

Electromagnetic Geoservices ASA

Final Environmental Management Plan (EMP)
Report to Support the Application for Environmental
Clearance Certificate (ECC) for the Proposed
Multiclient 2D and 3D Controlled Source
Electromagnetic (CSEM) covering the Walvis Basin,
NORTHCENTRAL OFFSHORE NAMIBIA

Electromagnetic Geoservices ASA
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NORWAY

MARCH 2020



SUMMARY INFORMATION

Type of Permit

Environmental Clearance Certificate (ECC)

Proponent

Electromagnetic Geoservices ASA

Regulatory Framework

Environmental Management Act, (EMA), 2007, (Act No. 7 of 2007) and Environmental Impact Assessment (EIA) Regulations No. 30 of 2012

Type of Listed Activities

Multiclient 2D and 3D Controlled Source Electromagnetic (CSEM) Survey for Petroleum Exploration, Walvis Basin, Offshore Namibia

Competent Authority

Ministry of Mines and Energy (MME)

Proposed Project Location

Walvis Basin, Northcentral Offshore Namibia,
West Coast of Africa

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Environmental Assessment Practitioner (EAP)

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Summary Profile and Qualification of the Environmental Assessment Practitioner (EAP) / International Consultant Projects Director – Dr Sindila Mwiya

Dr Sindila Mwiya has more than eighteen (18) years of practical field-based technical industry experience in Environmental Assessment (SEA, EIA, EMP, EMS), Energy (Renewable and Non-renewable energy sources), onshore and offshore resources (minerals, oil, gas and water) exploration / prospecting, operation and utilisation, covering general and specialist technical exploration and recovery support, Health, Safety and Environment (HSE) permitting for Geophysical Surveys such as 2D, 3D and 4D CSEM, Gravity and Electromagnetic Surveys for mining and petroleum (oil and gas) operations support, through to engineering planning, layout, designing, logistical support, recovery, production / operations, compliance monitoring, rehabilitation, closure and aftercare projects lifecycles. The great array of highly technical specialist knowledge and field-based practical experiences of Dr Sindila Mwiya has now been extended to supporting the development of Environmentally Sustainable, automated / smart and Climate Change resilient homes, towns and cities.

Through his companies, Risk-Based Solutions (RBS) CC and Foresight Group Namibia (FGN) (Pty) Ltd which he founded, he has undertaken more than 200 projects for Local (Namibian), Continental (Africa) and International (Global) based clients. He has worked and continue to work for Global, Continental and Namibian based reputable resources (petroleum and mining / minerals) and energy companies such as EMGS (UK/ Norway), Electromagnetic Geoservices ASA (UK/ France/Namibia), BW Offshore (Norway/Singapore /Namibia), Shell Namibia B. V. Limited (Namibia/ the Netherlands), Tullow Oil (UK/Namibia), Debmarn (DBMN) (Namibia), Reconnaissance Energy Africa Ltd (ReconAfrica) (UK/Canada/Namibia), Osino Resource Corporation (Canada/Germany/Namibia), Desert Lion Energy Corporation (Canada/ Australia/ Namibia), Petrobras Oil and Gas (Brazil) / BP (UK)/ Namibia, REPSOL (Spain/ Namibia), ACREP (Namibia/Angola), Preview Energy Resources (UK), HRT Africa (Brazil / USA/ Namibia), Chariot Oil and Gas Exploration (UK/ Namibia), NABIRM (USA/ Namibia), Serica Energy (UK/ Namibia), Eco (Atlantic) Oil and Gas (Canada / USA/ Namibia), ION GeoVentures (USA), PGS UK Exploration (UK), TGS-NOPEC (UK), Maurel & Prom (France/ Namibia), GeoPartners (UK), PetroSA Equatorial Guinea (South Africa / Equatorial Guinea/ Namibia), Preview Energy Resources (Namibia / UK), Sintezneftegaz Namibia Ltd (Russia/ Namibia), INA Namibia (INA INDUSTRIJA NAFTE d.d) (Croatia/ Namibia), Namibia Underwater Technologies (NUTAM) (South Africa/Namibia), InnoSun Holdings (Pty) Ltd and all its subsidiary renewable energy companies and projects in Namibia (Namibia / France), HopSol (Namibia/Switzerland), Momentous Solar One (Pty) Ltd (Namibia / Canada), OLC Northern Sun Energy (Pty) Ltd (Namibia) and more than 100 local companies. Dr Sindila Mwiya is highly qualified with extensive practical field-based experience in petroleum, mining, renewable energy (Solar, Wind, Biomass, Geothermal and Hydropower), Non Renewable energy (Coal, Petroleum, and Natural Gas), applied environmental assessment, management and monitoring (Scoping, EIA, EMP, EMP, EMS) and overall industry specific HSE, cleaner production programmes, Geoenvironmental, geological and geotechnical engineering specialist fields.

Dr Sindila Mwiya has undertaken and continue to undertake and manage high value projects on behalf of global and local resources and energy companies. Currently, (2020-2023) Dr Sindila Mwiya is responsible for permitting planning through to operational and completion compliance monitoring, HSE and engineering technical support for multiple major upstream onshore and offshore petroleum, minerals and mining projects, Solar and Wind Energy Projects, manufacturing and environmentally sustainable, automated / smart and Climate Change resilient homes developments in different parts of the World including Namibia. Currently, Dr Sindila Mwiya is developing a 16 Ha commercial and residential Mwale Mwiya Park in the Town of Katima Mulilo, Zambezi Region, Namibia as one of first advanced Environmentally Sustainable, automated / smart and Climate Change resilient development in Namibia. He continue to worked as an International Resources Consultant, national Environmental Assessment Practitioner (EAP) / Environmentally Sustainable, automated / smart and Climate Change resilient homes developer, Engineering / Technical Consultant (RBS / FGN), Project Manager, Programme Advisor for the Department of Natural and Applied Sciences, Namibia University of Science and Technology (NUST) and has worked as a Lecturer, University of Namibia (UNAM), External Examiner/ Moderator, NUST, National (Namibia) Technical Advisor (Directorate of Environmental Affairs, Ministry of Environment and Tourism / DANIDA – Cleaner Production Component) and Chief Geologist for Engineering and Environment Division, Geological Survey of Namibia, Ministry of Mines and Energy and a Field-Based Geotechnician (Specialised in Magnetics, CSEM, Gravity and Electromagnetics Exploration and Survey Methods) under the Federal Institute for Geoscience and Natural Resources (BGR) German Mineral Exploration Promotion Project to Namibia, Geophysics Division, Geological Survey of Namibia, Ministry of Mines and Energy.

He has supervised and continue to support a number of MScs and PhDs research programmes and has been a reviewer on international, national and regional researches, plans, programmes and projects with the objective to ensure substantial local skills development, pivotal to the national socioeconomic development through the promotion of sustainable natural resources coexistence, management, development, recovery, utilisation and for development policies, plans, programmes and projects financed by governments, private investors and donor organisations. Since 2006 until 2017, he has provided extensive technical support to the Department of Environmental Affairs (DEA), Ministry of Environment and Tourism (MET) through GIZ in the preparation and amendments of the Namibian Environmental Management Act, 2007, (Act No. 7 of 2007), new Strategic Environmental Assessment (SEA) Regulations, preparation of the updated Environmental Impact Assessment (EIA) Regulations as well as the preparation of the new SEA and EIA Guidelines and Procedures all aimed at promoting effective environmental assessment and management practices in Namibia. Among his academic achievements, Dr Sindila Mwiya is a holder of a PhD (Engineering Geology/Geotechnical / Geoenvironmental / Environmental Engineering and Artificial Intelligence) – Research Thesis: Development of a Knowledge-Based System Methodology (KBSM) for the Design of Solid Waste Disposal Sites in Arid and Semiarid Environments, MPhil/PG Cert and BEng (Hons) (Engineering Geology and Geotechnics) qualifications from the University of Portsmouth, School of Earth and Environmental Sciences, United Kingdom. During the 2004 Namibia National Science Awards, organised by the Namibian Ministry of Education, and held in Windhoek, Dr Sindila Mwiya was awarded the Geologist of the Year for 2004, in the professional category. Furthermore, as part of his professional career recognition, Dr Sindila Mwiya is a life member of the Geological Society of Namibia, Consulting member of the Hydrogeological Society of Namibia and a Professional Engineer registered with the Engineering Council of Namibia.

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NONTECHNICAL SUMMARY

Electromagnetic Geoservices ASA (“**EMGS**”) (the “**Proponent**”) is proposing to conduct a multiclient 2D and 3D marine Controlled Source Electromagnetic (**CSEM**) survey operations covering the Walvis Basin, offshore northcentral Namibia. The scope of this Environmental Management Plan (EMP) Vol. 3 of 3 report provides mitigation measures to significant impacts associated with the proposed marine CSEM survey activities around the survey area and the immediate surrounding areas covering routine and non-routine or accidental events / activities associated with the proposed survey mobilisation and pre-survey preparations, actual survey and post survey / demobilisation operations.

Marine CSEM survey is a geophysical technique that is globally used in the offshore environment in refining the exploration targets for predrilling reservoir appraisal and petroleum field characterisation and resources management. A CSEM survey is a vital technique that can indicate the presence of oil and gas in offshore situations and thus reduces the risk of drilling a dry exploration well and improves the chances for a commercial discovery especially in a frontier (high-risk area without known commercial hydrocarbon discovery) region such as the Walvis Basin offshore Namibia. EMGS has performed more than 950 surveys in frontier and mature basins across the world, from the Arctic, Canada, Brazil, Norway, USA to Australia and Angola, in water depths ranging from around 30 to 3600 m (www.emgs.com). Using CSEM, hydrocarbon-bearing formations can be distinguished from the surrounding geological formations because they are highly resistive (poor conductors of electric current).

The basic principle of the proposed CSEM survey method is the application of electric and magnetic (electromagnetic) fields in the mapping or imaging of electric resistivity distribution of the subsurface in the marine environment for the petroleum exploration. During the CSEM survey operations, EM field recorders / receivers will be deployed on to the seafloor spaced between 1 - 2 km apart over an Area of Interest (AOI) divided into survey grids and weighed down by environmentally benign anchors made from standard or degradable compacted sand that easily breaks down naturally after 6-9 months. The CSEM survey uses a 50 to 300 m long horizontal dipole (single pole) source that is towed 20-30 m above the seabed receivers and transmit a time-varying electromagnetic field into the earth. The field being emitted by the source is modified by the presence of subsurface resistive layers and these changes are detected and logged by an array of receivers / recorders placed on the seabed. The transmission currents are typically binary waveforms with 0.1- to 0.25-Hz (very low frequency and large wavelength). The processed data can determine the resistivity of the underlying rock. Hydrocarbon-bearing rock shows greater resistivity relative to water-bearing rock and thus areas that appear highly resistive may indicate the presence of hydrocarbons.

The data sets from the proposed CSEM survey when combined with other exploration data sets such as seismic, previous well drilled and geology, will provide critical insights into the subsurface geologic evolution, basin architecture and depositional and structural history of the petroleum system and will improve the chances for oil and gas commercial discovery in the Walvis Basin, offshore central Namibia.

The proposed CSEM survey will be undertaken in water depth ranging from ca-200 to -3000m with the bulk of the survey area falling within the deeper waters. The proposed survey is scheduled to start in May 2020 and will be undertaken using the vessel M/V Atlantic Guardian. The duration of the proposed CSEM Survey operations will be around seventy (70) days and will involve ten (10) days for deployment of receivers, forty (40) days for transmission (source towing) and twenty (20) days for recovering the receivers from the seabed.

The environmental assessment process has been undertaken in accordance with the provisions of Petroleum (Exploration and Production) Act 1991 (Act 2 of 1991) and associated amendments, the Environmental Impact Assessment (EIA) Regulations No. 30 of 2012 and the Environmental Management Act, 2007 as well as international best practices. Key project alternatives have been considered and include: Project location and the no-action alternative (no impacts), other marine users and potential user conflicts, influence on the ecosystem function, services, use values and non-use or passive use have all been considered.

Public consultation process was undertaken during the month of Months February and March 2020. In line with the provisions of the EIA Regulations, 2012 and in order to identify the key Interested and

Affected Parties (I&APs), public notices were published in the following newspapers: New Era Daily Newspaper dated 18th February 2020, the Confidante Weekly Newspaper dated 27th February to 4th March 2020 and Windhoek Observer Weekly Newspapers dated 6th March 2020. The closing date for registration and submission of written objections, comments or inputs to the environmental assessment process was Friday, 13th March 2020. During the public / stakeholder consultation period, no written comments / objections / inputs were received by Environmental Assessment Practitioner (EAP).

Detailed mitigation measures and monitoring plan have been developed and are presented in this EMP report for implementation and monitoring by the Proponent (EMGS). EMGS takes the environmental sensitivities of the offshore marine habitats seriously and integrates both environmental and social issues into the corporate governance of the company during the appraising and undertaking of marine CSEM surveys operations globally. The mitigation measures presented in this report are modelled around two main concepts and these are: The industry and EMGS best practices and local phenomena unique to the area of exploration (northcentral offshore Namibia).

