ensur of e handling chemical	1. There must be an emergency response plan for chemical spillages	Emergency spill kits		The proponent met this provision of the EMP.
Environmental / Social Impact	**Objectives**	**Mitigation Measures**	**Monitoring Indicator**	**Party responsible**	**Monitoring Results**
		2. Operators handling chemical must be well trained 3. There must be regular monitoring of leakages at welding intersections, pumps valves and all possible chemical leakages points 4. The loading areas of chemical must be a concrete bund 5. Diesel fuel and any other oil must be stored on a bunded structure 6. Fueling of vehicles must take place on bunded structure	Training Minutes Visible concrete bunds		The proponent met this provision of the EMP.

Section C: Pollution Control and Waste Management

Potential sources of impacts

- Generally, construction sites generate considerable amounts of waste, with no proper waste management and disposal systems
- Disregard of the pollution impacts (often considered insignificant e.g littering, oil spills etc)
- Poor management, storage and disposal of concrete and cement or spillages from equipment used for construction (e.g. cement mixers), and general spillage of contaminated wash or wastewater
- Oil spills (includes fuel, grease, etc)
- Leaking or broken sewerage pipes
- Storage of unwanted waste (e.g old / waste tyres) and poor disposal systems dispose ☐ Spoiled emulsions

Table 3. Aspects of Waste Management during Construction and Operation Phases

Environmental / Social Impact	Objectives	Mitigation Measures	Monitoring Indicator	Party Responsible	Monitoring Results
Vehicle emissions	Reduce greenhouse gas (GHG) emissions from poorly maintained or malfunctioning equipment (vehicles / machinery	1. All vehicles and equipment shall be kept in good working condition and serviced regularly (in accordance with the servicing frequency of the specific machinery), in order to prevent leakage and emission of poisonous smoke etc. 2. Switch off engines when vehicle is not operations	Vehicle servicing records Reports of smoke emissions from machinery	Site Manager	The proponent met this provision of the EMP.
Oil Spills	Manage oil spills and leak from construction vehicles and Machinery	1. Use authorized fuel transport companies and individual that meets the required standards to transport fuel 2. Staff must be properly trained to ensure that there are no fuel spills during fuelling 3. During dispensing of fuel, the site must be demarcated with a danger tape, and it should be carried out by competent and experience personnel	Physical verification and routine monitoring	Site Manager	The proponent met this provision of the EMP.

Environmental / Social Impact	Objectives	Mitigation Measures	Monitoring Indicator	Party Responsible	Monitoring Results
Leakages		4. Fuel tanks must be placed at concrete bund to prevent spill seepage 5. There must be an immediate spill response kit on site 6. Ensure all vehicle are well serviced and leak inspection are done 7. Provide drip trays to stationary vehicle 8. No servicing of vehicle must be done on site 9. There must be a re-fuelling area on concrete bund on site 10. Storage of fuel, oil and lubricants must be kept on bunded structure 11. If an oil spill occurs, collect the contaminated soil, store in drums and dispose at appropriate waste disposal site (e.g. Municipal disposal site)			The proponent met this provision of the EMP.

Environmental / Social Impact	Objectives	Mitigation Measures	Monitoring Indicator	Party Responsible	Monitoring Results
		12. Bund and concrete slabs should be installed at each point where hazardous materials are handled.			

Environmental / Social Impact	Objectives	Mitigation Measures	Monitoring Indicator	Party Responsible	Monitoring Results
		13. Contract oil recycling companies for the disposal of waste oils			
Waste Water	To prevent public exposure to waste water To avoid contamination of clean water resources	1. Waste water contaminated with grease and hydrocarbons must be collected and disposed of at approved site	Sighting of open sewer / waste water Reports / public complains	Site Manager	The proponent met this provision of the EMP.
Storm Water		1. Install storm water surge and drainage system, to contain surface run-off from rainfall. 2. Due to low to no rainfall, consider an earth bund for storm water	Flooding onsite or in the nearby surrounding	Site Manager	The proponent met this provision of the EMP.

Environmental / Social Impact	Objectives	Mitigation Measures	Monitoring Indicator	Party Responsible	Monitoring Results
Solid Waste	To manage solid waste both during the construction and operational phases To prevent littering, pollution,	1. Construction sites generate garbage, refuse and building rubbles. Therefore, waste generated from the construction site should be classified into different categories, e.g., Material Waste (Wood, steel, corrugated iron, etc.), Building Rubble (concrete, bricks etc.), Garden	Scattered waste, Littering and any other unsightly waste at the site (eyesore)	Site Manager	The proponent met this provision of the EMP. Noted that the project is in the operational phase.

