

**GRIT BLASTING OPERATIONS OF ELGIN BROWN &  
HAMER NAMIBIA (PTY) LTD IN THE PORT OF WALVIS BAY**

**ENVIRONMENTAL MANAGEMENT PLAN**



Assessed by:



Assessed for:



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<b>Project:</b>	<b>ENVIRONMENTAL MANAGEMENT PLAN FOR THE GRIT BLASTING OPERATIONS OF ELGIN BROWN &amp; HAMER NAMIBIA (PTY) LTD IN THE PORT OF WALVIS BAY</b>
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# **1 OBJECTIVES OF THE EMP**

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Elgin Brown & Hamer Namibia (Pty) Ltd (hereafter referred to as EBH Namibia) is in possession of an environmental clearance certificate (ECC) and accompanying environmental management plan (EMP) for their grit blasting operations in the Port of Walvis Bay (Appendix A). The EMP provides management options to ensure impacts of their operations are minimised. An EMP is a tool used to take pro-active action by addressing potential problems before they occur. This should limit the corrective measures needed, although additional mitigation measures might be included if necessary. The EMP acts as a stand-alone document, which can be used during the various phases (planning, construction, operational and decommissioning) of any proposed activity or development. The grit blasting operations include docking and floating of ships at the EBH Namibia ship repair yard; cleaning of the hull of the ship by scraping and spraying with pressurized water; grit blasting of the ships' hull to remove paint and provide a smooth finish in preparation of painting; submerging of docks to return ships to the ocean.

All contractors and sub-contractors taking part in the grit blasting operations should be made aware of the contents of the EMP, so as to plan the relevant activities accordingly in an environmentally sound manner.

The objectives of the EMP are:

- ◆ to include all components of the various activities;
- ◆ to prescribe the best practicable control methods to lessen the environmental impacts associated with the grit blasting operations;
- ◆ to monitor and audit the performance of the operational personnel in applying such controls; and
- ◆ to ensure that appropriate environmental training is provided to responsible operational personnel.

EBH Namibia may choose to implement an environmental management system (EMS). At the heart of an EMS is the concept of continual improvement of environmental performance with resulting increases in operational efficiency, financial savings and reduction in environmental, health and safety risks. An effective EMS would need to include the following elements:

- ◆ A stated environmental policy which sets the desired level of environmental performance;
- ◆ An environmental legal register;
- ◆ An institutional structure which sets out the responsibility, authority, lines of communication and resources needed to implement the EMS;
- ◆ Identification of environmental, safety and health training needs;
- ◆ An environmental program(s) stipulating environmental objectives and targets to be met, and work instructions and controls to be applied in order to achieve compliance with the environmental policy; and
- ◆ Periodic (internal and external) audits and reviews of environmental performance and the effectiveness of the EMS.

## **2 THE EMP**

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The following general guidance for the EMP is based on the findings of the EIA and risk assessment carried out by Geo Pollution Technologies (Faul et al. 2015).

### **2.1 OPERATIONS – IDENTIFIED IMPACTS**

The following is the summary of the identified impacts:

- ◆ The effects of dust pollution on the surrounding environment;
- ◆ The effects of noise pollution on the surrounding environment;
- ◆ The negative effects on marine ecology and environmental pollution.
- ◆ Health and safety impacts

## **2.2 OPERATIONS – MITIGATING MEASURES**

The following is a summary of the proposed Management Plan, which will make the facility safe taking into consideration all the risk perceptions:

- ◆ The generation and dispersal of dust should be minimized and personnel must be issued with personal protective equipment (PPE) including dust masks.
- ◆ Noise pollution should at all times meet the minimum World Health Organization requirements to prevent hearing loss and not to cause a nuisance to nearby receptors. Where levels are exceeded hearing protectors should be issued.
- ◆ The proposed facility could possibly cause substantial ecological threat to the environment in the vicinity of Walvis Bay if mitigation measures are not followed properly. The contamination of water is prevented through safe work practices, engineered safety devices and containment structures.
- ◆ Issuing of PPE and safe working practices would ensure a safe working environment.