As an international operator, EMGS's mitigation measures have been modelled around two main concepts namely: Industry best practice and local Namibian requirements unique to the area of exploration. In addition to national requirements, EMGS will conform to the international best industry practices and guidelines for marine offshore exploration developed by the Joint Nature Conservation Committee (JNCC) and the International Association of Geophysical Contractors (IAGC). Best industry practice has proved to be effective in several different countries like Canada, Australia, United Kingdom, Norway and the United States. EMGS guidelines and precautionary operational principles have been developed based on the ongoing researches and international experiences from over 900 CSEM surveys conducted globally.

The overall EMP Framework and mitigation measures as presented in this EMP Vol. 3 of 3 report are tailored-made to Namibia's northcentral offshore environment. The following is the summary of the key mitigation measures that are presented in this EMP Vol. 3 of 3 report and to be implemented by EMGS with respect to the proposed 2D and 3D CSEM survey over the Walvis Basin in the northcentral offshore Namibia:

1. Seasonality and timing;
2. Establishment of buffer zones;
3. Use of Marine Mammal Observer (MMO);
4. Use of Fisheries Liaison Officers (FLOs);
5. Suspension or pausing in the 500m exclusion zone with respect to marine mammals;
6. Marine animal monitoring and mitigation plan aboard the Survey Vessel;
7. The use of support vessel and fisheries liaison officer;
8. Pollution management;
9. Spill management;
10. Compliance to all MARPOL (marine pollution) regulations and waste disposal procedures, and;
11. Adoption of the precautionary principles in the absence of any specific mitigation measures being provide in this EMP, the Proponent shall always adopt the precautionary approach.

Based on the findings and recommendations of the EIA Vol. 2 of 3 report, the most favourable window of opportunity for conducting the proposed multiclient 2D and 3D CSEM survey covering the Walvis Basin offshore northcentral Namibia is December to May. However, this window can be extended over the winter months although weather conditions may not be favourable especially if the 2D or 3D CSEM survey operations is sensitive to weather conditions.

It's hereby recommended that the proponent (EMGS) be issued with an Environmental Clearance Certificate (ECC) for the proposed multiclient 2D and 3D CSEM survey operations in the Walvis Basin offshore northcentral Namibia. The Ministry of Fisheries and Marine Resources (MFMR), Ministry of Works and Transport (MWT) (Maritime Department Search and Rescue) shall be notified through the Office of the Petroleum Commissioner in the Ministry of Mines and Energy (MME) when the proposed 2D and 3D CSEM survey starts. The Ministry of Fisheries and Marine Resources (MFMR) and key fishing sectors such as the anchovy, hake, monkfish, horse mackerel and crab fisheries shall be notified when the proposed CSEM survey starts and kept updated on the progress and completion of the survey operations. The communication shall be done by direct contacting the key fishing associations representing the anchovy, hake, monkfish, horse mackerel and crab fisheries. Regular contacts to the vessels Captains shall be undertaken during the survey operations.

It's envisaged that EMGS will incorporate this EMP into the Environmental Management System (EMS) of the company. All environmental liabilities rest with EMGS and thus the company is ultimately responsible for the EMP implementation, environmental performance monitoring and reporting thereof to the Environmental Commissioner in the Ministry of Environment and Tourism as may be stipulated in the ECC to be issued. A "close up" report shall be prepared and submitted to the Government (Ministry of Mines and Energy, (MME), Ministry of Environment and Tourism (MET), Ministry of Fisheries and Marine Recourse (MFMR) and the Ministry of Work and Transport (MWT), Department of Maritimes Affairs) once the proposed 2D and 3D CSEM survey operations has been completed.

1. BACKGROUND

1.1 General Overview

Electromagnetic Geoservices ASA (“**EMGS**”) (the “**Proponent**”) is proposing to conduct a multiclient 2D and 3D marine Controlled Source Electromagnetic (CSEM) survey operations covering the Walvis Basin, offshore central Namibia (Figs. 1.1-1.3). The water depth of the proposed survey area falls between ca-200 to -3000m with gentle to very steep seafloor profile (Fig. 1.3). The proposed survey is scheduled to start in May 2020 once the Environmental Clearance Certificate (ECC) has been granted.

EMGS is a global company founded in 2002 with its headquarters in Trondheim, Norway and representative offices for Europe, Africa and Middle East (www.emgs.com). The company is listed on the Oslo stock exchange and is a pioneer on the application of Electromagnetic (**EM**) for offshore hydrocarbon exploration (www.emgis.com) (Scoping Report, Annex 1 to the EIA Vol. 2 of 3 Report).

The activities associated with proposed project have been characterised into routine, physical presence and accidental operational activities. The following is the summary of the proposed project implementation stages as assessed covered in this Environmental Management Plan (EMP) Report Vol. 3 of 3:

- (i) Mobilisation and pre-survey preparations;
- (ii) Actual survey operations;
- (iii) Post survey operations, and;
- (iv) Non-routine or accidental events.

Both the survey and support vessels will use existing facilities in the Port of Walvis Bay for supplies, fuelling and crew changeover as may be required. There will be no requirement for any additional port infrastructure to be constructed or modified to support the proposed survey. No helicopter crew transfer support is anticipated except in event of an emergency. Most of the impacts resulting from the proposed project activities will occur in the marine receiving environment and localised within the survey area, and possibly immediately surrounding area, with some very limited to no potential to impact to the Walvis Bay Port facilities and receiving coastal and onshore environments.

1.2 Project Motivation

The proposed 2D and 3D offshore CSEM survey area falls within the highly prospective oil and gas Walvis Basin in the northcentral offshore Namibia (Fig. 1.1). A CSEM survey is a vital technique that can significantly reduce the risk of drilling a dry and improves the chances for a commercial discovery especially in a frontier (high-risk area without known commercial hydrocarbon discovery) region such as offshore Namibia. The results and data from the proposed survey are likely to increase the interest by multinational oil and gas companies in conducting oil and gas exploration activities in Namibia. The increase in exploration activities could lead to a commercial discovery of economic petroleum reserves and such a discovery will positively transform the socioeconomic landscape of Namibia. Other benefits to be derived from the proposed survey operations are detailed in Scoping Report Annex 1 to the EIA Vol. 2 of 3 Report.

1.3 Regulatory Requirements

The proposed activities (2D and 3D CSEM Survey) are listed under petroleum exploration activities in the Environmental Impact Assessment (EIA) Regulations, 2012 and the Environmental Management Act, 2007, (Act No. 7 of 2007) and cannot be undertaken without an Environmental Clearance Certificate (ECC). The Proponent (EMGS) is required to have prepared EIA and EMP Reports in order to support the application for the ECC for the proposed survey operations. This EIA Report has been prepared by Risk-Based Solutions (RBS) CC in order to support the application for ECC for the proposed 2D and 3D CSEM survey covering the Walvis Basin, northcentral offshore Namibia (Figs. 1.1 and 1.2).

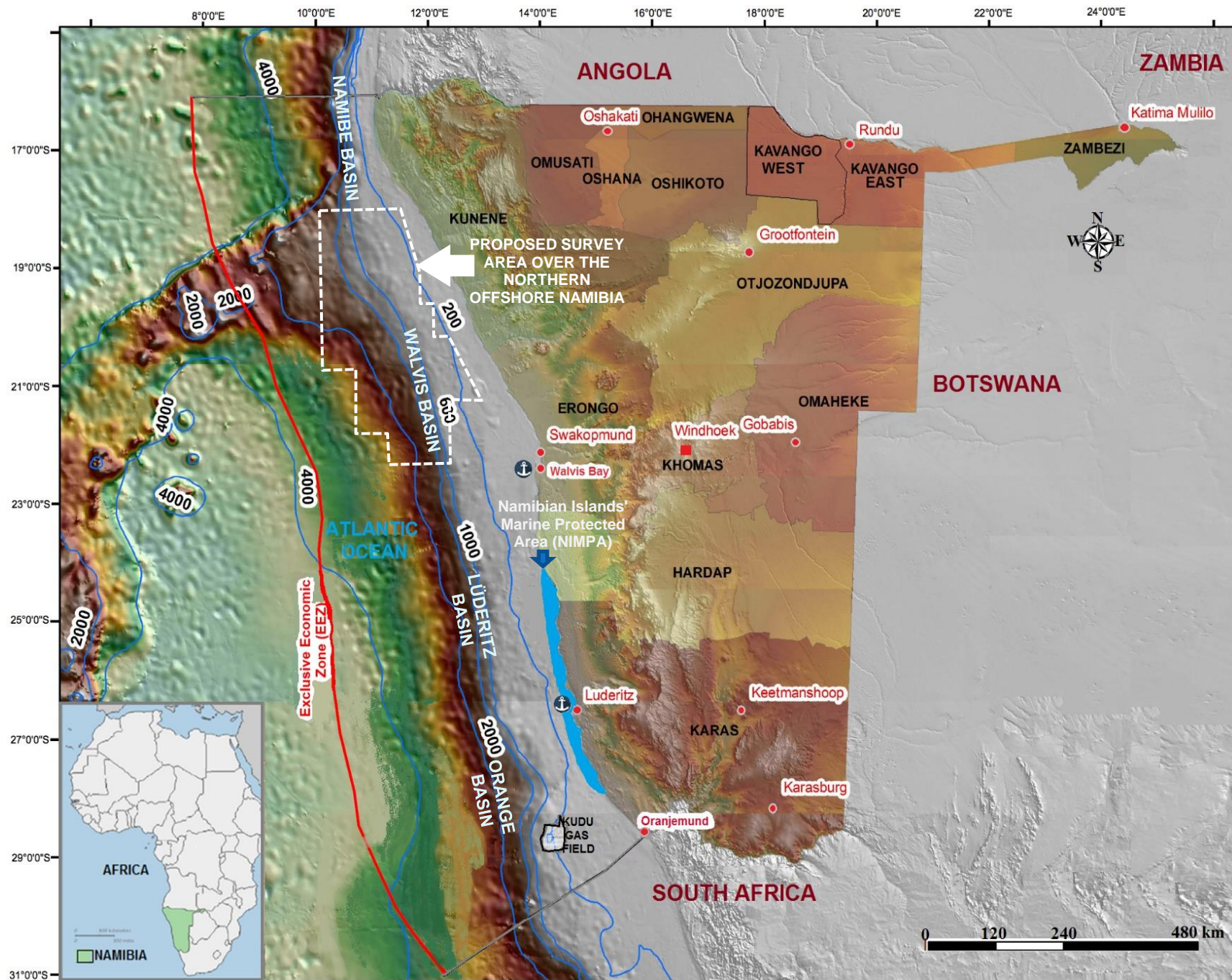


Figure 1.1: Regional location of the proposed 2D and 3D multiclient CSEM survey operations area covering the Walvis Basin.

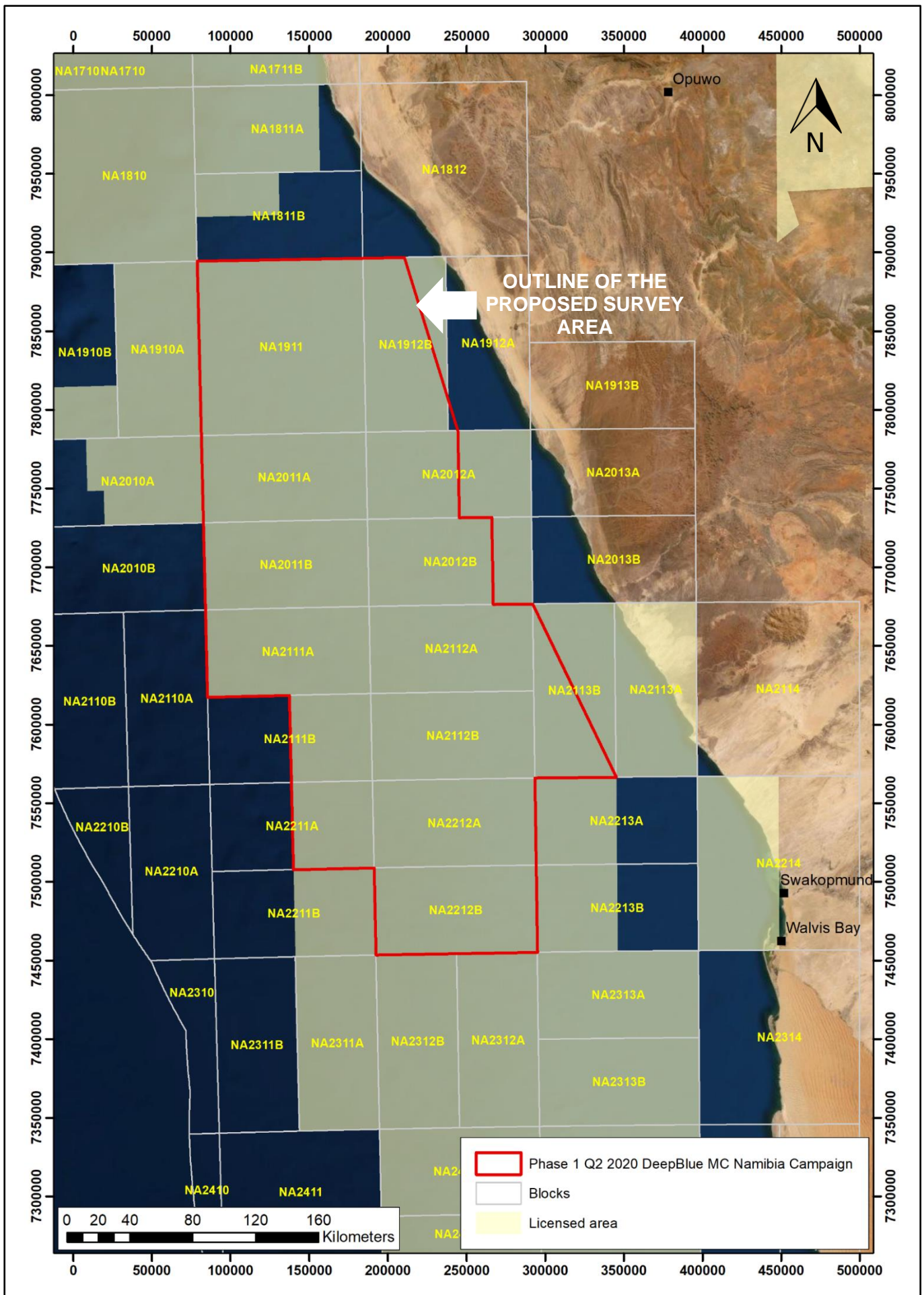


Figure 1.2: Petroleum License Degree Square Blocks showing the detailed outline of the proposed 2D and 3D multiclient (MC) CSEM survey operations, named DeepBlue covering Walvis Basin.

