



EMP REPORT

***ENVIRONMENTAL MANAGEMENT PLAN REPORT
FOR THE PROPOSED UNDERWATER HULL
CLEANING, WALVIS BAY (ERONGO REGION)***

This Report is prepared

by



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ENVIRONMENTAL IMPACT ASSESSMENT/SCOPING REPORT FOR THE PROPOSED UNDERWATER HULL CLEANING, WALVIS BAY, ERONGO REGION

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DECLARATION

I **MR. SAMUEL SHIKONGO** (full name) hereby declare that I am the Team Leader for this project consulting under Envirodu Consulting & Training Solutions cc. I further declare that I have no business, financial, personal or other interests in the proposed project, application or appeal in respect of which I was appointed other than fair remuneration for the work performed. Therefore, there are no circumstances that compromise the objectivity of this assessment and recommendations thereof.

.....

Mr. Samuel Shikongo

1. INTRODUCTION

The EMP (Environmental Management Plan) is a commitment by the proponent to incorporate environmental protection in their daily underwater hull cleaning operations. More importantly, the proponent further undertake to integrate this EMP into the company environmental policy statement.

EMP provides a clear and concise baseline environmental monitoring plan detailing which environmental indicators will be monitored and the SOPs (standard operation procedures) to be used for each environmental indicators. Environmental indicators will be used to describe state of the environment including seawater quality and sediment before and after the underwater hull cleaning. Environmental indicators are divided into 2 categories viz. physical/chemical and biological indicators.

Within each category are parameters which will be measured using various equipment and instruments.

2. OBJECTIVES

The purpose of this EMP is to describe how the proponent intend to implement the EMP by providing a clear and concise baseline environmental monitoring plan detailing which environmental indicators will be monitored and the SOPs to be used for each indicator.

Specific objectives are to:

- List documentations (e.g. permits, method statements, SOPs, etc) required for performing underwater hull cleaning activities;
- Identify baseline environmental indicators and parameters to be measured;
- Prescribe technology and equipment required;
- Establish the MC (Environmental Management Committee) and identify human capacity requirement;

- Translate EMP and baseline mitigation plan into a company environmental policy, and
- Describe in details mitigation actions required to minimize or reduce negative impacts.

3. ENVIRONMENTAL CERTIFICATIONS AND DOCUMENTATIONS

Environmental certifications will include permits and certificates needed to authorize performance of underwater hull cleaning as required by GRN. Documentations will be communicable materials that will be required to describe, explain or instruct and communicate information regarding the underwater hull cleaning operational procedures.

Before commencement of the proposed underwater hull cleaning operation, the following environmental certifications and documentations shall be required:

Table 1: permits and authorization.

Certification and documentation	Institution/competent authority	Contact person/details
Environmental clearance certificate	Ministry of Environmental, Forestry and Tourism	Environmental Commissioner
Written permission to operate	Namibia Ports Authority	Harbor master
Domestic and industrial wastewater and effluent discharge permits	Ministry of Agriculture, Water and Land Reform	Department of Water Affairs
Pre-cleaning inspection report	Namibia Ports Authority	Harbor master
Method statements	Namibia Ports Authority	Harbor master
Cleaning exit operation plan	Namibia Ports Authority	Harbor master
Baseline environmental monitoring plan	Namibia Ports Authority	Harbor master
SOPs (Standard operation procedures)	Namibia Ports Authority	Harbor master

Contents and conditions of ECC, written permission to operate as well as domestic and industrial wastewater and effluent discharge permits will be determined by the competent

authorizing entities. Details for other documentations required are proposed to be as described below.

Table 2: documentations.

Documentations	Proposed contents
Pre-cleaning inspection report	<ul style="list-style-type: none"> • Give composition of hull paint and determine whether TBTs and TPhTs are present. • Date of last painting and cleaning. • The last 3 ports visited/entered. • SOPs for MV inspection.
Method statement for underwater cleaning	<ul style="list-style-type: none"> • Information about the port of Walvis Bay. • Map of ecological sensitive areas in the port. • Land use planning of the Walvis Bay port including storm waters, river drainage, sewage discharge, etc. • SOPs for operation of the ROV-cart equipment.
Cleaning operation exit plan	<ul style="list-style-type: none"> • Housekeeping and removal of equipment from wharfs, quays, jetties and other work places in the port. • Provide details on type of drums to store/transport debris. • Waste management and water discharge procedures.
Baseline environmental monitoring plan	<ul style="list-style-type: none"> • Physical/chemical and biological indicators (environmental indicators). • SOPs for environmental indicators.
SOPs (Standard operation procedures)	<ul style="list-style-type: none"> • Detailed procedures will be provided in the SOPs for each documentation.