## **3 THE IMPLEMENTATION OF THE EMP**

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Tables 1 to 3 outline the management of the environmental elements that may be affected by the different activities, grouped in each phase of development. These groups are as follows:

- ◆ Planning Phase
- ◆ Operational Phase
- ◆ Decommissioning Phase

The EMP is a living document that must be prepared in detail, and regularly updated, by the proponent as the project progress and evolve.

The tables below act as a guideline for the EMP to be established by the proponent. Impacts addressed and mitigation measures proposed are seen as minimum requirements which have to be elaborated on. Delegation of mitigation and reporting activities should be determined by the proponent and included in the EMP.

All monitoring results must be reported on as indicated. These are important for any future renewals of the environmental clearance certificate and must be submitted to the Ministry of Environment and Tourism.

With renewal of the environmental clearance certificate a summary report based on the monitoring prescribed in this EMP must be submitted to the Ministry of Environment and Tourism together with the application for renewal.

**Table 1. Planning for Operations and Future Decommissioning of the Project**

Activity	Objective	Action	Timing	Proof of Compliance	Responsible Body
<b>Compliance</b>	To comply with all legal requirements for the operations of the facility in Namibia.	<p>Apply for the necessary permits from the various ministries, local authorities and any other bodies that governs the operations of the proposed activity.</p> <p>Have environmental clearance certificate available on site.</p> <p>Finalise negotiations and resolve any outstanding issues, if any, over the allocation of user rights and zoning of the property on which the proposed activity will be located.</p>	Prior to commencement of operations	All contracts, permits, certificates and other legal documents on file.	Proponent
<b>Appointments</b>	To appoint reputable contractors and operational personnel and establish the EMP, a legal requirement that forms part of the contract with the contractor and employees.	<p>Appoint contractors and employees and enter into an agreement which includes the EMP.</p> <p>Ensure that the contents of the EMP are understood by the contractor, sub-contractors, employees and all personnel who will be present on site.</p>	During operations as well as possible future decommissioning of the development	Contracts on file	Proponent; Contractor
<b>Management</b>	Establish a management system to implement and monitor Health, Safety and Environment.	<p>Make provisions to have a Health, Safety and Environmental Coordinator to implement the EMP and oversee occupational health and safety as well as general environmental related compliance at the site.</p> <p>Have the following emergency plans, equipment and personnel in place to deal with all emergencies:</p> <p>Risk Management / Mitigation / Environmental Management Plan/ Emergency Response Plan and HSE Manuals</p>	Prior to commencement of and during construction and operations	<p>Documentation on file</p> <p>Personal Protective Equipment (PPE) on site</p> <p>Signage related to restricted areas, dangerous areas, and PPE requirements on site</p> <p>Emergency response material on site</p>	Proponent; Contractor

Activity	Objective	Action	Timing	Proof of Compliance	Responsible Body
		<p>Adequate protection and indemnity insurance cover for incidents;</p> <p>Comply with the provisions of all relevant safety standards;</p> <p>Procedures, equipment and materials required for emergencies.</p>			
<b>Restoration Fund/Insurance</b>	To establish a fund/insurance for future environmental restoration or pollution remediation if ever required.	To establish a fund for future ecological restoration of the project site should project activities cease and the site is decommissioned and environmental restoration or pollution remediation is required.	For duration of operations	Financial statements of restoration fund/insurance	Proponent; Independent Specialist Consultant
<b>Reporting</b>	To establish a reporting system to report on monitoring aspects of operations and decommissioning as outlined in the EMP.	<p>Establish a reporting system to report on aspects of operations and decommissioning as outlined in the EMP.</p> <p>Keep monitoring reports on file for submission with Environmental Clearance Certificate renewal applications where needed.</p>	During operations as well as possible future decommissioning of the development	Monitoring Reports	Proponent; Contractor
<b>Environmental Clearance Renewal</b>	To renew the Environmental Clearance Certificate every three years.	Appoint a specialist environmental consultant to update the EIA and EMP, based on monitoring results and apply for renewal of the Environmental Clearance Certificate.	Prior to expiry of Environmental Clearance Certificate	Renewed Environmental Clearance Certificate	Proponent; Independent Specialist Consultant