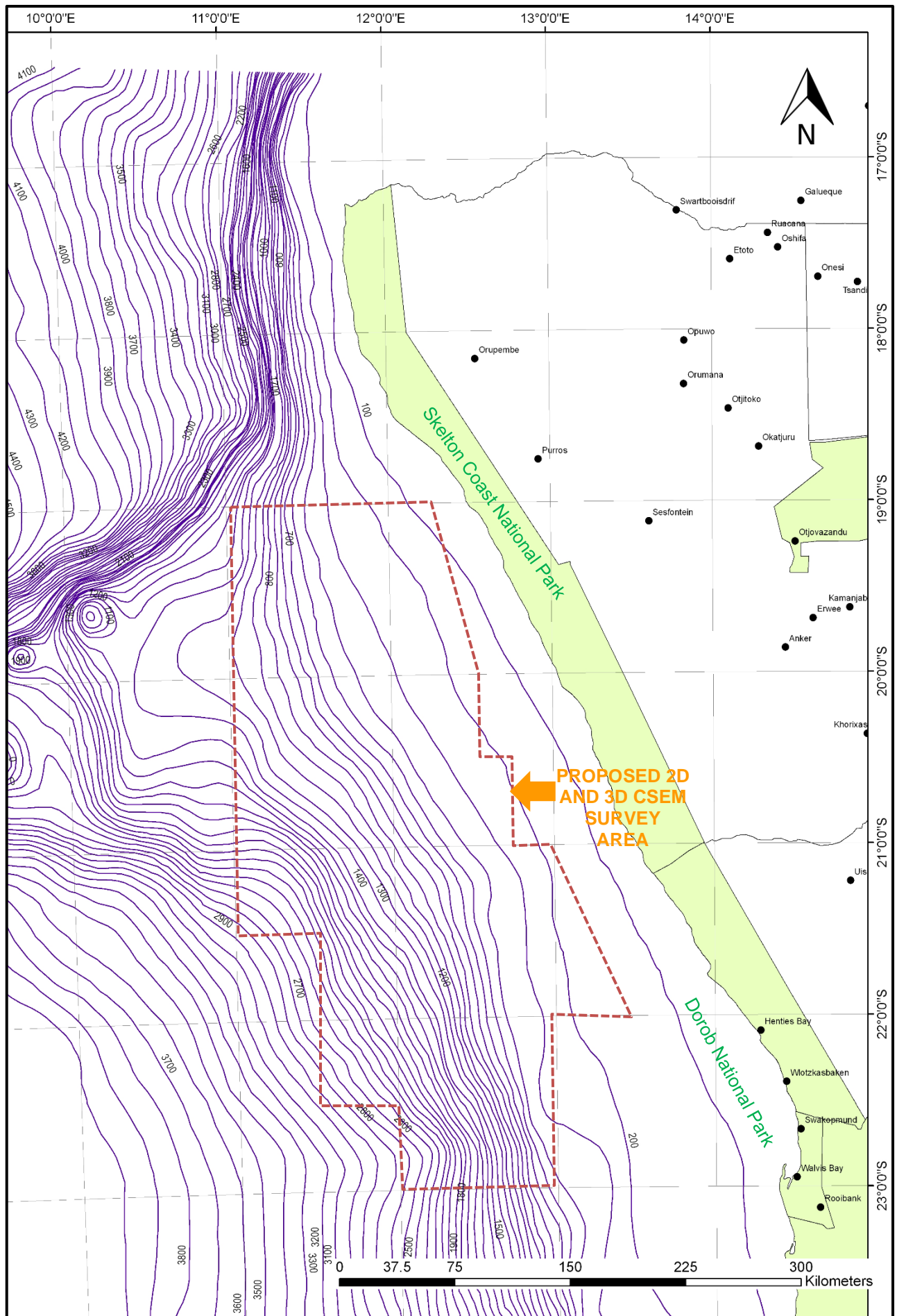


Figure 1.3: Detailed outline of the proposed 2D and 3D multiclient (MC) CSEM survey operations over seafloor bathymetry ranging from ca-200 to -3000m and with gentle to very steep seafloor profile.

2. THE EMP FRAMEWORK

2.1 Aims and Objectives of the EMP

This EMP Vol. 3 of 3 Report has the following specific objectives:

1. Ensure that the key environmental impacts identified and assessed in the EIA Vol. 2 of 3 Report are addressed;
2. Ensure compliance with all applicable national regulations and MARPOL (marine pollution) regulations and waste disposal procedure and all legal frameworks and other requirements that must be adhered to;
3. Promote environmental management and communicate the aims and goals of the project EMP to all stakeholders, contractor, subcontractor and all key EMGS employees who will be involved in the proposed 2D and 3D CSEM survey operations;
4. Incorporate environmental management principles into project design and operational procedures;
5. Ensure all workers, contractors, sub-contractors and all those who are involved in the project are meeting all requirements with respect to environmental management;
6. Address issues and concerns raised in the EIA process;
7. Serve as an action plan for environmental management;
8. Provide a framework for implementing mitigation measures to address all the key impacts identified in the EIA Vol. 2 of 3 Report;
9. Provided a framework for preparing and maintaining records of project environmental performance (i.e. monitoring, audits and compliance tracking), and;
10. Prepare an environmental monitoring plan whose aim is to ensure that the mitigation measures during the project mobilisation and pre-survey preparations, actual survey operations, post survey operations, and non-routine or accidental events are effectively implemented, and the positive impacts are enhanced, and;
11. Provide a basis for preparing the “close up” report to be submitted to the Government (Ministry of Mines and Energy, (MME), Ministry of Environment and Tourism (MET), Ministry of Fisheries and Marine Recourse (MFMR) and the Ministry of Work and Transport (MWT), Department of Maritimes Affairs) once the proposed 2D and 3D CSEM survey operations has been completed.

2.2 Principles of Environmental Management

The following principles of environmental management, as stated in Part II, Section 3 of the Environmental Management Act, 2007, Act No. 7 of 2007 have been considered in the preparation of this EMP for proposed 2D and 3D CSEM survey in the Namibe Basin:

- ❖ Use renewable resources on a sustainable basis for the benefit of present and future generations;
- ❖ Involve the community in natural resources management and promote and facilitate the sharing of benefits from the use of resources;
- ❖ Promote public participation in decisions affecting the environment and ensure that their interests, needs and values are considered;

- ❖ Promote equitable access to all environmental resources and consider the functional integrity of ecological systems so that the sustainability of systems is ensured and that harmful effects are prevented;
- ❖ Undertake environmental assessments for all projects that may adversely impact on the environment, or the use of natural resources;
- ❖ Promote sustainable development in all aspects relating to the environment;
- ❖ Protect and respect Namibia's cultural and natural heritage, including its biological diversity, for the benefit of present and future generations;
- ❖ Reduce the generation of waste and polluting substances at source by adopting the option that provides the most benefit or causes the least environmental damage, at costs acceptable by society, in the short- and long term;
- ❖ Promote the reduction, re-use and recycling of waste;
- ❖ Adopt the "polluter pays" principle;
- ❖ In cases where there is enough evidence to conclude that there are threats of serious or irreversible damage to the environment, the lack of full scientific certainty may not be used as an excuse for postponing cost-effective measures to prevent environmental degradation, and;
- ❖ Prevent damage to the environment; if this is not possible, reduce, limit, or control activities that may cause damage to the environment.

2.3 The EMP Framework

The following is the summary of the EMP Framework based on the precautionary principles and principles of environmental management as detailed in the Environmental Management Act, 2007, Act No. 7 of 2007 for the proposed offshore 2D and 3D CSEM survey:

- ❖ The proposed 2D and 3D CSEM survey can only be implemented once an Environmental Clearance Certificate has been issued by the MET;
- ❖ All interested and affected parties (I&APs), particularly other users of the marine environment, must be notified prior to the survey start;
- ❖ Attempts must be made to reduce the likelihood of possible cumulative impacts through co-ordination of activities with other operators / users of the marine environment;
- ❖ All communications and stakeholder (Ministry of Fisheries and Marine Resources and Fishing Associations and Vessel Captains) notifications shall be channelled through a single interface, usually the Proponent's Representative (PR) / Operations Manager (OM);
- ❖ Conditions and provisions as detailed in this EMP Vol. 3 of 3 Report shall be adhered to for conservation and preservation of the natural environment;
- ❖ The Proponent's Representative (PR) / Operations Manager (OM) is responsible for the implementation of the remediation of any environmental damage in accordance with the recommended methodology and/or the best available procedures / practices;
- ❖ Vessel crew should be trained in good environmental practices and onboard supervision shall always be applied;

- ❖ A Marine Mammal Observer (MMO/ Fisheries Liaison Officer (FLO) and /or Independent Marine Observer (IMO) who is familiar with fisheries sectors in the area and experienced in seabird and marine mammal identification and observation techniques must be appointed to be onboard throughout the survey period, and;
- ❖ In the absence of any specific mitigation measures being provided in this EMP, the Proponent shall always adopt the precautionary approach.

2.4 Key Contacts Details

The following is the summary of the key contacts relevant to the proposed 2D and 3D CSEM survey operations as may be applicable:

1. Mrs Maggy Shino, Petroleum Commissioner, Ministry of Mines and Energy +264-812882182, Tel: +264 61 2848209, Fax: +264 61 2848200, Email: Maggy.Shino@mme.gov.na;
2. Mr Pinehas N. Auene, Deputy Director: Maritime Search and Rescue (SAR), Directorate of Maritime Affairs, Ministry of Works and Transport (MWT), Tel: +264 64 203317, Fax: +264 64 205266, Mobile: +264 816 6491 88; Email: pauene@mwtc.gov.na;
3. Mr. Timo Mofeti, Environmental Commissioner, Office of the Environmental Commissioner, Ministry of Environment and Tourism (MET), Tel: +264 61 2842739, Mobile: +264 811244417; Fax: +264 61 240 339;
4. Mr Peter Amutenya, Director of Operations, Ministry of Fisheries and Marine Resources. Tel No. 061-205 3009 /3116, Fax No. 061-240412, Email: pamutenya@mfmr.gov.na;
5. Mr Immanuel Mulunga, Managing Director, National Petroleum Corporation of Namibia (Pty.) Ltd (Namcor), +264-811277267, +264 61 204 5000 +264 61 204 5061/30/92; info@namcor.com.na, and;
6. Dr Anja Kreiner, Chief Environment, Ministry of Fisheries and Marine Resources, National Information and Research Centre, Tel: +264 (0)64 410 1000 (switchboard)/ +264 (0)64 410 1158 (direct line), Fax: +264 (0)64 40 4385 or +264 (0)64 406784, Email: akreiner@mfmr.gov.na or a_kreiner_2000@yahoo.com.

3. EIA RESULTS AND MITIGATIONS MEASURES

3.1 Introduction

The potential impacts of the proposed 2D and 3D CSEM survey were identified, described and assessed in the EIA (Vol. 2 of 3) report. Mitigation measures are described in this EMP Vol. 3 of 3 report.