4. BASELINE ENVIRONMENTAL MONITORING INDICATORS

4.1. Physical/chemical environmental indicators

The following parametres will be used as indicators of water quality:

- Free Carbon Dioxide;
- Seas surface temperatures (SSTs);
- Dissolved oxygen (DO);
- Turbidity;
- Total suspended and dissolved solids;
- Nutrients (nitrates, nitrites, total phosphate, free chlorine, etc);
- pH, conductivity/salinity metre;

- Pathogens (bacteria, virus, etc), and
- Trace metals.

Water samples for the above parameters should be collected before, during and after the underwater hull cleaning operation at each site where cleaning operations were performed. Samples could either be measured on site or transported to a laboratory for analysis. Data will be recorded in various (see example **Form-1**). Detailed procedures are provided will be in the SOPs for each parameters.

Concentration levels of trace metals will be measured from water and sediment samples. Trace metals concentration levels will be used to indicate TBT (tributyltin) and TPhT (triphenyltin) compounds which may result from accidental removal of marine paints.

4.2. Baseline biological sampling

The following parameters will be used as biological indicators:

- Phytoplankton;
- Zooplankton;
- Epi-fauna, and
- Benthic fauna.

Phytoplankton and zooplankton samples for the each parameters should be collected before, during and after the underwater hull cleaning operation.

Samples for benthic fauna should be collected twice a year only.

Since IAS could either occur as part of phytoplankton, zooplankton, epi-fauna and benthic fauna, it will be necessary to keep record of alien and native or endemic species. Detailed procedures are provided in the SOPs for each parameters.

5. TECHNOLOGY AND EQUIPMENT REQUIREMENTS

Equipment and technologies required for EMP implementation and baseline environmental monitoring are provided below. These equipment and technology are available from various institutions in Namibia such as NCRST, NUST, MFMR, UNAM, NAMWATER, MAWL and commercial laboratories. There are also other institutions like BCC (Benguela Current Convention) that may not own required equipment and technologies but whose mandate is to combat marine pollution.

With regard to technologies and equipment requirements, the local capacity for baseline environmental monitoring exist in Namibia. Therefore, it will not be necessary for the proponent to purchase these technologies and equipment. Rather it will be advisable for the proponent to collaborate with local institutions in order to invest in the local capacity for environmental baseline monitoring activities. These activities which will involve hiring of environmental consultants; training of students and in-service staffs in conducting baseline surveys; sample collection; sample processing and analysis and reporting; will positively contribute to a cleaner and safer environment in Namibia.

Table 2: technology and equipment requirements.

Parametre	Equipment/method
Free Carbon Dioxide (CO ₂)	<p>-Measure CO₂ directly using beverage carbonation metre. The recommended OxyGuard portable CO₂ meter is a reliable and easy-to-use instrument that measures dissolved CO₂ in water. The meter consists of a probe and a battery-powered transmitter. The meter displays CO₂ concentration and an analog signal as output.</p> <p>-The titration method can also be used, though not recommended.</p>
Water temperature	<p>-Measure using a thermometer.</p> <p>-The Hach HQ30D also measures temperature.</p> <p>-Currently there are online weather databases that provide daily water temperature data.</p>
Dissolved oxygen	<p>-The recommended Hach HQ30D portable multi-parametre gives maximum measurement flexibility and ease of operation with interchangeable probes and automatic parameter recognition.</p> <p>-The Winkler's titration method will be used for comparison.</p>
Turbidity	<p>-The recommended HACH 2100Q turbidometre is accurate and reliable in measuring turbidity. It is portable and battery powered; so measurements could be taken and recorded while in the field.</p>