**Table 2. The Operational Phase**

<b>Criteria</b>	<b>Nature</b>	<b>Mitigation</b>	<b>Monitoring</b>	<b>Responsible Body</b>
<b>Skills, Technology &amp; Development</b>	Enhanced skills and technology transfer to the Erongo coastal region and subsequent promotion of economic development.	Training must be provided to Namibians to ultimately employ a predominantly Namibian workforce.	All training provided to be included in a six monthly environmental monitoring report.	Proponent
<b>HIV/AIDS, In-migration, Informal Settlements and Property Prices</b>	Increased spread of HIV/AIDS; Increased influx to Walvis Bay or other areas of the coast; Increased informal settlement and associated problems; Property prices.	Restricted employment for local people only should be practiced. Deviations from this practice should be justified appropriately.  Educational programs on HIV/AIDS.	All training, educational programmes and employee demographics to be included in a six monthly environmental monitoring report.	Proponent.
<b>Employment</b>	The facility plays an important role in providing employment to locals.	If skills exist locally Namibians must be employed. Alternatively, training must be provided to Namibians to ultimately employ a predominantly Namibian workforce.	Employment statistics to be included in a six monthly environmental monitoring report.	Proponent
<b>Ship Repair and Maintenance Services</b>	Provision of ship repair and maintenance services	N/A.	The number of vessels handled on the floating dry dock to be included in a six monthly environmental monitoring report.	Proponent
<b>Air Pollution/Dust</b>	Dust consisting of pulverised blasting grit, paint (including overspray) and other materials present on the surface blasted, will be created and it can be dispersed in strong winds.	Due to the potential toxic nature of dust created its dispersion in the air should be prevented.  The following controls are typical measures for mitigating dust: <ul style="list-style-type: none"> <li>◆ Mesh netting that enclose the front and rear ends of the docks must be used at all times.</li> <li>◆ EBH Namibia must install a real time wind monitoring station that records wind speed and direction on a daily basis. Grit blasting must be stopped when wind speeds are high enough to disperse dust to nearby receptors.</li> <li>◆ Alternative blasting techniques such as wet blasting or centrifugal shot blasting should be used in areas where</li> </ul>	Wind data should be recorded on a daily basis.  Any complaints regarding dust should be recorded and investigated. The problem area should be correlated with wind direction and speed.  All complaints received, including action taken to prevent future occurrences, must be included in a six monthly environmental monitoring report.	Proponent



Criteria	Nature	Mitigation	Monitoring	Responsible Body
		<p>dispersion of dust cannot be prevented.</p> <p>The World Health Organization - Hazard prevention and control in the work environment: Airborne dust (WHO, 1999) should be consulted.</p>		
<b>Health &amp; Safety</b>	<p>Risks include work related injuries such as falling from heights, injuries due to high velocity grit particles and exposure to harmful chemicals.</p>	<p>All Health and Safety standards specified in the Labour Act and other applicable legislation should be complied with.</p> <p>All staff members must be briefed about potential health risks and injuries on site.</p> <p>All staff involved in grit blasting operations must at all times wear personal protective equipment (PPE) to protect themselves from inhalation and contact with dust, safety harnesses for working at heights as well as protection against high velocity particles that can cause injuries.</p> <p>Safe working conditions must be provided when working at heights or in confined spaces.</p> <p>Selected personnel should be trained in first aid.</p> <p>The contact details of all emergency services must be readily available.</p> <p>Mesh netting must be suspended at the openings of the dry docks to prevent dust from reaching other receptors.</p> <p>Grit blasting must be stopped if wind conditions are such that harmful dust will be blown to neighbouring properties where people without PPE may be exposed.</p> <p>The build-up of static electricity must be prevented by grounding the surface to be blasted.</p>	<p>An up-to-date health and safety file to be maintained.</p> <p>Any incidents or complaints must be recorded with action taken to prevent future occurrences.</p> <p>All incidents or complaints received, including action taken to prevent future occurrences, must be included in a six monthly environmental monitoring report.</p> <p>The report should contain dates when training were conducted and when safety equipment and structures were inspected and maintained.</p>	Proponent
<b>Fire and / or Explosion Risk</b>	<p>The facility is located adjacent to the existing fuel offloading facility. Fuel spillages during offloading may create a risk to human life and material.</p>	<p>Proper communication systems between oil companies and EBH. Oil companies must prevent fuel from spreading towards EBH and must inform EBH as priority of any fuel spillage. EBH to abandon all work on the floating docks and evacuate all staff and visitors to a safe area.</p> <p>If fuel is observed on water the same procedure must be</p>	<p>Visual observation of fuel on water.</p> <p>All potentially dangerous or fire related incidents, including action taken, must be included in a six monthly</p>	Proponent.