3.2 Summary Assessment of Positive Impacts

The implementation of the proposed multiclient 2D and 3D CSEM survey operations activities will be undertaken in order to attract multinational oil and gas companies to undertake targeted exploration drilling activities in order to ascertain whether Namibia's deep-water offshore environment in the Walvis Basin contains potential economically viable hydrocarbon reserves.

The discovery of economic hydrocarbons reserves, and the development of a successful oil and gas industry will greatly and positively transform the economic landscape of Namibia and will have direct and indirect benefits to Namibia and its people.

The following is summary of the key positive impacts that the proposed multiclient 2D and 3D CSEM survey operations activities will have on socioeconomic landscape of Namibia:

1. Increased earnings by the State through rentals petroleum rights and sale of petroleum exploration data to oil companies;
2. Increased understanding and knowledge of the deep-water petroleum systems of Namibia that could finally led to the discovery of economic oil or gas resources that will change the economic landscape of Namibia for benefits of its people;
3. Contributions to the national geosciences' skills development and knowledge transfer through on job training and short-term job attachments of Namibians;
4. Contributions to the short and long-term strategies of attracting investments in the petroleum exploration sector in Namibia through new data acquisition, research, monitoring and management;
5. Contribution to the long-term strategy that will promote the coexistence of petroleum operations with other marine users in Namibia;
6. Direct contributions to the training of young Namibians through increased contributions to the national PetroFund which is currently offering several scholarships to Namibians to be able to study at foreign universities;
7. Contributions to economic growth through ongoing exploration investments and potential future oil and gas discovery;
8. Creation of employment opportunities through short and long-term contracts, and;
9. Contribution to the development of local infrastructures and new businesses to support the ongoing oil and gas exploration opportunities particularly around the Port of Walvis Bay.

3.3 Summary Assessment of Negative Impacts

3.3.1 Overall Negative Impact Assessment Framework

The overall impact assessment framework adopted for this project used the Leopold matrix which is one of the best known internationally matrix methodology available for predicting the impact of a project on the environment. The Leopold matrix is a two-dimensional matrix cross-referencing the following:

- ❖ The activities linked to the project stages covering mobilisation and pre-survey preparations, actual survey operations, post survey operations, and non-routine or accidental events that are likely to have an impact on the receiving environment, and;
- ❖ The existing environments (physical, biological and socioeconomic) that could possibly be affected by the project.

The activities linked to the proposed 2D and 3D CSEM survey operations are listed on one axis, while the receiving environments (physical, biological and socioeconomic) are listed on the other axis, and divided in following three (3) major groups:

- ❖ Physical conditions: marine and coastal air quality, change climate, seawater quality, seabed topography and sediment quality;
- ❖ Biological conditions: marine and coastal benthic ecology, fishes, turtles, seabirds, seals and cetaceans, and;
- ❖ Socioeconomic conditions and other users: marine and coastal fishing industry, tourism and recreation, minerals exploration and mining, other petroleum exploration licence.

The proposed 2D and 3D CSEM survey activities have the potential to affect the receiving environments in many ways. The first step in impact identification has been to identify the various types of activities associated with the mobilisation and pre-survey preparations, actual survey operations, post survey operations stages of the proposed survey, together with their associated emissions and discharges where appropriate. At a high level, the main sources of impact of the proposed survey operations are:

- ❖ Planned or routine events: where an aspect (i.e. impact producing factor) is a result of routine Project activities. For example, the generation of atmospheric emissions from the survey and support vessels can be considered a planned event, and;
- ❖ Unplanned or non-routine (accidental) events: where an aspect is a result of mishaps or failures, including failure of equipment, procedures not being followed, human error, unforeseen events, or process equipment not performing as per design parameters. Typical examples are spills, leaks, emergency emissions, collisions, and explosions.

Overall, the following is the summary of the project related activities linked to planned/ routine and unplanned / accidental events of the mobilisation and pre-survey preparations, actual survey operations, post survey operations stages of the proposed survey:

1. Port of Walvis Bay including onshore support operations and waste management;
2. Physical presence of survey and support vessels;
3. Physical disturbance of the survey operations;
4. Sound generation from 2D and 3D CSEM survey airguns including sound of the survey and support vessels;
5. Increased light levels from routine vessels operations;
6. Atmospheric emissions from routine operations of the survey and support vessels;
7. Planned marine discharges;
8. Unplanned marine discharges (e.g. minor spillages of fuel, lubricants / maintenance oils);
9. Accidental event: Loss of vessel, equipment or material;

10. Accidental event: Collision with marine wildlife during vessel operations;

11. Accidental Event: Loss of Marine Gasoline Oil (MGO) containment on the survey or support vessels due to ship collision or another major event.

Accidental events can potentially lead to significant impacts, for example in the event of an oil spill. However, they are clearly not a part of the intended activity and their potential occurrence has a low probability of occurrence associated with it. The activities / sources of potential impact due to the project and the receiving environment that could potentially be affected has been assessed in this EIA report and presented in form of a two-dimensional cross-referencing Leopold matrix covering the following:

- ❖ Sensitivity of receptors (Table 3.1);
- ❖ Impact magnitude (Table 3.2);
- ❖ Duration / time period of exposure (Table 3.3);
- ❖ Geographical extent (Table 3.4);
- ❖ Probability, likelihood of occurrence (Table 3.5), and;
- ❖ Overall significant impacts (Table 3.6).

Table 3.1: Sensitivity of receptors.

| RECEIVING ENVIRONMENT SENSITIVITY | | | RECEPTORS / TARGETS THAT MAY BE IMPACTED (MARINE AND COASTAL RESOURCES) | | | | | | | | | | | | | | | | | |
|------------------------------------|---|---|--|----------------|------------------|-------------------|------------------|------------------------|--------|---------|----------|-------|---------------------------|------------------|------------------------|---------------------------------|---|-----------------------------|--|---|
| SENSITIVITY RATING | | CRITERIA | PHYSICAL ENVIRONMENT | | | | | BIOLOGICAL ENVIRONMENT | | | | | SOCIOECONOMIC ENVIRONMENT | | | | | | | |
| 1 | Negligible | The receptor or resource is resistant to change or is of little environmental value. | Air Quality | Change Climate | Seawater Quality | Seabed Topography | Sediment Quality | Benthic Ecology | Fishes | Turtles | Seabirds | Seals | Cetaceans | Fishing Industry | Tourism and Recreation | Minerals Exploration and Mining | Other Petroleum Exploration Licence Holders | International Shipping Line | International Communication Lines / Cables | |
| 2 | Low | The receptor or resource is tolerant of change without detriment to its character, is of low environmental or social value, or is of local importance. | | | | | | | | | | | | | | | | | | |
| 3 | Medium | The receptor or resource has low capacity to absorb change without fundamentally altering its present character, is of high environmental or social value, or is of national importance | | | | | | | | | | | | | | | | | | |
| 4 | High | The receptor or resource has moderate capacity to absorb change without significantly altering its present character, has some environmental or social value, or is of district/regional importance. | | | | | | | | | | | | | | | | | | |
| 5 | Very High | The receptor or resource has little or no capacity to absorb change without fundamentally altering its present character, is of very high environmental or social value, or is of international importance. | | | | | | | | | | | | | | | | | | |
| SOURCES OF POTENTIAL IMPACT | ROUTINE AND PHYSICAL PRESENCE OPERATIONAL ACTIVITIES | ONSHORE / COASTAL | | | | | | | | | | | | | | | | | | |
| | | 1. | Mobilisation and Logistics: Port of Walvis Bay including Onshore support operations and waste management | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| | | OFFSHORE | | | | | | | | | | | | | | | | | | |
| | | 2. | Physical presence of survey and support vessels | 1 | 1 | 2 | 1 | 1 | 1 | 3 | 3 | 3 | 3 | 3 | 3 | 1 | 1 | 1 | 1 | 1 |
| | | 3. | Physical disturbance of the survey operations | 1 | 1 | 1 | 1 | 1 | 1 | 3 | 3 | 3 | 3 | 3 | 3 | 1 | 1 | 1 | 1 | 1 |
| | | 4. | Vessels noise, electric and magnetic fields generation from the survey operations (NOTE: The actual CSEM survey does not generate airgun sound used in seismic survey) | 1 | 1 | 1 | 1 | 1 | 1 | 3 | 3 | 3 | 3 | 3 | 3 | 1 | 1 | 1 | 1 | 1 |
| | | 5. | Increased light levels from routine vessels operations | 1 | 1 | 1 | 1 | 1 | 1 | 3 | 3 | 3 | 3 | 3 | 3 | 1 | 1 | 1 | 1 | 1 |
| | 6. | Atmospheric emissions from routine operations of the survey and support vessels | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | |
| | 7. | Planned marine discharges | 1 | 1 | 2 | 1 | 1 | 1 | 3 | 3 | 3 | 3 | 3 | 3 | 1 | 1 | 1 | 1 | 1 | |
| | ACCIDENTAL | 8. | Unplanned marine discharges (e.g. minor spillages of fuel, lubricants / maintenance oils) | 1 | 1 | 2 | 1 | 1 | 1 | 3 | 3 | 3 | 3 | 3 | 1 | 1 | 1 | 1 | 1 | |
| | | 9. | Accidental event: Loss of vessel, equipment or material | 1 | 1 | 1 | 1 | 1 | 1 | 3 | 3 | 3 | 3 | 3 | 1 | 1 | 1 | 1 | 1 | |
| 10. | | Accidental event: Collision with marine wildlife during vessel operations; | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | |
| 11. | | Accidental Event: Loss of Marine Gasoline Oil (MGO) containment on the survey or support vessels due to ship collision or another major event. | 1 | 1 | 4 | 1 | 1 | 1 | 4 | 4 | 4 | 4 | 4 | 4 | 1 | 1 | 1 | 1 | 1 | |

Table 3.2: Impact magnitude.

| MAGNITUDE | | RECEPTORS / TARGETS THAT MAY BE IMPACTED (MARINE AND COASTAL RESOURCES) | | | | | | | | | | | | | | | | | | |
|-----------------------------|--|--|--|-------------|----------------|------------------|------------------------|------------------|-----------------|--------|---------|---------------------------|-------|-----------|------------------|------------------------|---------------------------------|---|-----------------------------|--|
| | | PHYSICAL ENVIRONMENT | | | | | BIOLOGICAL ENVIRONMENT | | | | | SOCIOECONOMIC ENVIRONMENT | | | | | | | | |
| | | SCALE | DESCRIPTION | Air Quality | Climate Change | Seawater Quality | Seabed Topography | Sediment Quality | Benthic Ecology | Fishes | Turtles | Seabirds | Seals | Cetaceans | Fishing Industry | Tourism and Recreation | Minerals Exploration and Mining | Other Petroleum Exploration Licence Holders | International Shipping Line | International Communication Lines / Cables |
| 0 | no observable effect | | | | | | | | | | | | | | | | | | | |
| 1 | low effect | | | | | | | | | | | | | | | | | | | |
| 2 | tolerable effect | | | | | | | | | | | | | | | | | | | |
| 3 | medium high effect | | | | | | | | | | | | | | | | | | | |
| 4 | high effect | | | | | | | | | | | | | | | | | | | |
| 5 | very high effect (devastation) | | | | | | | | | | | | | | | | | | | |
| SOURCES OF POTENTIAL IMPACT | ROUTINE AND PHYSICAL PRESENCE OPERATIONAL ACTIVITIES | ONSHORE / COASTAL | | | | | | | | | | | | | | | | | | |
| | | 1. | Mobilisation and Logistics: Port of Walvis Bay including Onshore support operations and waste management | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | OFFSHORE | | | | | | | | | | | | | | | | | | |
| | | 2. | Physical presence of survey and support vessels | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 0 | 1 | 1 | 0 |
| | | 3. | Physical disturbance of the survey operations | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 0 | 1 | 1 | 0 |
| | | 4. | Vessels noise, electric and magnetic fields generation from the survey operations (NOTE: The actual CSEM survey does not generate airgun sound used in seismic survey) | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 1 | 1 | 2 | 2 | 1 | 0 | 1 | 1 | 0 |
| | | 5. | Increased light levels from routine vessels operations | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 1 | 2 | 0 | 1 | 0 | 1 | 1 | 0 |
| | 6. | Atmospheric emissions from routine operations of the survey and support vessels | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| | 7. | Planned marine discharges | 0 | 0 | 2 | 0 | 0 | 0 | 1 | 2 | 2 | 2 | 2 | 0 | 1 | 0 | 1 | 1 | 0 | |
| | ACCIDENTAL | 8. | Unplanned marine discharges (e.g. minor spillages of fuel, lubricants / maintenance oils) | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 2 | 2 | 2 | 2 | 1 | 0 | 1 | 1 | 0 | |
| | | 9. | Accidental event: Loss of vessel, equipment or material | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 2 | 2 | 1 | 0 | 1 | 1 | 0 |
| 10. | | Accidental event: Collision with marine wildlife during vessel operations; | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 1 | 1 | 0 | |
| 11. | | Accidental Event: Loss of Marine Gasoline Oil (MGO) containment on the survey or support vessels due to ship collision or another major event. | 0 | 0 | 1 | 0 | 0 | 0 | 4 | 4 | 4 | 4 | 4 | 4 | 1 | 0 | 1 | 1 | 0 | |