	-The HACH HQ30D also measures TDS (total dissolved solids) and could be ideal in case the HACH 2100Q turbidometre is not available. TDS could be used to indicate turbidity.
Total suspended and volatile solids	TSS and TVS could be measured either using the HACH DR 2700, DR 2800 or DR 900. The recommend HACH DR 900 is portable, LED-sourced colorimeter and it measures at wavelengths of 420, 520, 560 nd 610 nm. Measurements could be taken and recorded while in the field; eliminating the need for sample transportation.
Nutrients (nitrates, nitrites, total phosphate, free chlorine, etc)	
pH, conductivity/salinity metre	The Hach HQ30D multi-parametre is recommended.
Pathogens	Pathological samples shall be taken for analysis of total coliforms and <i>Streptococcus sp.</i> Other indicators may be selected according to the IEC's discretion and factors inherent at site.
Trace metals	It is recommended that analysis for trace metals are performed by a commercial laboratory. The proponent or the IEC should collect samples, preserve and send them to a commercial laboratory (e.g. Analytical laboratory or NAMWATER).
Phytoplankton	Use a phytoplankton net to collect the samples. The samples should be analysed under a compound microscope (recommended is the Olympus type).
Zooplankton	Use a zooplankton net to collect the samples. The samples should be analysed under a light microscope (recommended is the Zeiss type).
Epi-fauna	Sample should be collected from vessel hulls or sub-merged structures as well as from rocks and soft sediments (sandy shores). Microscopes maybe required for tiny organisms.
Benthic fauna	A Van veen grab will be used to collect sediment samples. The samples should be analysed either under a light or compound microscopes (recommended is the Olympus and Zeiss type).
Sediment size analysis	Part of the sediment will be used to study grain size using the Sieving Assemblage-Wilson instrument.

6. ENVIRONMENTAL MANAGEMENT COMMITTEE

The shall be established an environmental management committee. There is no need for the proponent to recruit new employees as the committee will only meet on quarterly basis. For specialized environmental services, the proponent may hire IECs (independent environmental consultants) on contract basis.

Below are proposed committee members as well as required competency and responsibilities.

Table 3: composition of environmental management committee.

Personnel	Competence	Responsibilities
Environmental management representative (EMR)	Should be in employment of the proponent. Should be a senior staff member with a management position in the company.	<ul style="list-style-type: none"> • Represent management on environmental safety and occupational issues related to underwater hull cleaning operations. • Provide support and avail resources needed to endorse and implement the company's environmental policy. • Upon advice from the ESOR and IEC, the EMR may call off an underwater cleaning operation.
Environmental safety and occupational representative (ESOR)	Should be in employment of the proponent. A minimum of grade 12, sufficient knowledge of environment, safety and ethics at work place. Preferably, a professional diver.	<ul style="list-style-type: none"> • Represent employees' environmental safety and occupational concerns related to underwater hull cleaning operations. • Ensure other employees comply to conditions as required in the environmental compliance certificates or permits. • The ESOR may call off the cleaning operation if: <ul style="list-style-type: none"> -Vacuum suction fails to operate. -Filters or macerator/screen fails to operate. -Excessive turbidity arises from natural or other events. -Where untoward situation arises that may constitute a hazard human life or environment and the equipment or other assets.
SHREQ officer (NAMPORT representative)	Bachelor's degree or BSc. Hons. Valid competency certificates. Registration as a helath and	<ul style="list-style-type: none"> • Represent NAMPORT on this committee.

	Safety officer. Strong communication skills.	<ul style="list-style-type: none"> Advise the Proponent and IEC on issues related to environmental management.
Independent Environmental Consultant (IEC)	Master's degree or MSc. in the field of environmental or natural resources management, marine biology or water science. Knowledge of environmental impact assessment, EMP implementation and baseline environmental monitoring is compulsory. More than 10 years of field survey co-ordination and laboratory analytical skills will an added advantage.	<ul style="list-style-type: none"> The overall responsibility of the IEC is to assist the proponent in implementation of the EMP and baseline environmental plan; ensure environmental compliance and certification with GRN policies and legislations. IEC will advise the committee in domestication of the EMP, scientific interpretation of results from baseline environmental surveys as well as reporting.