Criteria	Nature	Mitigation	Monitoring	Responsible Body
		<p>followed.</p> <p>Adequate firefighting equipment, fire drills and trained personnel must be available on site for any fires that may originate on the dry docks or on/in vessels being worked on.</p>	<p>environmental monitoring report.</p>	
<b>Noise Pollution and Vibration</b>	<p>Noise will exist due to compressors and high-pressure blasting.</p> <p>Vibration may negatively affect the operators.</p>	<p>The World Health Organization (WHO) guidelines on maximum noise levels (Guidelines for Community Noise, 1999) to prevent hearing loss should be adhered to.</p> <p>Hearing protectors must be issued as part of PPE.</p> <p>Mechanisms to reduce vibration impact must be employed. This includes frequently rotating operators of grit blasting equipment and wearing of PPE such as vibration absorbing gloves.</p>	<p>Any complaints received regarding excessive noise should be recorded with notes on action taken. Any negative effects caused from excessive vibrations should be recorded as well.</p> <p>All complaints received, including action taken to prevent future occurrences, must be included in a six monthly environmental monitoring report.</p>	Proponent
<b>Waste Production</b>	<p>Hull scraping and pressurised cleaning with water produces organic waste as well as water potentially contaminated with paint containing anti-biofouling chemicals such as tributyltin (TBT).</p> <p>Blast material consisting of used copper grit and dust of removed materials (i.e. paint, rust, etc.) are produced and is a potentially toxic waste that must be disposed of in an appropriate manner.</p>	<p>Due to the potential toxic nature of waste water and blast material, it should be disposed of in an appropriate way at an appropriately classified waste disposal facility. Material Safety Data Sheet instructions for disposal should be followed.</p> <p>Monitoring must be conducted on a quarterly basis.</p> <p>Seawater samples must be collected as follow: One At Buoy 6 in the main entrance channel (control site); One within the harbour at the floating docks, one at the seawater inlet at United Fishing, and one at the Syncrolift area. The following parameters should be investigated: Tributyltin, Cadmium (Cd), Mercury (Hg), Copper (Cu), Chrome (Cr), Lead (Pb), Zinc (Zn), Arsenic, Nickel, Barium (Ba), Beryllium (Be), Hydrocarbons and PAHs and Turbidity or suspended material. Updated chemicals of concern should be identified based on new antifouling paint content and grit used. <b>Quarterly sampling.</b></p>	<p>EBH Namibia must collect and keep a 1 kg sample of spent grit blasting material from each ship being blasted for future analysis if required.</p> <p>A surface water and sediment sampling regime must be undertaken <b>quarterly</b> to monitor the condition of the environment.</p> <p>A once-off water analysis regime must be performed to analyse pressure cleaning water collected in ballast tanks before such water is released into the ocean.</p>	Proponent; Independent Specialist Consultant(s)