Table 3.3: Duration / time period of exposure.

| DURATION OF IMPACT EXPOSURE | | RECEPTORS / TARGETS THAT MAY BE IMPACTED (MARINE AND COASTAL RESOURCES) | | | | | | | | | | | | | | | | | | |
|-----------------------------|--|--|--|------------------|-------------------|------------------|------------------------|--------|---------|----------|-------|---------------------------|------------------|------------------------|---------------------------------|---|-----------------------------|--|---|---|
| | | PHYSICAL ENVIRONMENT | | | | | BIOLOGICAL ENVIRONMENT | | | | | SOCIOECONOMIC ENVIRONMENT | | | | | | | | |
| SCALE | DESCRIPTION | Air Quality | Climate Change | Seawater Quality | Seabed Topography | Sediment Quality | Benthic Ecology | Fishes | Turtles | Seabirds | Seals | Cetaceans | Fishing Industry | Tourism and Recreation | Minerals Exploration and Mining | Other Petroleum Exploration Licence Holders | International Shipping Line | International Communication Lines / Cables | | |
| T | Temporary | | | | | | | | | | | | | | | | | | | |
| P | Permanent | | | | | | | | | | | | | | | | | | | |
| SOURCES OF POTENTIAL IMPACT | ROUTINE AND PHYSICAL PRESENCE OPERATIONAL ACTIVITIES | ONSHORE / COASTAL | | | | | | | | | | | | | | | | | | |
| | | 1. | Mobilisation and Logistics: Port of Walvis Bay including Onshore support operations and waste management | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T |
| | | OFFSHORE | | | | | | | | | | | | | | | | | | |
| | | 2. | Physical presence of survey and support vessels | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T |
| | | 3. | Physical disturbance of the survey operations | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T |
| | | 4. | Vessels noise, electric and magnetic fields generation from the survey operations (NOTE: The actual CSEM survey does not generate airgun sound used in seismic survey) | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T |
| | | 5. | Increased light levels from routine vessels operations | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T |
| | 6. | Atmospheric emissions from routine operations of the survey and support vessels | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | |
| | 7. | Planned marine discharges | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | |
| | ACCIDENTAL | 8. | Unplanned marine discharges (e.g. minor spillages of fuel, lubricants / maintenance oils) | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | |
| | | 9. | Accidental event: Loss of vessel, equipment or material | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | |
| 10. | | Accidental event: Collision with marine wildlife during vessel operations; | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | | |
| 11. | | Accidental Event: Loss of Marine Gasoline Oil (MGO) containment on the survey or support vessels due to ship collision or another major event. | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | T | | |

Table 3.4: Geographical coverage / extent.

| GEOGRAPHICAL COVERAGE | | RECEPTORS / TARGETS THAT MAY BE IMPACTED (MARINE AND COASTAL RESOURCES) | | | | | | | | | | | | | | | | | |
|-----------------------------|--|--|--|------------------|-------------------|------------------|------------------------|--------|---------|----------|-------|---------------------------|------------------|------------------------|---------------------------------|---|-----------------------------|--|---|
| | | PHYSICAL ENVIRONMENT | | | | | BIOLOGICAL ENVIRONMENT | | | | | SOCIOECONOMIC ENVIRONMENT | | | | | | | |
| | | Air Quality | Climate Change | Seawater Quality | Seabed Topography | Sediment Quality | Benthic Ecology | Fishes | Turtles | Seabirds | Seals | Cetaceans | Fishing Industry | Tourism and Recreation | Minerals Exploration and Mining | Other Petroleum Exploration Licence Holders | International Shipping Line | International Communication Lines / Cables | |
| SCALE | DESCRIPTION | | | | | | | | | | | | | | | | | | |
| L | limited impact on location | | | | | | | | | | | | | | | | | | |
| O | impact of importance for municipality; | | | | | | | | | | | | | | | | | | |
| R | impact of regional character | | | | | | | | | | | | | | | | | | |
| N | impact of national character | | | | | | | | | | | | | | | | | | |
| M | impact of cross-border character | | | | | | | | | | | | | | | | | | |
| SOURCES OF POTENTIAL IMPACT | ROUTINE AND PHYSICAL PRESENCE OPERATIONAL ACTIVITIES | ONSHORE / COASTAL | | | | | | | | | | | | | | | | | |
| | | 1. | Mobilisation and Logistics: Port of Walvis Bay including Onshore support operations and waste management | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L |
| | | OFFSHORE | | | | | | | | | | | | | | | | | |
| | | 2. | Physical presence of survey and support vessels | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L |
| | | 3. | Physical disturbance of the survey operations | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L |
| | | 4. | Vessels noise, electric and magnetic fields generation from the survey operations (NOTE: The actual CSEM survey does not generate airgun sound used in seismic survey) | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L |
| | | 5. | Increased light levels from routine vessels operations | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L |
| | 6. | Atmospheric emissions from routine operations of the survey and support vessels | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | |
| | 7. | Planned marine discharges | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | |
| | ACCIDENTAL | 8. | Unplanned marine discharges (e.g. minor spillages of fuel, lubricants / maintenance oils) | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L |
| | | 9. | Accidental event: Loss of vessel, equipment or material | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L |
| 10. | | Accidental event: Collision with marine wildlife during vessel operations; | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | L | |
| 11. | | Accidental Event: Loss of Marine Gasoline Oil (MGO) containment on the survey or support vessels due to ship collision or another major event. | L | L | O | L | L | L | O | O | O | O | O | O | L | L | L | L | |

Table 3.5: Probability, likelihood of occurrence.

| PROBABILITY, LIKELIHOOD | | RECEPTORS / TARGETS THAT MAY BE IMPACTED (MARINE AND COASTAL RESOURCES) | | | | | | | | | | | | | | | | | | |
|-----------------------------|--|---|--|--|-------------------|------------------|------------------------|--------|---------|----------|-------|---------------------------|------------------|------------------------|---------------------------------|---|-----------------------------|--|---|---|
| | | PHYSICAL ENVIRONMENT | | | | | BIOLOGICAL ENVIRONMENT | | | | | SOCIOECONOMIC ENVIRONMENT | | | | | | | | |
| | | Air Quality | Climate Change | Seawater Quality | Seabed Topography | Sediment Quality | Benthic Ecology | Fishes | Turtles | Seabirds | Seals | Cetaceans | Fishing Industry | Tourism and Recreation | Minerals Exploration and Mining | Other Petroleum Exploration Licence Holders | International Shipping Line | International Communication Lines / Cables | | |
| SCALE | DESCRIPTION | | | | | | | | | | | | | | | | | | | |
| A | Extremely unlikely (e.g. never heard of in the industry) | | | | | | | | | | | | | | | | | | | |
| B | Unlikely (e.g. heard of in the industry but considered unlikely) | | | | | | | | | | | | | | | | | | | |
| C | Low likelihood (egg such incidents/impacts have occurred but are uncommon) | | | | | | | | | | | | | | | | | | | |
| D | Medium likelihood (e.g. such incidents/impacts occur several times per year within the industry) | | | | | | | | | | | | | | | | | | | |
| E | High likelihood (e.g. such incidents/impacts occurs several times per year at each location where such works are undertaken) | | | | | | | | | | | | | | | | | | | |
| SOURCES OF POTENTIAL IMPACT | | ONSHORE / COASTAL | | | | | | | | | | | | | | | | | | |
| | | ROUTINE AND PHYSICAL PRESENCE OPERATIONAL ACTIVITIES | 1. | Mobilisation and Logistics: Port of Walvis Bay including Onshore support operations and waste management | A | A | A | A | A | A | A | A | A | A | A | A | A | A | A | A |
| | | OFFSHORE | | | | | | | | | | | | | | | | | | |
| | | 2. | Physical presence of survey and support vessels | A | A | C | A | A | A | C | C | C | C | C | C | A | A | A | A | A |
| | | 3. | Physical disturbance of the survey operations | A | A | A | A | A | A | C | C | C | C | C | C | A | A | A | A | A |
| | | 4. | Vessels noise, electric and magnetic fields generation from the survey operations (NOTE: The actual CSEM survey does not generate airgun sound used in seismic survey) | A | A | A | A | A | A | D | D | C | C | D | D | A | A | A | A | A |
| | | 5. | Increased light levels from routine vessels operations | A | A | A | A | A | A | A | A | C | A | A | A | A | A | A | A | A |
| | | 6. | Atmospheric emissions from routine operations of the survey and support vessels | A | A | A | A | A | A | A | A | A | A | A | A | A | A | A | A | A |
| | | 7. | Planned marine discharges | A | A | B | A | A | A | B | B | B | A | A | A | A | A | A | A | A |
| | | ACCIDENTAL | 8. | Unplanned marine discharges (e.g. minor spillages of fuel, lubricants / maintenance oils) | A | A | B | A | A | A | B | B | B | B | B | B | A | A | A | A |
| | | 9. | Accidental event: Loss of vessel, equipment or material | A | A | A | A | A | A | A | A | A | A | A | B | A | A | A | A | A |
| 10. | Accidental event: Collision with marine wildlife during vessel operations; | A | A | B | A | A | A | B | B | B | B | B | B | A | A | A | A | A | | |
| 11. | Accidental Event: Loss of Marine Gasoline Oil (MGO) containment on the survey or support vessels due to ship collision or another major event. | A | A | B | A | A | A | B | B | B | B | B | B | A | A | A | A | A | | |

Table 3.6: Significance of impacts.

| SIGNIFICANCE | | | | | | RECEPTORS / TARGETS THAT MAY BE IMPACTED (MARINE AND COASTAL RESOURCES) | | | | | | | | | | | | | | | | | | | |
|---|--|--|---|--|----------------|---|----------------|------------------|-------------------|------------------|------------------------|--------|---------|----------|-------|---------------------------|------------------|------------------------|---------------------------------|---|-----------------------------|--|-----|-----|-----|
| | | | | | | PHYSICAL ENVIRONMENT | | | | | BIOLOGICAL ENVIRONMENT | | | | | SOCIOECONOMIC ENVIRONMENT | | | | | | | | | |
| IMPACT SEVERITY [Magnitude, Duration, Extent, Probability] | RECEPTOR CHARACTERISTICS (SENSITIVITY) | | | | | Air Quality | Climate Change | Seawater Quality | Seabed Topography | Sediment Quality | Benthic Ecology | Fishes | Turtles | Seabirds | Seals | Cetaceans | Fishing Industry | Tourism and Recreation | Minerals Exploration and Mining | Other Petroleum Exploration Licence Holders | International Shipping Line | International Communication Lines / Cables | | | |
| | Very High (5) | High(4) | Medium (3) | Low (2) | Negligible (1) | | | | | | | | | | | | | | | | | | | | |
| Very High (5) | Major [5/5] | Major [4/5] | Moderate [3/5] | Moderate [2 /5] | Minor 1/5 | | | | | | | | | | | | | | | | | | | | |
| High (4) | Major [5/4] | Major [4/4] | Moderate [3/4] | Moderate [2/4] | Minor[1/4] | | | | | | | | | | | | | | | | | | | | |
| Medium (3) | Major [5/3] | Moderate[4/3] | Moderate[3/3] | Minor[2/3] | None[1/3] | | | | | | | | | | | | | | | | | | | | |
| Low (2) | Moderate [5/2] | Moderate[4/2] | Minor[3/2] | None[2/2] | None[1/2] | | | | | | | | | | | | | | | | | | | | |
| Negligible (1) | Minor [5/1] | Minor [4/1] | None [3/1] | None [2/1] | None [1/1] | | | | | | | | | | | | | | | | | | | | |
| SOURCES OF POTENTIAL IMPACT | | ROUTINE AND PHYSICAL PRESENCE OPERATIONAL ACTIVITIES | ONSHORE / COASTAL | | | | | | | | | | | | | | | | | | | | | | |
| | | | 1. | Mobilisation and Logistics: Port of Walvis Bay including Onshore support operations and waste management | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | |
| | | | OFFSHORE | | | | | | | | | | | | | | | | | | | | | | |
| | | | 2. | Physical presence of survey and support vessels | 2/1 | 1/1 | 2/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 2/1 | 2/1 | 2/1 | 4/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 |
| | | | 3. | Physical disturbance of the survey operations | 2/1 | 2/1 | 2/1 | 2/1 | 2/1 | 2/1 | 3/1 | 3/2 | 3/2 | 3/2 | 3/2 | 4/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 |
| | | | 4. | Vessels noise, electric and magnetic fields generation from the survey operations (NOTE: The actual CSEM survey does not generate airgun sound used in seismic survey) | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 3/1 | 3/2 | 3/2 | 3/2 | 3/2 | 4/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 |
| | | | 5. | Increased light levels from routine vessels operations | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 4/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 |
| | | 6. | Atmospheric emissions from routine operations of the survey and support vessels | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | |
| | | 7. | Planned marine discharges | 1/1 | 1/1 | 3/2 | 1/1 | 1/1 | 1/1 | 3/2 | 3/2 | 3/2 | 3/2 | 3/2 | 2/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | |
| | | ACCIDENTAL | 8. | Unplanned marine discharges (e.g. minor spillages of fuel, lubricants / maintenance oils | 1/1 | 1/1 | 3/2 | 1/1 | 1/1 | 1/1 | 3/2 | 3/2 | 3/2 | 3/2 | 3/2 | 3/2 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | |
| | | | 9. | Accidental event: Loss of vessel, equipment or material | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 3/2 | 3/2 | 3/2 | 3/2 | 4/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | |
| 10. | Accidental event: Collision with marine wildlife during vessel operations; | | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 4/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | | | |
| 11. | Accidental Event: Loss of Marine Gasoline Oil (MGO) containment on the survey or support vessels due to ship collision or another major event. | | 1/1 | 1/1 | 4/1 | 1/1 | 1/1 | 1/1 | 3/2 | 3/2 | 3/2 | 3/2 | 3/2 | 3/2 | 3/2 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | 1/1 | | | |

4. EMP IMPLEMENTATION AND MITIGATION MEASURES

4.1 Hierarchy of Mitigation Measures Implementation

A hierarchy of methods for mitigating significant adverse effects has been adopted in order of preference and as follows:

- (i) Enhancement, e.g. protection of habitats through operational approaches;
- (ii) Avoidance, e.g. flexible implementation timing to avoid effects on ecological receptors;
- (iii) Reduction, e.g. limitation of effects on receptors through design or operational changes, and;
- (iv) Compensation, e.g. community benefits.