7. INTEGRATION OF EMP INTO COMPANY POLICY

Although companies are not required by law to have environmental policies; the proponent has opted to do this voluntarily. Below is the proponent's policy statement:

“Walvis Bay Diving & Salvage specialize in commercial diving ship maintenance and repair with our focus on rendering a top-rated quality service to all our clients in Namibia and other parts of the world while protecting the environment for future generations.

At Walvis Bay Diving & Salvage we are fully committed to continually improve and enhance our environmental performance. This will be achieved by complying to all statutory and regulatory requirements, monitoring and reviewing of our environmental performance.

This Environmental Policy Statement is applicable to all areas of Walvis Bay Diving & Salvage and has been implemented to meet the requirements of the ISO 14001:2015.

We are committed to:

- Prevent pollution;*

- *Protect the Environment in all aspects of our business to prevent any adverse environmental effects during operation;*
- *Recycle / reuse materials wherever practical;*
- *Minimize the environmental impact, for the life cycle (including disposal) of all infrastructure, equipment, and other physical assets under our control;*
- *Comply with legislation, regulations & relevant other requirements that we subscribe to, at all times.*

Walvis Bay Diving & Salvage will monitor our environmental progress in the following ways:

- *Setting Objectives and Targets that will be reviewed by management at the required and designated intervals;*
- *Management Programs for all identified high environmental processes in our operations;*
- *In the annual management review meeting we will monitor and measure our environmental management system performance for suitability, adequacy and effectiveness.*

The management of Walvis Bay Diving & Salvage commit to employ specialists, where necessary, to assist or advise with environmental matters and to ensure adherence our Policy and Programs, and to address resulting actions identified through it.

We have included within our system measures to control abnormal and emergency situations.

This environmental policy will be communicated and made available to our employees, sub-contractors, suppliers and all persons working on our behalf at any of our areas or client areas. This will be done to promote environmental awareness and meet our environmental objectives”.

8. MITIGATION ACTIONS

Mitigation actions that are required to reduce or minimize negative impacts are described in **table 4**.

4.1. Risk preparedness and response plan

Risk is an event that may or may not happen; whereas an impact is what will happen if a risk occurs. Risks poses a significant impact on people, the environment or property. Although they may or not happen, there is a need to be prepared to response to risks at all times.

All response actions should be geared toward the following priorities in the order below:

- **Safety** of people (always First);
- **Protection** of the Environment, and
- **Protection** of Assets.

Emergence preparedness and response management involves 5 basic steps as follows:

- **Preventive actions** are taken to avoid an incident.
- **Mitigation measures** are actions taken to prevent an emergency, reduce the chance of an emergency happening, or reduce the damaging effects of unavoidable emergencies.
- **Preparedness** increase the proponent's ability to respond when a risk occurs. Typical preparedness measures include developing method statement and emergence exit procedures, awareness and training for both response personnel and affected parties and conducting drills to reinforce training and test capabilities.
- **Response** is an action carried out immediately before, during, and immediately after a hazard impact, which is aimed at saving lives, reducing economic losses, and alleviating suffering. Response actions may include activating the emergency operations center, evacuating threatened

employees or equipment, opening shelters and providing mass care, emergency rescue and medical care, firefighting, and sea search and rescue.

- **Recovery.** These are actions taken to return to normal or near-normal conditions, including the restoration of basic services and the repair of environmental, social and economic damages. Typical recovery actions include debris cleanup, financial assistance to individuals, rebuilding of infrastructures and key facilities, and sustained mass care for displaced marine animal populations.

9. GRIEVANCE MECHANISM

The procedure the management will apply to deal with the employees' grievances will be enforced as follows:

9.1. Timely Action

The first and foremost requisite in grievance handling shall be immediate settlement as they arise. The sooner a grievance is settled, the lesser it will affect employees' performance. This requires the first line supervisors to be trained in recognizing and handling a grievance properly and promptly.

9.2. Accepting the Grievance

The supervisor shall recognize and accept the employee grievance as and when it shall be expressed. Acceptance shall not necessarily mean agreeing with the grievance; it rather shows the supervisor's willingness to look into the complaint objectively and dispassionately.

9.3. Identifying the Problem

The grievance expressed by the employee shall be at times simply emotional, over-toned, imaginary or vague. The supervisor, therefore, shall be required to identify or diagnose the problem stated by the employee.