Criteria	Nature	Mitigation	Monitoring	Responsible Body
		<p>Mussel samples must be collected from the floating docs (start growing mussels on a nearby structure), the mariculture area as well as from the lagoon entrance. The following parameters should be analysed for: Cadmium (Cd), Mercury (Hg), Copper (Cu), Chrome (Cr), Lead (Pb), Arsenic, Nickel, Barium (Ni), Beryllium (Be), Zinc (Zn) and Tributyltin. Results should be compared to the samples collected at the floating docs. <b>Quarterly sampling.</b></p> <p>Three composite sediment samples collected from the sea floor around the floating docs. Parameters to be tested are Tributyltin, Cadmium (Cd), Mercury (Hg), Copper (Cu), Chromium (Cr), Lead (Pb), Zinc (Zn), Arsenic (As), Nickel (Ni), hydrocarbons and Polycyclic aromatic hydrocarbons PAHs. <b>Sampling once a year.</b></p>	<p>This will determine whether this practice should be allowed to continue.</p> <p>A register of hazardous waste disposal should be kept. This should include type of waste, volume as well as disposal method/facility.</p> <p>Any complaints received regarding waste should be recorded with notes on action taken.</p> <p>All monitoring data must be included in a six monthly environmental monitoring report.</p>	
<b>Surface Water Contamination</b>	Waste water, blasting material, particulate matter, spray paint and dust not being contained may enter the ocean.	<p>During blasting and spray-painting mesh nets must be suspended at the front and rear ends of the dry dock to contain dust and spray paint.</p> <p>Grit blasting must be stopped if windy conditions carry dust out of the dry dock area.</p> <p>During blasting the thruster pit must be adequately covered to prevent any contaminants from entering the water in the pit that will eventually be pumped into the ocean.</p> <p>After grit blasting and before the dry dock is submerged the entire working platform must be cleaned to ensure no residue dust, grit and other contaminants enter the ocean.</p> <p>Monitoring must be conducted on a quarterly basis.</p> <p>Seawater samples must be collected as follow: One At Buoy 6 in the main entrance channel (control site); One within the harbour at the floating docks, one at the seawater inlet at United Fishing, and one at the Syncrolift area. The</p>	<p>EBH Namibia must collect and keep a 1 kg sample of spent grit blasting material from each ship being blasted for future analysis if required.</p> <p>A surface water and sediment sampling regime must be undertaken <b>quarterly</b> to monitor the condition of the environment.</p> <p>A once-off water analysis regime must be performed to analyse pressure cleaning water collected in ballast tanks before such water is released into the ocean.</p>	Proponent; Independent Specialist Consultant(s)

Criteria	Nature	Mitigation	Monitoring	Responsible Body
		<p>following parameters should be investigated: Tributyltin, Cadmium (Cd), Mercury (Hg), Copper (Cu), Chrome (Cr), Lead (Pb), Zinc (Zn), Arsenic, Nickel, Barium (Ba), Beryllium (Be), Hydrocarbons and PAHs and Turbidity or suspended material. Updated chemicals of concern should be identified based on new antifouling paint content and grit used. <b>Quarterly sampling.</b></p> <p>Mussel samples must be collected from the floating docs (start growing mussels on a nearby structure), the mariculture area as well as from the lagoon entrance. The following parameters should be analysed for: Cadmium (Cd), Mercury (Hg), Copper (Cu), Chrome (Cr), Lead (Pb), Arsenic, Nickel, Barium (Ni), Beryllium (Be), Zinc (Zn) and Tributyltin. Results should be compared to the samples collected at the floating docs. <b>Quarterly sampling.</b></p> <p>Three composite sediment samples collected from the sea floor around the floating docs. Parameters to be tested are Tributyltin, Cadmium (Cd), Mercury (Hg), Copper (Cu), Chromium (Cr), Lead (Pb), Zinc (Zn), Arsenic (As), Nickel (Ni), hydrocarbons and Polycyclic aromatic hydrocarbons PAHs. <b>Sampling once a year.</b></p>	<p>This will determine whether this practice should be allowed to continue.</p> <p>All monitoring data must be included in a six monthly environmental monitoring report.</p>	
<b>Marine Impact</b>	Toxic spray paint, blasting material, particulate matter and dust entering the ocean and impacting on marine life.	<p>Due to the potential toxic nature of spray paint and dust created, its dispersion in the air should be prevented.</p> <p>Mesh netting to enclose the front and rear ends of the docks must be used at all times.</p> <p>Grit blasting and spray painting must be stopped when wind speeds are high enough to disperse spray paint and dust to nearby receptors (e.g. ocean).</p> <p>Alternative blasting techniques such as wet blasting or centrifugal shot blasting should be used in areas where dispersion of dust cannot be prevented.</p> <p>The World Health Organization - Hazard prevention and control in the work environment: Airborne dust (WHO,</p>	<p>EBH Namibia must collect and keep a 1 kg sample of spent grit blasting material from each ship being blasted for future analysis if required.</p> <p>A surface water and sediment sampling regime must be undertaken <b>quarterly</b> to monitor the condition of the environment.</p> <p>A once-off water analysis</p>	Proponent; Independent Specialist Consultant(s)