4.2 Roles and Responsibilities

4.2.1 Overview

Management and monitoring of the environmental elements that may be affected by the different activities of the 2D and 3D CSEM survey through the allocation of resources, roles and responsibilities is an important element of the mitigatory process. This EMP provides for the human resources roles and responsibilities necessary for the implementation and monitoring of the key components of the mitigation measures.

4.2.2 Proponent's Representative (PR) / Operations Manager (OM)

The proponent shall appoint a **Proponent's Representative (PR) / Operations Manager (OM)** with responsibilities not limited to the following with respect to the EMP implementation:

- ❖ Act as the PR and implementing agent on behalf of the proponent;
- ❖ Ensure that the proponent's responsibilities are executed in compliance with the relevant national and international regulations and best practices;
- ❖ Ensure that all the necessary environmental authorisations and permits have been obtained before the implementation of the proposed activities;
- ❖ Assist any contractor / subcontractor and monitoring specialists in finding environmentally responsible solutions to challenges that may arise during the survey;
- ❖ Should the operations manager believe a serious threat to, or impact on the receiving environment may be caused by the CSEM survey activities, he/she may stop work and the proponent must be informed of the reasons for the stoppage as soon as possible;
- ❖ The OM has the authority to issue fines for transgressions of basic conduct rules and/or contravention of the EMP;
- ❖ Should any contractor / subcontractor and monitoring specialists or his/her employees fail to show adequate consideration for the environmental aspects related to the EMP, the operations manager can have person(s) and/or equipment removed from the vessel or work suspended until the matter is remedied;
- ❖ Maintain an open and direct lines of communication between the stakeholders and proponent, as well as any other identified Interested and Affected Parties (I&APs) with regards to environmental matters, and;
- ❖ Attend regular meetings / daily briefings and inspections as may be required.

4.2.3 Safety, Health and Environment (SHE) Officer / Environmental Coordinator

The proponent shall appoint a Safety, Health and Environment (SHE) Officer / Environmental Coordinator with responsibilities not limited to the following with respect to the EMP implementation:

- ❖ Assist the OM in ensuring that the necessary environmental authorisations and permits have been obtained and any subsequent filings are prepared and lodged accordingly;
- ❖ Assist the OM and Contractor in finding environmentally responsible solutions to challenges that may arise;
- ❖ Conduct daily safety and environmental management briefings as per EMP requirements or as may be required;
- ❖ Carry out regular site inspections (on average once per week) with regards to compliance with the EMP; report any non-compliance(s) to the OM as soon as possible;
- ❖ Continuously review the EMP and recommend additions and/or changes to the EMP document as may be required and in consultations with the OM and monitoring specialists;
- ❖ Monitor the Contractor's environmental awareness training for all new personnel joining the operations;
- ❖ Keep records of all activities related to environmental control and monitoring; the latter to include a photographic record of all the major incidents / incidences, and;
- ❖ Attend regular meetings.

4.2.4 Other Contractors and Subcontractors

The responsibilities of the **Contractors and Subcontractors** that may be appointed by the proponent to undertake certain activities of the proposed include but not limited to the following with respect to the EMP implementation:

- ❖ Comply with the EMP provisions of relevant national and international regulations and best practices;
- ❖ Preparation and submission to the proponent through the Project HSE of the following Management Plans:
 - Environmental Awareness Training and Inductions;
 - Emergency Preparedness and Response;
 - Waste Management, and;
 - Health and Safety.
- ❖ Ensure adequate environmental awareness training for senior site personnel;
- ❖ Environmental awareness presentations (inductions) to be given to all personnel prior to work commencement; the Project HSE shall provide the content and topics that should be covered the awareness materials and should not be limited to the following guidance:
 - The importance of complying with the EMP provisions;
 - Roles and responsibilities, including emergency preparedness;

- Basic rules of conduct (Do's and Don'ts);
- EMP: aspects, impacts and mitigation;
- Fines for failure to adhere to the EMP, and;
- Health and safety requirements.
- ❖ Record keeping of all environmental awareness training and induction presentations, and;
- ❖ Attend regular meetings and environmental reviews /inspections of the operations.

4.2.5 Environmental Monitoring Specialist (MMO and FLO)

The proponent shall appoint a Marine Mammal Observation (MMO) and Fishery Liaison Officers (FLO) with responsibilities not limited to the following with respect to the EMP implementation:

- (i) MMO:
 - ❖ Record a written physical description of a marine mammal;
 - ❖ Log which direction it is travelling in;
 - ❖ Describe its behaviour;
 - ❖ Log the time;
 - ❖ Inform the operator that they need to suspend operations until further notice (which will be when the marine mammal has exited the exclusion zone);
 - ❖ Track the marine mammal and keep the operator informed;
 - ❖ Attend regular meetings and environmental reviews /inspections of the operations, and;
 - ❖ Prepare daily, weekly, monthly / final closure monitoring report as may be applicable.
- (ii) FLO:
 - ❖ Act as the link between fishing vessels in the CSEM survey area and survey / support vessel;
 - ❖ Communicate in the same language as those on the fishing vessel who may not necessarily be native to the country in which the survey is being acquired;
 - ❖ Work closely with the OM and the fishing industry to minimise any potential impact of the project upon local fishing. The objective is to facilitate as far as possible, an arrangement based on coexistence;
 - ❖ Keeps local fishing vessels informed of ongoing work on major projects within that area. This allows local fishermen to understand the potential hazards and to plan their fishing activities accordingly. It also enables the CSEM survey project to proceed unhindered by fishing vessels, saving significant time and money for the client or CSEM contractor;
 - ❖ Attend regular meetings and environmental reviews /inspections of the operations, and;
 - ❖ Prepare daily, weekly, monthly / final closure monitoring report as may be applicable.

4.3 Specific Mitigation Measures

4.3.1 Specific Mitigation Measures Implementation

Based on the findings of the impact assessment as detailed in the EIA Report Vol. 2 of 3 and summarised in Table 3.1 – 3.6 in this report, Table 4.1 - 4.3 provides the detailed specific mitigations measures to be implemented by the proponent with respect to the proposed 2D and 3D CSEM survey operations. A summarised EMP based on EMGS framework is provided under the Chapter 6 Section 6.2 Recommendation for easy incorporation in project / contract documents. The following is the summary of the key project stages linked to the migration measures provided in Tables 4.1 - 4.3:

(i) **Mobilisation and Pre-Survey Preparations (Table 4.1):**

- ❖ Pre-survey planning;
- ❖ Emergency and Contingency planning;
- ❖ EIA submission and approval;
- ❖ Environmental mitigation.
- ❖ Compliance with EIA and EMP;
- ❖ Notification of and coordination with relevant parties., and;
- ❖ Appointment of IMO.

(ii) **Actual Survey Operations (Table 4.2):**

- ❖ Adherence to EMP;
- ❖ monitoring of effects and performance assessment;
- ❖ Pollution control and waste management;
- ❖ Equipment management;
- ❖ Airgun operation;
- ❖ Communication and notification to other vessels;
- ❖ Exclusion of other vessels;
- ❖ Prevention of emergencies, and;
- ❖ Emergency management procedures including oil spills.

(iii) **Post Survey Operations (Table 4.3):**

- ❖ Survey vessels to leave;
- ❖ Inform relevant parties of survey completion;
- ❖ Final waste disposal;
- ❖ Final observation reports, and;
- ❖ Close-out reports.

Table 4.1: Mobilisation and Pre-Survey Preparations.

| ACTIVITY | RATIONALE and MOTIVATION | COURSE OF ACTION TO FULFIL EMP PROVISOS | DESIGNATED PERSON RESPONSIBLE | CONTROL and VERIFICATION | TIMING | REQUIREMENT FOR "CLOSEOUT" REPORT |
|---|---|---|--|------------------------------|--|---|
| Pre-survey Planning | Allocate provisions for Environmental monitoring and Liaison with fishing, mining, petroleum industries and other users of the sea. | 1) Make provision for including Marine Mammal Observation (MMO) and Fishery Liaison Officers (FLO) as crew on board the survey / support vessel. 2) Notify relevant government departments Ministry of Mines and Energy (MME), Ministry of Environment and Tourism (MET), Ministry of Fisheries and Marine Recourse (MFMR) and the Ministry of Work and Transport (MWT) Department of Maritimes Affairs Search and Rescue, Namibian Ports Authority and port captains 3) Determine the extent of local fishing, petroleum and mining activities within the survey area. 4) Notify other marine users, fishing industry (Namibian and foreign), marine petroleum, mineral prospecting and mining licence holders. - Notification must include <ul style="list-style-type: none"> ➢ navigational co-ordinates of the survey area ➢ timing and duration of proposed activities ➢ designated safety zone around the survey / support vessel (500 m) 5) Finalise negotiations and resolve any conflict over the allocation of user rights prior to the commencement of operation. 6) Charter a local vessel to act as chase boat | EMGS, Operations Manager CSEM contractor Environmental Coordinator | | Prior to commencing survey operations | Minutes of meetings Copies of all correspondence MMO / FLO /SHE reports |
| Emergency and Contingency Planning | Preparation for any emergency that could result in an environmental impact | 1) Company (or representative) Emergency Response Plan; 2) Survey and support vessel Contractor Emergency Response Plan (including. MEDIVAC) 3) Helicopter Operator Emergency Response Plan. 4) Oil Pollution Emergency Plan should refer to the National Marine Pollution Contingency Plan (NMPCP) 5) Ensure there is adequate protection and indemnity insurance cover for oil pollution 6) Produce vessel's seaworthiness certificate and/or classification stamp | CSEM contractor SHE Officer | Copies of all correspondence | | Confirm compliance and justify any omissions |
| EIA submission and Approval / Environmental Clearance | Compliance with legislative requirements – Namibian EA Policy | Submit EIA and EMP to Ministry of Environment and Tourism for approval and issuing of Environmental Clearance Certificate (ECC) | EMGS / Subcontractor (Risk-Based Solution) | | Prior to commencing survey operations | Final EIA and EMP Reports with ECC issued |
| Environmental Mitigation | Minimise impact on cetaceans and turtles | 1) Employ an MMO 2) Use visual monitoring during daytime and night vision equipment for the night | EMGS, Operations Manager Contractor Environmental Coordinator | | Prior to commencing survey / appointment contractors | None |

Table 4.1: Cont.