Environmental / Social Impact	Objectives	Mitigation Measures	Monitoring Indicator	Party Responsible	Monitoring Results
	contamination of water and general environmental health hazards	Waste (tree stumps, branches, etc.), Domestic Waste (Litter – cans, plastics, tissue, plastics etc.) 2. Each category should be collected separated disposed of, in the most suitable and environmentally acceptable manner 3. All waste produced on site should be contained and disposed as required by law 4. There must be sufficient skip containers at the site for building rubbles 5. There must be sufficient temporally ablution facility at the site for designated for males and female. 6. Waste generated must be disposed of at approved sites 7. No onsite burying, dumping or burning of waste material shall be permitted.			The proponent met this provision of the EMP.

Environmental / Social Impact	Objectives	Mitigation Measures	Monitoring Indicator	Party Responsible	Monitoring Results
		8. Ensure appropriate waste collection and removal from the site and dispose at appropriate waste disposal site. 9. There must be sufficient waste bins. Colour segregated for different waste; 10. General waste must be separated from hazardous waste; 11. Hazardous waste must be disposed of at an approved site; 12. The Waste Bin for oil cans must be clearly marked Hazardous;			

Section D: Environment

Potential Sources of impacts;

- Uncontrolled routes (everyone drives wherever they want)
- Disregard of environmental values, concerns and recommendations
- Lack of awareness amongst workers and contractors of how their actions may impact on the environment
- Soil erosion due to the clearance of vegetation, excavations
- Loss of topsoil due to lack of rehabilitation and restoration measures
- Lack of adequate storm water management and drainage systems

Table 4. Aspects of General Environment during Construction and Operation Phases

Environmental and Social Aspects	Objectives	Mitigation Measures	Monitoring Indicator	Party responsible	Monitoring Results
Surface Water	To avoid any potential water contamination from the construction site (run-off) and make provision for storm water drainage	1. Although no potential of occurrence, contain any run-off from the construction site with an earth bund	Storm water drainage system in place	Site Manager	The proponent met this provision of the EMP. Noted that the project is in the operational phase.

Environmental and Social Aspects	Objectives	Mitigation Measures	Monitoring Indicator	Party responsible	Monitoring Results
Ground Water	To avoid contamination of underground water	1. Staff must be properly trained to handle hydrocarbons 2. Fuelling tanks must be installed on concrete bund 3. Waste water from wash bays for cars and machinery must be disposed of at appropriated site, alternatively they must be treated before released	Training minutes Physical Observations	Site Manager	The proponent met this provision of the EMP.
Ecology	Protect trees and other plants and only remove trees when necessary	1. The site is almost free of vegetation, only one species of "Dwarf Shrub" which is sparsely distributed on site 2. Poaching of animals is strict forbidden and punishable by law 3. Only used demarcated roads, no off-road driving 4. Bright lights scare wild life, do not use them at night	Inspection report	Site Manager	The proponent met this provision of the EMP.
Soil Erosion	To avoid soil erosion	1. Soil erosion is mainly caused by wind and rain. Hence is important that	Physical Observation	Site Manager	The proponent met this provision of the EMP.

Environmental and Social Aspects	Objectives	Mitigation Measures	Monitoring Indicator	Party responsible	Monitoring Results
					Noted that the project is in the operational phase.

Environmental and Social Aspects	Objectives	Mitigation Measures	Monitoring Indicator	Party responsible	Monitoring Results
		construction stops during heavy wind and during the rainfall season. 2. Movement of heavy vehicles must be coordinated and restricted to be within the site 3. Soil compaction must be done at site to avoid wind erosion			
Rehabilitation	To ensure that all disturbed areas are rehabilitated ✓ Removal of concrete slabs ✓ Filling of septic tanks	1. All areas disturbed as a result of the construction activities should be cleaned up and rehabilitated 2. Inform the relevant authorities (MET, WB Municipality), and	Physical verification	Site Manager	Noted that the project is in the operational phase.

Environmental and Social Aspects	Objectives	Mitigation Measures	Monitoring Indicator	Party responsible	Monitoring Results
	✓ Removal of fences	workers at least six months prior decommissioning 3. Contract an environmental practitioner and engineers to prepare a decommissioning plan 4. Concrete slabs must be disposed with approval from the municipality.			Proponent should consider the development of a decommissioning plan.
Environmental and Social Aspects	**Objectives**	**Mitigation Measures**	**Monitoring Indicator**	**Party responsible**	**Monitoring Results**
		5. The compacted place on site must softly be ripped 6. Re-introduce Dwarf Shrubs onsite			Noted that the project is in the operational phase.