Criteria	Nature	Mitigation	Monitoring	Responsible Body
		<p>1999) should be consulted.</p> <p>Monitoring must be conducted on a quarterly basis.</p> <p>Seawater samples must be collected as follow: One At Buoy 6 in the main entrance channel (control site); One within the harbour at the floating docks, one at the seawater inlet at United Fishing, and one at the Syncrolift area. The following parameters should be investigated: Tributyltin, Cadmium (Cd), Mercury (Hg), Copper (Cu), Chrome (Cr), Lead (Pb), Zinc (Zn), Arsenic, Nickel, Barium (Ba), Beryllium (Be), Hydrocarbons and PAHs and Turbidity or suspended material. Updated chemicals of concern should be identified based on new antifouling paint content and grit used. <b>Quarterly sampling.</b></p> <p>Mussel samples must be collected from the floating docs (start growing mussels on a nearby structure), the mariculture area as well as from the lagoon entrance. The following parameters should be analysed for: Cadmium (Cd), Mercury (Hg), Copper (Cu), Chrome (Cr), Lead (Pb), Arsenic, Nickel, Barium (Ni), Beryllium (Be), Zinc (Zn) and Tributyltin. Results should be compared to the samples collected at the floating docs. <b>Quarterly sampling.</b></p> <p>Three composite sediment samples collected from the sea floor around the floating docs. Parameters to be tested are Tributyltin, Cadmium (Cd), Mercury (Hg), Copper (Cu), Chromium (Cr), Lead (Pb), Zinc (Zn), Arsenic (As), Nickel (Ni), hydrocarbons and Polycyclic aromatic hydrocarbons PAHs. <b>Sampling once a year.</b></p>	<p>regime must be performed to analyse pressure cleaning water collected in ballast tanks before such water is released into the ocean. This will determine whether this practice should be allowed to continue.</p> <p>All monitoring data must be included in a six monthly environmental monitoring report.</p>	
<b>Marine Impact</b>	Introduction of exotic and potentially invasive species into the Namibian coastal environment through ballast water.	<p>Ballast water must be replaced at least once before the dredging vessel enters the Namibian Exclusive Economic Zone and again as it enters the Namibian Exclusive Economic Zone.</p> <p>Follow procedures of International Maritime Organization (IMO): The International Convention for the Control and Management of Ships' Ballast Water and Sediments</p>	<p>Ship log book to reflect the exchange of ballast water.</p> <p>Ballast Water Management Plan</p>	Proponent; Namport.

Criteria	Nature	Mitigation	Monitoring	Responsible Body
		<p>(BWM Convention).</p> <p>On ship treatment of Ballast Water can also take place on ships already fitted with treatment plants, via two step treatment processes recommended in IMO guidelines and relevant published information on Ballast Water Treatment methods.</p> <p>It is advised that all guidelines in the IMO are followed strictly with regards to both Ballast Water Exchange and Ballast Water Treatment to ensure minimal introduction of invasive species.</p>		
<b>Visual Impact</b>	This is an impact that affects the aesthetic appearance.	Regular maintenance and general upkeep of the facility will ensure continuous low visual impact.	<p>Any complaints received regarding waste should be recorded with notes on action taken.</p> <p>All monitoring data must be included in a six monthly environmental monitoring report.</p>	Proponent
<b>Cumulative Impact</b>	These are impacts on the environment, which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of who undertakes such other actions. Cumulative impacts can result from individually minor, but collectively significant actions taking place over a period of time. In relation to an activity, it means the impact of an activity that in itself may not be significant, may become significant when added to the existing and potential impacts resulting from similar or diverse activities or undertakings in the area.	<p>Addressing each of the individual impacts as discussed and recommended in the EMP would reduce the cumulative impact.</p> <p>Directing lighting downwards and minimizing the number of lights used would decrease the potential impact on flying birds.</p> <p>Reviewing biannual and annual reports for any new or re-occurring impacts or problems would aid in identifying cumulative impacts and help in planning if the existing mitigations are insufficient.</p>	Reviewing the 6 monthly monitoring reports will provide an overall assessment of the impact of the operational phase.	Proponent