9.4. Collecting the Facts

Once the problem is identified as a real problem; the supervisor should, then, collect all the relevant facts and proofs relating to the grievance. The facts so collected shall be separated from the opinions and feelings to avoid distortions of the facts.

9.5. Analyzing the cause of the Grievance

Having collected all the facts and figures relating to the grievance, the next step involved in the grievance procedure shall be to establish and analyse the cause that led to grievance. The analysis of the cause shall involve studying various aspects of the grievance such as the employees past history, frequency of the occurrence, management practices, union practices, etc. Identification of the cause of the grievance helps the management to take corrective measures to settle the grievance and also to prevent its recurrence.

9.6. Taking Decision

In order to take the best decision to handle the grievance, alternative courses of actions shall be worked out. These are, then, evaluated in view of their consequences on the aggrieved employee, the union and the management. Finally, a decision taken should best suite a given situation. Such decision should serve as a precedent both within the department and the company.

9.7. Implementing the Decision

The decision shall be immediately communicated to the employee and also implemented by the competent authority.

In case, it is not resolved, the supervisor once again needs to go back to the whole procedure step by step to find out an appropriate decision or solution to resolve the grievance.

10. EXTERNAL COMMUNICATIONS

External communications shall be handled in line with company procedures.

11. RECOMMENDATIONS

It is recommended that:

- The proponent strictly adheres to EMP and undertake baseline environmental monitoring;
- Data from baseline environmental monitoring should be kept and availed to NAMPORT and other GRN authorities when requested, and
- The technology and equipment may be hired.

12. REPORTING

Baseline monitoring and environmental monitoring should be reported to NAMPORT and other GRN authorities when requested. This should be done either by submitting quarterly or annual reports.

Table 4: EMP and mitigation.

Receiving environment	Valued environmental component	Issue	Mitigation actions	Performance indicator	Responsible institution/ personnel
Air and climate	Technosphere	Poor ambient air quality and health implications to residents due to emissions of GHGs (greenhouse gases).	Avoid higher consumption of heavy diesel by MVs in order to reduce emissions of GHGs. It is anticipated that environmental regulations will at some point see fuel oils displaced in favor of supposedly cleaner fuels. Encourage MVs to use fuels with low carbon such as ULSD. Regular hull cleaning of MVs. Reduce vessel drag and increase fuel efficiency by regular hull cleaning.	Regulations to use cleaner marine fuels.	MWTC/DMA (Ministry of works, transport and communication/Directorate of maritime Affairs). Vessel owners.
		Release of dust and metals particles into the air	Grit blasting with glass beads or metal particles such as aluminum oxide, steel grit, cast iron shot, garnet and slag should be done only upon approved method statement by NAMPORT.	Method statement. This method statement should provide SOPs, equipment used and mitigation measures to reduce environmental impacts.	NAMPORT
	Air composition	Ocean acidification due to increased atmospheric Carbon Dioxide.	Reduce emission of Carbon Dioxide.	Regulations to use cleaner marine fuels.	MWTC

	Biosphere	Effects of acidification on flora and fauna	The Proponent should regularly measure pH, carbon dioxide and other indicators of acidification as may be determined by NAMPORT or authorizing entity.	Baseline Environment Monitoring Plan and SOPs.	IEC (Independent Environmental Consultant)
	Cryosphere	Melting of ice and sea level rise due to global warming.	Avoid higher consumption of heavy diesels by MVs and reduce emission of GHGs.	Regulations to use cleaner marine fuels. Regular hull cleaning of MVs.	MWTC. Vessel owners.
Ocean and seas	Sediment modification	Hydrodynamic vortices generated by the ROV-cart equipment.	Hull cleaning operations maybe be temporarily terminated if it is observed that the equipment used generate a hydrodynamic vortices with a significant impact on sediment transport.	Notice to terminate port activity.	NAMPORT
	Seawater quality	Increased turbidity.	The Proponent should measure turbidity before, during and after the hull cleaning operation and such data should be availed to NAMPORT or other authorized entity upon request.	Baseline Environment Monitoring Plan and SOPs.	IEC (Independent Environmental Consultant)
		Release of IAS and harmful pathogens.	The Proponent should demonstrate that the hull cleaning equipment could reclaim debris removed from MVs' hull and that such equipment efficiently minimizes the release of IAS and harmful pathogens into port waters. Samples of bio-fouling organisms removed from MVs should be taken in order to identify potential IAS and harmful pathogens.	Baseline Environment Monitoring Plan and SOPs.	Proponent