| ACTIVITY | RATIONALE and MOTIVATION | COURSE OF ACTION TO FULFIL EMP PROVISOS | DESIGNATED PERSON RESPONSIBLE | CONTROL and VERIFICATION | TIMING | REQUIREMENT FOR "CLOSEOUT" REPORT |
|--|--|--|---|---|---|---|
| Compliance with EIA and EMP | <p>EMGS and contractor to fulfil requirements set by MET, MME and MARPOL</p> <p>Commit to adherence to EMP</p> | <p>1) Ensure copies of ECC, EIA and EMP reports are onboard throughout survey period</p> <p>2) Ensure that a copy of the EIA report is provided to the CSEM contractor.</p> <p>3) Elucidate all personnel of the EMP requirements and motivation. Assign duties appropriately.</p> <p>4) Ensure availability of relevant personnel and suitable equipment to meet EMP requirements.</p> <p>5) Notify other marine users and promote cooperation to minimise cumulative impacts.</p> | CSEM contractor Operations Manager, Environmental Coordinator, Equipment Quartermaster, SHE Officer | Minutes of meetings Copies of all environmental awareness training manuals and schedules Self-audit | Prior to commencing survey operations | <p>Minutes of meetings</p> <p>Signed acknowledgment of receipt of EIA by Contractor</p> <p>Confirm compliance and justify any omissions</p> |
| Notification of and coordination of activities with relevant parties | <p>Ensure that other users are aware of the CSEM survey. Promote cooperation and coexistence with other users to minimise cumulative environmental impacts</p> | <p>1) Notify relevant government ministries and departments – Ministry of Fisheries and Marine Resources (MFMR), Ministry of Environment and Tourism (MET), Ministry of Mines and Energy (MME) and Ministry of Works and Transport (MWT) / Maritime Search and Rescue (SAR)</p> <p>2) Notify other marine users, fishing industry (Namibian and foreign), marine petroleum, mineral prospecting and mining licence holders.</p> <p>- Notification must include</p> <ul style="list-style-type: none"> ➢ Navigational co-ordinates of the survey area ➢ Timing and duration of proposed activities ➢ Designated safety zone around the survey / support vessel (500m). <p>3) Notify fishing operators through recognised fishing associations, MFMR, fishing companies, agents or through MME</p> <ul style="list-style-type: none"> ➢ Notify operational fishing vessels directly where required or encountered <p>4) Transmit Daily Radio Navigation Warnings and Notices to Mariners the survey vessel's position and operation progress</p> | CSEM contractor Operations Manager, Environmental Coordinator | Copies of all correspondence Copies of notices sent | Notice to Mariners t at least 24 hours before start of survey Daily positional updates throughout survey | Copies of notices and list of recipients/ addressees |
| Appointment of FLO / MMO | <p>Ensure compliance with EMP Minimise impacts</p> | <p>Appoint trained FLO who are familiar with fisheries operational in the area and MMO must have experience in seabird, turtle, seal and marine mammal identification and observation techniques.</p> | CSEM contractor | FLO / MMO contract and reports | Prior to commencing survey | Monitoring reports |

Table 4.2: Actual Survey Operations.

| ACTIVITY | RATIONALE and MOTIVATION | COURSE OF ACTION TO FULFIL EMP PROVISOS | DESIGNATED PERSON RESPONSIBLE | CONTROL and VERIFICATION | TIMING | REQUIREMENT FOR "CLOSEOUT" REPORT |
|--|--|--|---|--|--------------------------|---|
| Adherence to EMP and Industry Best Practices | Operate in an environmentally responsible manner | 1) Comply fully with the EMP (compliance means all activities are undertaken successfully and details recorded). 2) Abide by terms of internationally recognised Environmental Management Policy <ul style="list-style-type: none"> ➤ Include environmental awareness training, waste management, environmental monitoring, procedure and data recording. 3) Comply with the Joint Nature Conservation Committee (JNCC) "guidelines for minimising the risk of injury and disturbance to marine mammals as may be applicable" 4) Comply with " <i>Environmental Guidelines for Worldwide Geophysical Operations</i> " as issued by the International Association of Geophysical Contractors (IAGC). | Operations Manager and CSEM contractor, FLO and MMO | Self-audits | During the survey period | Copies of self-audit reports FLO and MMO reports |
| Helicopters Crew changes, Services or in an event of an Emergency as may be required | Minimise noise impact to coastal fauna | 1) Instruct helicopter operator and pilots not to overfly Ramsar sites, islands, coastal reserves, bird and seal breeding colonies. If not possible <ul style="list-style-type: none"> ➤ Minimum altitudes of 600 m over nature conservation/breeding areas ➤ No-fly zone 3km seaward and 1km landward of sensitive area ➤ Avoid seabird colonies on the numerous offshore islands 2) Brief all pilots on the ecological risks associated with flying over seabird and seal colonies and at a low level parallel to the coast. 3) Avoid prolonged coast-parallel flights within 1 nautical mile of the shore) 4) Maintain reasonable altitude over sea (600 m) if cetaceans are spotted. 5) Report any deviations from pre-set flight paths. | Operations Manager Environmental coordinator Helicopter operator | Report deviation from prescribed flight path | Ad Hoc As required | Log of flight paths |
| Equipment management | Minimise equipment loss overboard and minimise hazards on seafloor or floating | 1) Keep a record of all items lost overboard including time and location 2) Inform relevant authorities (MET, MFMR, MME), and other users in the area (mining houses, fishing companies). 3) When any items that constitute a seafloor or navigation hazard are lost a standard form must be completed including: <ul style="list-style-type: none"> ➤ Date and cause of loss ➤ Details of equipment (Type, Size) ➤ Vessel ➤ Location ➤ Sea state and weather ➤ Nature of the Seafloor | CSEM contractor Operations Manager Equipment quartermaster Environmental officer | Incident records | During the operation | List of lost equipment Copy of record sheet |

Table 4.2: Cont.

| ACTIVITY | RATIONALE and MOTIVATION | COURSE OF ACTION TO FULFIL EMP PROVISOS | DESIGNATED PERSON RESPONSIBLE | CONTROL and VERIFICATION | TIMING | REQUIREMENT FOR "CLOSEOUT" REPORT |
|--|--|--|--|--|------------------------------|---|
| Pollution control and Waste Management | Minimise marine pollution Maximise recycling Adherence to MARPOL 73/78 | <p>1) Minimise pollution and maximise recycling by implementing and maintaining a company waste management policy.</p> <p>2) Comply with legal requirements for waste management and pollution control (for air and water quality levels at sea) by educating crew, adhering to MARPOL policies and monitoring practices.</p> <p>3) Ensure all crew is trained in spill management.</p> <p>4) Ensure that a waste disposal contractor disposes of waste returned to port at a licensed landfill site.</p> <p>5) Ensure waste disposal is carried out in accordance with appropriate laws.</p> <p>5) Supply vessels must comply with internationally agreed MARPOL standards</p> <p>MARPOL Procedures and Guidelines</p> <ul style="list-style-type: none"> • <i>General waste:</i> Minimise waste generation -No disposal overboard. • <i>Galley waste:</i> Reduce to < 25 mm prior to disposal overboard if < 12 NM from shore - No disposal within 3 NM of the coast. • Disposal without macerating – vessel must be >12 nautical miles from shore. • <i>Medical waste:</i> Seal in aseptic containers for disposal onshore. • <i>Deck drainage:</i> Use biodegradable, non-toxic cleaning agents • Ensure that weather decks are kept free of spillage. Mop any spill immediately. Collect in oily water separator systems. • <i>Machinery space drainage:</i> Collect used oil and oily water • Filter oily water and release water of < 5ppm oil in water • Dispose of sludge in appropriate facility at port. • Return waste oil to shore for processing • <i>Solid waste:</i> Incinerate onboard or store and transport to port for disposal on land. • <i>Hazardous waste:</i> record volume and type brought onboard • Store in dedicated waste containers • Dispose of in the designated site at port. • <i>Sewage:</i> use approved treatment plants set to MARPOL standards. Discharge only where the high wind and wave energy is expected to result in rapid dispersal. Discharge treated sewage between 4 and 12 NM from the coast. No sewage discharge within 4 NM of the coast. No treatment needed if beyond 12 NM from coast. However, vessel must be moving at ≥4 knots before discharging at a moderate rate. • <i>Metal:</i> Send to shore for recycling or disposal. • <i>Minor oil spill:</i> Use oil absorbent. • <i>Atmospheric emissions:</i> Maintain and tune all hydraulic hoses, engines, motors, generators to minimise soot and unburned diesel. | CSEM contractor Operations Manager Environmental coordinator | Self-audit Registers Record books Daily reports | Throughout survey operations | Summary of waste record book Waste disposal schedule Receipts from disposal agents/sites Record destination of waste for on land disposal Report occurrence of minor oil spills |

Table 4.2: Cont.

| ACTIVITY | RATIONALE and MOTIVATION | COURSE OF ACTION TO FULFIL EMP PROVISOS | DESIGNATED PERSON RESPONSIBLE | CONTROL and VERIFICATION | TIMING | REQUIREMENT FOR "CLOSEOUT" REPORT |
|--|---|--|---|---|---|---|
| Communication and notification to other vessels, Coordination with other users | <p>Minimise disruption to other users.</p> <p>Promote cooperation</p> <p>Promote safe navigation</p> <p>Minimise cumulative impacts</p> | <p>1) Notify relevant government ministries and departments – MFMR, MET, MME, Namibian Ports Authority; Port Captains and Commissioner for Petroleum Affairs</p> <p>2) Notify other marine users, fishing industry (Namibian and foreign), marine petroleum, mineral prospecting and mining licence holders. - Notification must include</p> <ul style="list-style-type: none"> ➢ Navigational Coordinates of The Survey Area ➢ Timing and Duration of Proposed Activities ➢ Designated safety zone around the survey / support vessel (500 m). <p>3) Notify fishing operators through recognised fishing associations, MFMR, fishing companies, agents.</p> <ul style="list-style-type: none"> ➢ Notify operational fishing vessels directly <p>4) Transmit Daily Radio Navigation Warnings and Notices to Mariners re the survey vessel's position and operation progress</p> <p>5) Co-operate with other users to minimise disruption of their activities.</p> <p>6) Co-operate with other legitimate users of the sea to minimise cumulative impacts on marine life.</p> | CSEM contractor Operations Manager Environmental Coordinator FLO | Copies of written notices and correspondence | <p>Notice to Mariners t at least 24 hours before start of survey</p> <p>Daily positional updates throughout survey During survey operations as required</p> | Copies of notices and list of recipients/ addressees/ FLO Reports / nots/ minutes |
| Exclusion of other vessels | Minimise probability of collision or contact incidents | <p>1) Use communication channels (radio and email) to inform all other potential users about the survey locations, timing, priority of passage, safety exclusion zones.</p> <p>2) Keep constant watch for approaching vessels during operations.</p> <p>3) Warn by radio and chase boat if required.</p> <p>4) Communicate any delays or equipment loss.</p> <p>5) Record any unusual incidents</p> | Survey Contractor Environmental Coordinator Operations Manager FLO Officer of the watch Chase boat skipper | Daily Reports Copies of written communication Incident Report | During the survey operations | Copies of written communication Incident Reports// FLO Reports / nots/ minutes |
| Prevention of emergencies | <p>Minimise potential emergency</p> <p>Minimise environmental damage</p> <p>Minimise extraneous costs</p> | <p>1) Prevent collisions by ensuring good communications with relevant parties.</p> <p>2) Ensure survey and support vessels display correct signals by day and lights by night (including twilight)</p> <p>3) Set watches – visual, radar and standby vessel.</p> <p>4) Identify any long-line activity in survey area and communicate with fishers as to location of gear.</p> <p>5) Service equipment regularly</p> <p>6) Conduct weekly emergency drills.</p> <p>7) Establish lines of communication with emergency response:</p> <ul style="list-style-type: none"> ➢ MET, MFMR, MWT, Sea Rescue Institute of Namibia, Walvis Bay Namport Port Captain. | Survey Contractor Environmental Coordinator Operations manager FLO Officer of the watch Chase boat skipper | Daily Reports Copies of written communication Incident Report | Throughout survey operations | Copies of written communication Incident Reports// FLO Reports / nots/ minutes |

Table 4.2: Cont.

| ACTIVITY | RATIONALE and MOTIVATION | COURSE OF ACTION TO FULFIL EMP PROVISOS | DESIGNATED PERSON RESPONSIBLE | CONTROL and VERIFICATION | TIMING | REQUIREMENT FOR "CLOSEOUT" REPORT |
|---|--|---|---|--|------------------------------|---|
| Emergency management procedures (include. Oil Spills) | Minimise environmental damage Minimise distress and tragedy | <p>1) Adhere to code of conduct and Law of the Sea obligations regarding other vessels in distress.</p> <p>2) In the event of an onboard crisis implement health and safety procedures in accordance with emergency plans.</p> <p>3) In the event of an oil spill immediately notify NAMPORT and the Commissioner for Petroleum Affairs. Information required when reporting a spill includes:</p> <ul style="list-style-type: none"> ➤ The type and circumstances of incident ➤ Ship name, type, port of registry ➤ Nearest agent representing the ships company ➤ Location (lat, long), distance offshore and extent of oil spill ➤ Prevailing weather conditions and sea state ➤ Persons and authorities already informed of the spill. <p>Where diesel, which evaporates relatively quickly, has been spilled, the water should be agitated or mixed using a propeller boat to aid dispersal and evaporation.</p> <p>Dispersants are most effective:</p> <ul style="list-style-type: none"> ➤ On fresh crude oils; under turbulent sea conditions (dispersants require mixing). ➤ When applied within 12 hours or at a maximum of 24 hours after the spill. <p>The volume of dispersant application should not exceed 20-30% of the oil volume.</p> <p>Dispersants should not be used without authorisation by MFMR.</p> <p>Dispersants should not be used:</p> <ul style="list-style-type: none"> ➤ On diesel or light fuel oil or on heavy fuel oil. ➤ On slicks > 0.5 cm thick. ➤ On any oil spills within 5 nautical miles offshore ➤ In water depths < 30 m ➤ When spill is so far offshore there is little chance of oil reaching the shore. | Survey Contractor Environmental Coordinator Operations manager/ SHE Officer of the watch | Daily Reports Copies communication Incident Report | Throughout survey operations | Copies of communication Incident Reports |