Criteria	Nature	Mitigation	Monitoring	Responsible Body
	<p>Possible cumulative impacts associated with the operational phase include increase in noise and dust as a result of ship repair at the EBH Namibia Dry Docks as well as the Syncrolift and other industrial properties nearby. The industrial activity and ship repair may also lead to a cumulative impact on the marine environment in terms of pollutants entering the water.</p> <p>The cumulative effect of lighting on birds due to industrial developments may increase the risk of collisions and interference with bird flight paths at night.</p>			

**Table 3. Decommissioning Phase**

<b>Criteria</b>	<b>Nature</b>	<b>Mitigation</b>	<b>Monitoring</b>	<b>Responsible Body</b>
<b>Waste Production</b>	<p>Upon decommissioning waste will be produced in the form of building rubble, obsolete equipment and structures, obsolete or residual products and equipment or structures that can be used elsewhere or sold as scrap.</p> <p>Waste grit material that is potentially toxic may be present on site.</p>	<p>To reduce the amount of waste all re-usable equipment must be removed to another site owned by EBH Namibia or sold.</p> <p>Those items that can not be used again must be recycled or scrapped in the appropriate manner.</p> <p>Upon demolition of any structures the waste and rubble must be removed from the property and taken to an approved dumpsite designated by the Walvis Bay Municipality.</p> <p>All hazardous waste must be disposed of at an approved facility.</p> <p>Rehabilitation if necessary are to be done using funds designated for the purpose.</p>	<p>Regular visual inspection.</p> <p>A register of hazardous waste produced, and disposal methods should be maintained.</p>	Proponent; Contractor
<b>Employment</b>	<p>Decommissioning of the facility may lead to retrenchments or re-location of staff no longer required.</p>	<p>Plan in advance for meeting the Labour Acts requirements for retrenching of staff if required.</p> <p>Where possible staff can be relocated to another facility or town where business continues in the same way.</p>	<p>During normal operations of the facility appropriate plans for handling of employees should the facility be decommissioned must be prepared. The plan should include budgeting for retrenchments and possible alternative positions elsewhere.</p>	Proponent
<b>Noise</b>	<p>Noise pollution will exist due dismantling of structures and heavy vehicles accessing the site to collect waste and rubble.</p>	<p>The facility is situated in an industrial area so there is no restriction on the times of operation. The Walvis Bay Municipality does not have any guidelines with respect to noise levels but the World Health Organization (WHO) guideline on maximum noise levels (Guidelines for Community Noise, 1999) to prevent hearing impairment is followed. These limits noise levels in industrial areas to an average of 70 dB over a 24-hour period with maximum noise levels not exceeding 110 dB during the period.</p> <p>All personnel must be issued with hearing protectors and neighbours must be notified of the time and duration of decommissioning. Notice of the start of the</p>	<p>A complaints register must be maintained, in which any complaints from the community must be logged. Complaints must be investigated and, if appropriate, acted upon.</p>	Proponent; Public Relations Personnel; Contractor.