					Proponent and IEC
		Release of pollutants from biocide antifouling paint.	The Proponent should measure trace elements before, during and after the hull cleaning operation and such data should be availed to NAMPORT or other authorized entity upon request.	Baseline Environment Monitoring Plan and SOPs.	Proponent and IEC
		Water pollution	Where needed permit to extract or discharge water will be needed.	Domestic and industrial waste and effluent discharge permits.	Proponent
			Appoint IEC to co-ordinate water pollution and monitoring activities.	IEC	Proponent
			No sanding, stripping and chipping of antifouling paints may be carried out in and or during hull cleaning operations in the port's waters.	Method statement	Proponent and NAMPORT
			The proponent shall not perform any hull cleaning activity on vessels or movable structures that have reached or exceeded their planned in-service period.		
			When the anti-fouling coating has reached the end of its service life the vessel or movable structure should be removed from the water and a new antifouling coating applied. Should the vessel require new anti-fouling coating, the activity should be carried out in a dry or floating dock facility.		
			No chemicals or detergents shall be released into the water, port, air and sea during the hull cleaning operations. This includes the release of Tributyltin (TBT), which is a common constituent of ship paints. Only vessels which are certificated		

			of TBT-free paint will be allowed to undergo under-water hull cleaning in ports.		
Land and seabed	Sediment transport and morphology	Sediment modification will negatively affect the environment.	Monitor sediment characteristics and benthic fauna before and after underwater hull cleaning operations.	Baseline Environment Monitoring Plan and SOPs.	Proponent and IEC
	Waste pollution	Disposal of waste	Waste generated may only be disposed in a manner as prescribed in relevant policies and legislations. The proponent should submit to NAMPORT a method statement detailing on how waste will be managed.	Method statement.	Proponent
	Land use	Port Authority	Hull cleaning operations should not be performed without written authorization from NAMPORT. This authorization should be granted on a vessel to be cleaned and per quay berth where the vessel is docked. NAMPORT will do this in strict compliance and adherence to conditions in the ECC and any conditions imposed by other relevant authorities. The Proponent may not enter the port without this authorization.	Written permission to undertake hull cleaning. Port entry register.	NAMPORT
	Potential conflict use		The proposed areas where cleaning will take place include fishing factories, main harbour, tanker jetties and anchorage 1-4. Hull cleaning operations may not be undertaken at the expense of other users.	Port map.	NAMPORT

Ecology and biodiversity	Effect on local biodiversity	Bio-fouling organisms	The Proponent shall submit the monitoring plan and SOPs (as per IMO Resolution MEPC. 207(62)) to NAMPOT detailing how bio-fouling organisms will be treated.	Baseline Environment Monitoring Plan and SOPs.	Proponent
		IAS and pathogens	The proponent should submit a monitoring plan and SOPs detailing how IAS and pathogens will be monitored and mitigated.	Biosecurity Risk Assessment Plan and EMP	
	Ecosystem diversity	Ecologically sensitive areas	Hull cleaning operations should only be permitted in certain port areas for which permission is not granted; these areas specifically exclude ecologically sensitive areas.	Map of ecologically sensitive areas	Vessel
Human environment	Safety of life at sea	Occupational safety and public health.	<p>Prior to cleaning operations, the Proponent shall submit occupational safety plan detailing how safety and occupational issues will be dealt with while working at sea.</p> <p>Among other, occupational safety plan should provide details on how CVDs (cardio-vascular diseases) and communicable diseases (including COVID-19) will be dealt with among different employees.</p>	Occupational health safety plan and EMP	Proponent
		Diving	Terms and conditions of the underwater hull cleaning permit should be read in conjunction with the Diving License conditions.	Diving license	Proponent
		Vessel preparation	Ensure the main engine and any relevant auxiliary engines must be isolated and not be operated for the duration of the hull cleaning activity. All costs related to the activity and any movement of vessel shall be for the account of the vessel.	Method statement	Vessel owner and Proponent.
		Injury on duty (IOD)	Any IOD or fatality to employees or third party, shall be reported to NAMPORT without delay and	Accident report	Proponent