Section E: Cultural Heritage

Table 5. Aspects of Cultural Heritage during Construction and Operation Phases

Environmental / Social Aspects	Objective	Mitigation measures	Monitoring Indicator	Party responsible	Monitoring Results
Heritage Resources / artefacts	Reduce the impacts of construction and associated earthworks on heritage resources / artefacts	1. Workers must be trained on the possible find of archaeological material in the area 2. Establish a "Chance Find Procedure" where if any archaeological finding (Heritage (rock painting and drawings), human remains or artefacts) is encountered; a. The activity must be stopped immediately and the operation manager of that activity be informed; b. The manager must ensure the cordoning off the area with a danger tape and take appropriate records and pictures	Sighting report/s of heritage resources / artefacts	Site Manager	The proponent met this provision of the EMP. Noted that the project is in the operational phase.
Environmental / Social Aspects	**Objective**	**Mitigation measures**	**Monitoring Indicator**	**Party responsible**	**Monitoring Results**

Environmental / Social Aspects	Objective	Mitigation measures	Monitoring Indicator	Party responsible	Monitoring Results
		c. The manager must immediately report the findings to the National Museum (+264 61 276800) or the National Forensic Laboratory (+264 61 240461). 3. No artefacts must be removed or be interfered with prior to authorisation from the Namibian National Heritage Council (NHC) 4. Recovery of heritage remains or artefacts discovered and removal thereof should be directed by the National Museum			

Section F: Socio-Economic

Table 6. Aspects of Socio-Economic during Construction and Operation phases

Environmental / Social Impact	Objectives	Mitigation Measures	Monitoring Indicator	Party Responsible	Monitoring Results
Employment opportunities for Locals	Promote benefits to the local community	1. Recruit locals for unskilled labour 2. Where possible, procure materials from local suppliers	Employee structure and proportion of local employment	Proponent and Contractors	The proponent met this provision of the EMP.
Alcohol and Drug use	Prevent alcohol and drug use at the construction site	1. Ban and warn the employees against the use of alcohol and drug at construction site 2. Provide awareness on the dangers and health impacts of alcohol and drug use 3. All employees must be screened with the breathalyser to avoid intoxicated personnel on site	Drunk / Misbehaving employees Breathalyzer report Monitor presence of alcohol at the construction site	Site Manager	The proponent met this provision of the EMP. Noted that the project is in the operational phase.

Environmental / Social Impact	Objectives	Mitigation Measures	Monitoring Indicator	Party Responsible	Monitoring Results
Working hours	Adhere to the Labour Act No. 11 of 2007	1. Operate within the prescribed working days and hours as per the Namibian Labour laws and regulations	Verification of working hours against the labour Act	Site Manager	The proponent met this provision of the EMP.
Internship for students (Construction phase only)	Provide internships to students from technical institutions (e.g., NIMT, VTC etc.)	1. Provide a minimum of 15 internships opportunities for all trades 2. Advertise for student internships with NIMT, VTC etc.	Student internship register, trade etc.	Site Manager	The proponent met this provision of the EMP. Noted that the project is in the operational phase.
HIV / AIDS	Provide HIV / AIDS awareness to employees	1. Provide HIV / AIDS awareness at induction 2. Avail Condoms in Toilets at site	Availability of condoms at construction site	Site Manager	The proponent met this provision of the EMP.
Security	Orientation of workers about security for both equipment and themselves	1. Orientate all staff about the security of equipment and themselves & provide contact numbers for Police and other emergency services e.g. Ambulance	Proof of security orientation and emergency contact numbers	Site Manager	The proponent met this provision of the EMP.