Criteria	Nature	Mitigation	Monitoring	Responsible Body
		decommissioning should be given to the local authorities with an invitation to give feedback at any time with regards the noise impact.		
<b>Visual Impact</b>	This is an impact that affects the aesthetic appearance	Visual impact could pose one of the most significant impacts. Visual impacts could be limited through keeping all decommissioned areas clean and orderly at all times. Good housekeeping also reduces the risk of injuries. Notice of the start of the decommissioning should be given to the local authorities with an invitation to give feedback at any time with regards the visual impact.	A complaints register must be maintained, in which any complaints from the community must be logged. Complaints must be investigated and, if appropriate, acted upon.	Proponent; Contractor
<b>Surface Water Contamination</b>	Hazardous waste or water remaining at the floating dry docks may enter the ocean.	<p>All precautions are to be taken to prevent contamination of the ocean.</p> <p>Any remaining hazardous materials must be disposed of at a municipal hazardous waste disposal site.</p> <p>A final baseline survey must be conducted:</p> <p>Seawater samples must be collected as follow: One At Buoy 6 in the main entrance channel (control site); One within the harbour at the floating docks, one at the seawater inlet at United Fishing, and one at the Syncrolift area. The following parameters should be investigated: Tributyltin, Cadmium (Cd), Mercury (Hg), Copper (Cu), Chrome (Cr), Lead (Pb), Zinc (Zn), Arsenic, Nickel, Barium (Ba), Beryllium (Be), Hydrocarbons and PAHs and Turbidity or suspended material. Updated chemicals of concern should be identified based on new antifouling paint content and grit used.</p> <p>Mussel samples must be collected from the floating docs (start growing mussels on a nearby structure), the mariculture area as well as from the lagoon entrance. The following parameters should be analysed for: Cadmium (Cd), Mercury (Hg), Copper (Cu), Chrome (Cr), Lead (Pb), Arsenic, Nickel, Barium (Ni), Beryllium (Be), Zinc (Zn) and Tributyltin. Results should be compared to the samples collected at the floating docs.</p>	A baseline study must be carried out after the decommissioning. This is to assess the condition of seafloor sediment and surface water. Comparisons with operation baseline data is to be made and any discrepancies must be addressed before the site can be signed over.	Proponent; Contractor

Criteria	Nature	Mitigation	Monitoring	Responsible Body
		<p>Three composite sediment samples collected from the sea floor around the floating docs. Parameters to be tested are Tributyltin, Cadmium (Cd), Mercury (Hg), Copper (Cu), Chromium (Cr), Lead (Pb), Zinc (Zn), Arsenic (As), Nickel (Ni), hydrocarbons and Polycyclic aromatic hydrocarbons PAHs.</p>		
<b>Health, Safety and Security</b>	<p>During the decommissioning phase risks to human beings are present.</p>	<p>The decommissioning of a grit blasting facility can cause health and safety risks to workers on site. Occupational exposures are normally related to contact with hazardous substances during handling of such products. For this reason adequate measures must be brought in place to ensure safety of staff on site, and includes: (Provide forms for all end users who monitor)</p> <ul style="list-style-type: none"> <li>◆ Proper training of operators;</li> <li>◆ First aid treatment;</li> <li>◆ Medical assistance;</li> <li>◆ Emergency treatment;</li> <li>◆ Protective clothing, footwear, gloves and belts; safety goggles and shields;</li> <li>◆ Manuals and training regarding the correct handling of materials should be in place and updated as new or updated MSDS' become available.</li> <li>◆ 24-hour security surveillance in case of opportunistic activities.</li> </ul>	<p>A register of all incidents must be maintained on a daily basis. This should include measures taken to ensure that such incidents do not repeat it self.</p>	<p>Proponent; Contractor</p>

## **4 CONCLUSIONS**

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The above Environmental Management Plan, if properly implemented will help minimise adverse impacts on the environment. Where impacts occur, immediate action must be taken to reduce the escalation of effects associated with these impacts. To ensure the relevance of this document to the specific stage of project, it needs to be reviewed throughout all phases.

The Environmental Management Plan should be used as an on-site reference document during all phases of the proposed project, and auditing should take place in order to determine compliance with the EMP for the proposed site, and Parties responsible for transgression of the EMP should be held responsible for any rehabilitation that may need to be undertaken.

Monitoring reports must be kept available for possible submission with future renewal applications for environmental clearance certificates.

### **Geo Pollution Technologies**

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July 2018

## **5 REFERENCES**

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Faul A, Botha P, Brews L. 2015. Environmental Impact Assessment Scoping Report for the Grit Blasting Operations of Elgin Brown & Hamer Namibia (Pty) Ltd in the Port of Walvis Bay.