			to any applicable statutory body within the required time-frame.		
		Reporting of incidents	<p>The proponent shall:</p> <ul style="list-style-type: none"> a) Report to competent authorities any incidents that result or could result, any environmental impact and any activity that may remotely affect the operations of the port. b) Not undertake any modification of the authorized equipment, of whatsoever nature, unless approved in writing by all relevant Authorities and such approvals provided to NAMPORT. 		
		Termination of hull cleaning	NAMPORT, DMA, EC/DEA, DWA or any other duly authorised entity may terminate hull cleaning operations immediately upon receipt of notification to do so.	Notice to terminate hull cleaning.	NAMPORT, MWTC/DMA, EC/DEA, DWA, MFMR
Hull cleaning technology		Removal of macro-fouling organisms of domestic or international origin	Underwater cleaning technologies should aim to, at least, capture debris greater than 50 micrometres (μm) in diameter in order to minimise release of viable adult, juvenile and larval stages of bio-fouling organisms.	SOPs for underwater cleaning using ROV-cart	Proponent
		Release into water of macro-fouling organisms of domestic or international origin	<p>The Proponent should avoid accidental removal of anti-fouling paint that may contain TBT (tributyltin) and TPhT (triphenyltin).</p> <p>The following vessels may not be cleaned while underwater:</p> <ul style="list-style-type: none"> o MVs that were painted 10 years ago as there is a higher risk of removing painting materials; 	Pre-cleaning inspection report and SOPs.	Proponent

			<ul style="list-style-type: none"> ○ MVs that frequently visit/enter ports known to be 'hotspots' of IAS and pathogens, and ○ Vessels that had been denied entry into other ports for environmental violations. <ul style="list-style-type: none"> • The proponent may only be allowed to clean aged MVs while on dry dock where old paint could be removed and properly disposed. 		
		Hull cleaning equipment	<p>The proponent is limited to the use of equipment that are:</p> <ul style="list-style-type: none"> a) The same technology as demonstrated when applying for the hull cleaning authorisation and permit, b) Where the equipment efficacy is proven and approved by relevant/competent authority and are marked with a safe working load and or is capable of being recovered in case of remote failure; c) In good operating and maintenance conditions in accordance with statutory standards and duly licensed by the appropriate regulatory body, operated by competent and adequately trained and certified staff. 	SOPs for underwater cleaning using ROV-cart	Proponent
		Calibration and servicing of the equipment	Calibration and servicing of the equipment should be done as prescribed by equipment manufacturers.	Equipment calibration certificate and service plan	Proponent

		House keeping	All equipment used during the performance of hull cleaning activities should be removed from wharfs, quays, jetties and other work places in the Port without delay immediately after the hull cleaning activities are completed on a particular vessel, or within such extended time as the Authority may allow, on good cause shown.	Cleaning operation exit plan.	Proponent
		Inspection and compliance	The proponent shall have written safety, health and occupational plan as well as environmental certifications, SOPs and method statements in place at all times and shall make these available to NAMPORT or relevant Authority for inspection upon request.	Baseline environmental monitoring plan	Proponent

Table: baseline environmental monitoring plan.

Activity	Description	Frequency	Responsible
PRE-CLEANING INSPECTION REPORT	Upon booking of ship for in water hull cleaning the following information should be obtained: <ul style="list-style-type: none"> • Make and composition of paint on hull and date when painted. • Age of ship. • Route to port and names of last three ports visited. • Date of last hull cleaning. • Copy of vessel bio-fouling management plan. 	All ship cleaning operations.	Proponent/IEC.
	Upon arrival at cleaning berth, manual inspection of hull is to be undertaken and the following is to be evaluated: <ul style="list-style-type: none"> • Nature of biofouling: heavy, moderate or limited. • Dominant bio-fouling species (e.g. mussel; barnacle; algal). • Nature of paint hull - degraded; some peeling and sound state. • Presence of cathodic protection devices. • State of propeller/ prop shaft <p>DECISION: where biofouling is considered excessive, alternative cleaning methods or rejection will be considered. ALTERNATIVE: alternative is to clean MV at dry dock. ACCEPTANCE: upon acceptance the proponent should:</p> <ul style="list-style-type: none"> • Submit pre-inspection report to NAMPORT for approval so that underwater cleaning could commence. • Conduct a general inspection of the berth. 	All ship cleaning operations.	Proponent/IEC.
OPERATIONAL MANAGEMENT			
Check operations of generator and containment of spillage	Ascertain that all aspects of ROV-cart are operating appropriately and that the generator and fuel spillage is addressed/contained.	All MV cleaning operations.	Proponent - land based crew