Section G. Hazard Material Assessment of ANE production

Table 7. Assessment of Hazardous Materials (Source: Umwelt Pty Ltd December 2009[1])

Hazardous Material	Classification	Hazard	Comments
Ammonium nitrate solution (ANS)/oxidiser solution (OXS)	Class 5.1 Oxidiser	• Decomposition due to excessive heating and/or contamination • Explosion if decomposition gases are sufficiently confined • Toxic decomposition gases	☐ ANS and OXS are highly insensitive to friction, impact and sparks (i.e have a low explosion risk when uncontaminated)
Ammonium nitrate emulsion (ANE) meeting UN3375 classification	Class 5.1	• 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	☐ ANE are insensitive to friction and impact and also insensitive to sparks
Ammonium nitrate (AN)	Class 5.1 Oxidiser	• Toxic decomposition gases • Solid AN may explode under confined and high temperature, but is not readily detonated	☐ If high temperature and confinement are not present solid AN requires a high energy shockwave (e.g from high explosive) to detonate

[1] Orica ANE Facility and Continued Operation Environmental Assessment

Hazardous Material	Classification	Hazard	Comments
			☐ When molten it may decompose violently due to pressure or shock
Combustibles	C1 and C2 combustible will be used at the ANE Plant	☐ Combustible are difficult to ignite in the absence of a direct flame	☐ Combustibles fires as a possible source of externa heat to the AN, ANE and ANS inventories only.
Sodium Nitrate	Class 5.1 oxidiser	☐ Heat, shock, or contact with other materials may cause fire or explosive decomposition	• It is extremely toxic if ingested • For the assessment sodium nitrate is treated as having the same hazards as AN.

3. CONCLUSIONS AND RECOMMENDATIONS.

The inspection revealed that the operations on site are, to the most part, carried out with high regard to environmental sensitivities and that the provisions of the Environmental Management Plan for the activities have been met to a large extent. While challenges are likely to occur in an operation of this magnitude NSF has shown willingness to confront these challenges by willingfully subjecting itself to environmental monitoring with the view to act on those aspects that have a potential to negatively impact on the environment they operate in.

It is important that the proponent submit the bi-annual reports to the Environmental Commissioner as stipulated in the conditions of the ECC in the required time frame.

It is recommended that the proponent appoints an Environmental Practitioner to monitor the implementation of the EMP, and recommend any changes to this document when necessary.

It is also recommended that the proponent commissions a decommissioning plan within 12 months after approval of the application for the renewal of the ECC.

4. PHOTOPLATE

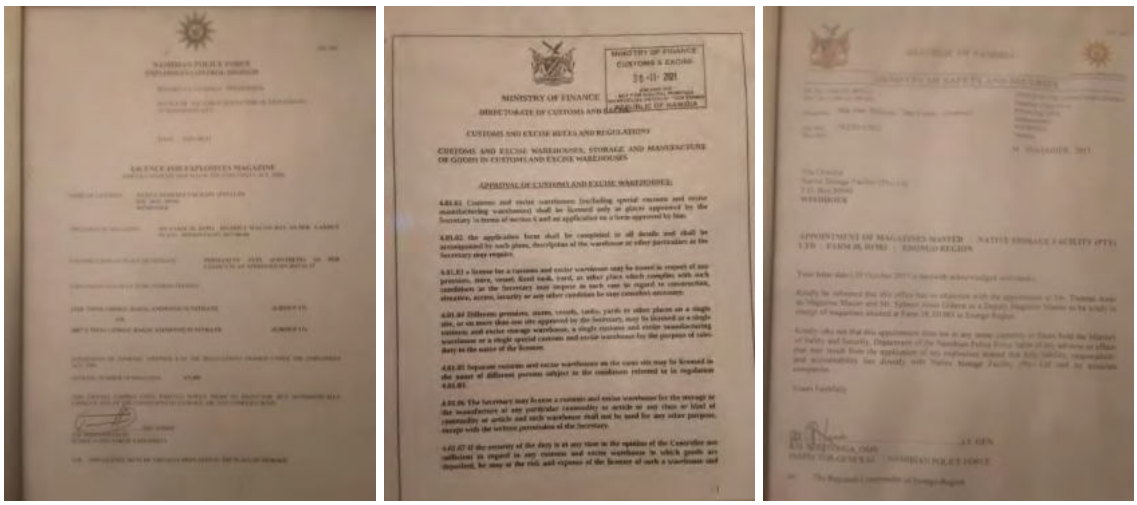

Figure 1: Dangerous and Explosion Licenses available on site

Figure 2: Ammonium Nitrate Emulsion Storage Tank

Figure 3: Self-bunded Diesel Fuel Tank and Signage

Figure 4: Ammonium Nitrate Emulsion Production Facility

Figure 5: Waste and Wastewater Management Facilities

Figure 6: Storage Magazines and Admin Facilities

5. REFERENCES

Tortoise Environmental Consultants (TEC), 2019. ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED CONSTRUCTION AND OPERATION OF EMULSION PLANT AT WALVIS BAY, FARM 38, ERONGO REGION.