Emergency response equipment	Ensure all emergency response equipment are mobilized and in working conditions including the following: <ol style="list-style-type: none"> 1. Turbidity curtains. 2. Spill booms. 3. Sample probe. 	All MV cleaning operations.	Proponent - land based crew
Pre-operation check of cart	Oversee brushes/skirt and rectify any anomalies. Check hoses and hose connection. Ensure outlet pipe is down drift of MV.	All MV cleaning operations.	Proponent - land based crew.
Review surface water turbidity / variation	Identify state of water around MV: turbid/clear? Any solid waste?	All MV cleaning operations.	Proponent - land based crew.
Check intake of brush cart during operations	Any evidence of plumes?	All MV cleaning operations.	Diver.
Check intake of filter system	During operations camera review of intake, ensuring that no plumes arise from cart.	All MV cleaning operations.	Diver.
Establish probe and collection process	Where applicable – ascribe position and placement of probe.	All MV cleaning operations.	Proponent/IEC.
CLOSURE OF CLEANING OPERATION			
Solid waste debris	Ensure that all solid waste is contained within containment drum: <ul style="list-style-type: none"> • Add probiotic if required. • Ensure labelling is completed and in order. • Seal drum. • Ensure collection by registered waste operator and transfer to H : H approved landfill site. 	All MV cleaning operations.	Proponent - land based crew.
Removal and cleaning of cart	Cart is to be removed from the water once all cleaning has been completed. The following actions are required: <ul style="list-style-type: none"> • Cart is to be inspected for debris and any damage. • Cart is to be removed from the berth and cleaned at point with freshwater. • No washing down of the cart is to take place on the quayside or on the barge. 	All MV cleaning operations.	Proponent - land based crew.

BASELINE ENVIRONMENTAL MONITORING	<p>Specific analysis of water quality and operations is to be undertaken on individual MV using the multi parameter probe as well as taking samples for further analysis as per SOPs. This data is to be recorded as per vessel and will act as a record of findings on that vessel.</p> <p>More specific monitoring of underwater hull cleaning by the Pure Ballast 3.1 barge mounted system is to take place on a selected MV once every 3 months as advised by the IEC.</p>	Every 3 months	IEC
Pre-cleaning	Measure and record weather parameters such as tide level, air temperature, humidity, etc.	Every 3 months	IEC
	Collect surface water samples from bow and stern of MV for analysis.	Every 3 months	IEC
	Collect sediment samples.	Every 3 months	IEC
	<p>Phytoplankton and zooplankton samples should be collected before, during and after the underwater hull cleaning operation.</p> <p>Samples for benthic fauna should be collected twice a year only.</p>	Every 3 months	IEC
Operations	Collect 2 x samples from intake pipeline of cart and at intake of Pure Ballast system using sterilized sampling bottles.	Every 3 months	IEC
	Collect 2 x samples from intake pipeline of cart and at outfall of Pure Ballast system using sterilized sampling bottles.	Every 3 months	IEC
Closure of cleaning procedure	Collect sediment samples from centerline of MV.	Every 3 months	IEC
	Collect surface water sample from fore and aft of MV for analysis.	Every 3 months	IEC
	Collect sample of solid careened materials for preservation in dry form and formaldehyde.	Every 3 months	IEC
	All sampling requiring laboratory analysis should be transferred to commercial/accredited laboratory under instruction of IEC.	Every 3 months	IEC
MONITORING REPORTS	Present/submit report on analysis on 7th day of every quarter after analysis to Harbour Master.	Every 3 months	Proponent