Table 4.2: Cont.

| ACTIVITY | RATIONALE and MOTIVATION | COURSE OF ACTION TO FULFIL EMP PROVISOS | DESIGNATED PERSON RESPONSIBLE | CONTROL and VERIFICATION | TIMING | REQUIREMENT FOR "CLOSEOUT" REPORT |
|------------------|--|--|---|---|---|--|
| Survey Operation | Minimise impact of CSEM Survey noise on marine fauna | <p>1) Maintain continuous watch for marine life within 500 m of vessel and use infra-red binoculars to undertake visual observations at night and in poor visibility.</p> <p>2) Implement the following procedures before and during shooting:</p> <ul style="list-style-type: none"> • Commence "soft-start" procedures if no animals sighted within the safe zone (500 m) for at least 30 minutes. If after 30 minutes, small cetaceans (dolphins) and seals are still in area, normal "soft start" procedures may commence • Re-initiate "soft starts" after 20 minutes or longer. Ramp-up proportionally if break was shorter than 20 minutes. <p>Temporarily suspension of survey activities when:</p> <ul style="list-style-type: none"> • Negative behaviour indicating distress directly related to the survey operations is observed • Cetaceans are observed within 500 m of the survey vessel (except dolphins and seals) • Injury occurs as a direct result of the survey. • Natural avoidance behaviour is over-ridden by feeding response near the survey vessel (e.g. Due to the presence of stunned fish) • There is mass mortality or evidence of mass disorientation or injury of fish and/or invertebrates. <p>At night:</p> <ul style="list-style-type: none"> • Infra-red binoculars may be use for monitoring • Lighting on board survey vessels should be reduced to the minimum safety levels to minimise the potential stranding of pelagic seabirds • Any stranded seabirds must be retrieved and released according to appropriate guidelines <p>3) Record sightings of any injured or dead protected species, regardless of whether the injury or death was caused by the survey / support vessel itself. If the injury or death was caused by a collision with the survey / support vessel, the date and location (lat, long) of the strike and the species and a description of the animal and/or bird should be recorded.</p> | Survey Contractor Environmental Coordinator Officer of the watch MMO | Self-audit Daily Reports Shut-down logs IMO/MMO reports Incident Report Records of marine fauna observations and "soft-start" procedures | Prior to and throughout survey operations | IMO/MMO reports Copies of completed marine fauna observation forms and CSEM activity log showing "soft-start" Initiation. Log of shutdowns, including all decisions and discussions relevant to the termination. |

Table 4.2: Cont.

| ACTIVITY | RATIONALE and MOTIVATION | COURSE OF ACTION TO FULFIL EMP PROVISOS | DESIGNATED PERSON RESPONSIBLE | CONTROL and VERIFICATION | TIMING | REQUIREMENT FOR "CLOSEOUT" REPORT |
|-------------------------------|--|--|--|------------------------------|--|--|
| Ongoing monitoring of effects | Ongoing monitoring programmes (in conjunction with government if required) | 1) Initiate monitoring programmes as per specific indication by authorities, 2) Monitor performance against objectives and targets 3) Document all activities and findings for internal and external audits 4) Undertake daily monitoring and recording of the following: <ul style="list-style-type: none"> ➤ Marine mammals and sea birds sighted ➤ Record species and numbers in relation to survey activities ➤ Responses of animals and birds to CSEM survey ➤ Fish or invertebrate mortality associated CSEM survey ➤ Record sound levels and "soft start procedures" ➤ Record changes in behaviour (swimming motion, feeding, diving patterns, change in swimming direction and speed, startle responses) ➤ Record vessel interaction, particularly if chase boat was used to maintain safe operational zone ➤ Details of unattended fishing gear ➤ Document communication with other vessels | CSEM contractor Environmental Coordinator MO | Daily Reports | During survey operations | Daily reports MMO reports |
| Performance assessment | Ongoing monitoring programme and EMP Performance Assessments | 1) Implement the ongoing monitoring programmes and EMP Performance Assessment as determined by MME 2) Submit Environmental Performance Assessment reports to MME and MET. 3) Performance assessment based on successful implementation of EMP Data recorded should include: <ul style="list-style-type: none"> ➤ Species and numbers ➤ Location (lat, long) ➤ Relation to vessels (distance, approaching/retreating) ➤ Swimming direction and speed ➤ Change in swimming direction/speed as a result of survey activities ➤ Stunning or mortality as a result of survey activities Take note of: <ul style="list-style-type: none"> • CSEM Survey activities that were undertaken at the time • Location, meteorological conditions and sea state • Compliance with (MARPOL 73/78 regulations) 4) Submit reports to ministries weekly and to research institutes such as the National Marine Information and Research Centre (NatMirc) in the MFMR for analyses of survey impacts in local waters. | CSEM contractor SHE FLO and MMO | Daily reports MMO reports | During survey operations and after completion of survey Required regularity of performance assessment to be determined by MET and MME | Monitoring reports Provide all recorded information |

Table 4.3: Post Survey Operations.

| ACTIVITY | RATIONALE and MOTIVATION | COURSE OF ACTION TO FULFIL EMP PROVISOS | DESIGNATED PERSON RESPONSIBLE | CONTROL and VERIFICATION | TIMING | REQUIREMENT FOR "CLOSEOUT" REPORT |
|--|--|--|--|---|---|--|
| Survey vessels to leave area | Leave area in state that it was prior to survey operations | Ensure that all deployed equipment is retrieved except for the receiver anchor that is expected to disintegrate within 6-9 months. | CSEM contractor Operations Manager SHE Equipment Quartermaster | Self-Audit Equipment records | On completion of survey operations | SHE / Environmental Coordinator Report |
| Inform relevant parties of survey completion | Ensure all relevant parties are aware of completion of survey operations | 1) Inform MET, MME and MFMR of completion of survey operations 2) Inform other users of completion of survey operations (Fishing Industry Mining Companies) <ul style="list-style-type: none"> Inform fishing companies and vessels through recognised fishing associations / Captains of the vessels operating in the area. | CSEM contractor Operations manager SHE Environmental Officer | Records of communication | Within a fortnight of survey completion | Copies of communication and notification documents |
| Final waste disposal | Minimise pollution, maximise recycling Ensure correct disposal of all waste brought to port | 1) Dispose of all waste retained onboard at a licensed waste site through a licensed waste disposal contractor. | CSEM contractor operations manager SHE Environmental Officer | Receipts from waste disposal contractor | In port | Receipts from waste disposal contractor and sites |
| Final observation reports | Share information with interest groups | 1) Share faunal observation reports with relevant parties/associations and MFMR, MET. | MMO and FLO | Reports | After completion of survey | FLO and MMO monitoring reports |
| Close-out report | Ensure corrective action and EMP compliance | 1) Compile a CSEM survey "close-out" report on completion of the survey. 2) Base "close-out" report the monitoring requirements and the EMP. 3) Provide information / records asked for in "close-out" report column of EMP 4) Submit copies to MET and MME | EMGS / External Consultant such as Risk-Based Solutions (RBS) CC | | Three (3) month after survey close | Above information, records and reports |

5. MONITORING AND REPORTING

5.1 OVERVIEW

The current Namibian environmental assessment and management procedure requires the submission of biannual Environmental Monitoring Reports (EMRs) or as the Environmental Clearance Certificate (ECC) additional conditions that may be stipulate.

It recommended that the EMRs as submitted when due even if no activities did take place. The EMRs are used to support the renewal of the ECC once it expires after three (3) years.

The EMRs shall comprise the summary description of the activities undertaken for the period under review, the EMP implementation and the submission of the monitoring datasets collected. The regular submission of EMRs and collation of data may facilitate recognition of effects and impacts not previously foreseen and allow for the implementation of precautionary measures and mitigation before the impacts become significant.

The monitoring programme acts as a quality assurance check list on all environmental procedures and environmental performances with respect to the implementation on the EMP. The following is the summary of the key general component of the EMP monitoring framework that shall be monitored and documented in addition to the specific reporting requirements of the SHE / Environmental Coordinators, FLO and MMO activities:

- 1) I&AP consultation and communication records:
 - a. Pre-survey meetings;
 - b. Communication with I&APs, and;
 - c. Notice to Mariners.
- 2) Port calls;
- 3) Vessel operations:
 - a. Fuel consumption;
 - b. Oil consumption, and;
 - c. Water consumption.
- 4) Weather and Climate:
 - a. Atmospheric weather conditions, and;
 - b. Sea state.
- 5) Marine Fauna sightings and interactions
 - a. Invertebrates (sightings / reaction to survey);
 - b. Turtles (sightings / reaction to survey);
 - c. Sea Birds (sightings / reaction to survey /landing on vessel);
 - d. Seals (sightings / reaction to survey);

- e. Baleen whales (sightings / reaction to survey);
 - f. Toothed whales and dolphins (sightings /reaction to survey);
 - g. Cetaceans (sightings /reaction to survey), and;
 - h. Fish / fishing vessel/s (sightings / reaction to survey).
- 6) Incidents involving other marine users:
- a. Daily updates (survey position and progress);
 - b. Fishing industry interaction (incident record – vessels / gear), and;
 - c. Other Vessels (incident record).
- 7) Onboard environmental awareness:
- a. Environmental training;
 - b. Waste management:
 - i. Discharge to atmosphere (volume);
 - ii. Discharge to sea:
 - o Sewage (volume), and;
 - o Galley waste (tonnage).
 - iii. Disposal at port:
 - o Solid waste (tonnage/ disposal site);
 - o Hazardous Waste (volume/ disposal site), and;
 - o Other waste (volume/ disposal site)
- 8) Emergencies:
- a. Service record;
 - b. Major Oil/ Chemical spills;
 - c. Emergency Drills / Training, and;
 - d. Health and Safety Briefings.

6. CONCLUSIONS AND RECOMMENDATIONS

6.1 EMP Conclusions

A number of specific mitigation measures have been provided in this EMP report based on the findings and recommendations of the EIA Report Vol 2 of 3 in order to mitigate the potential negative impacts that the proposed 2D and 3D CSEM survey may have on the receiving coastal and marine environments (physical, biological and socioeconomic components). If the mitigation measures are implemented and monitored, any likely negative impacts that the proposed 2D and 3D CSEM survey may have on the receiving environment are likely to be reduced significantly, thereby promoting the coexistence of petroleum exploration activities with natural marine environment and other marine users such as fisheries.

6.2 EMGS Based Summarised EMP Framework Recommendations

Based on the results of the EIA Report Vol. 2 of 3 and the mitigation measures detailed in this EMP Report Vol. 3 of 3, it's hereby recommended that the proponent (EMGS) be issued with Environmental Clearance Certificate (ECC) for the proposed 2D and 3D CSEM survey operations in the Walvis Basin, offshore northcentral Namibia.

EMGS and the survey contractor are responsible for ensuring that all the provisions of this EMP implemented and monitored accordingly. The ultimate responsibility rests with the Proponent (EMGS), for providing all appropriate resources and ensure that all employees, including contractors and sub-contractors are informed of, understand and are familiar with the EMP requirements for the proposed 2D and 3D CSEM survey. The following is the summarised local tailor made EMP prepared for easy incorporation in the project / contract documents with respect to the proposed 2D and 3D CSEM survey over the Walvis Basin, northcentral offshore Namibia and based on the standard EMGS EMP framework:

1. Procedure for Commencement of Operations:

- ❖ Exclusion zone:
 - 500 m horizontal radius from centre of source array;

2. General Practices:

- ❖ Environmental awareness programmes must be organised for all crew members to explain the conservation status of the cetaceans and turtles and to highlight the importance of the mitigation measures;
- ❖ Ensure that the support vessel(s) are in watch of the safety zone established around the survey / support vessel (5.5km ahead and abeam and 13 km as clearance from the vessel) this measure will allow the reduction of potential safety risks associated with the CSEM operations especially with the fishing vessels while working in the shallow waters;
- ❖ High intensity unnecessary noise must be avoided where possible;
- ❖ Any occurrence of large marine mammals should be brought to the attention of MMO or FLO;
- ❖ MMO and FLO observations shall always be made the vessel is moving (not only during CSEM survey operations);
- ❖ Regular maintenance must be performed on the project vessels and the maintenance team must pay special attention to the noise produced by the vessels;
- ❖ All crew members must be forbidden from killing or causing injuries to marine fauna. Any crew member that deliberately kills or causes any damage to marine fauna must be immediately dismissed, reported to the relevant authorities and sent to shore;

- ❖ There must be someone in the support vessels who is responsible for watching out for the possible occurrence of these animals in the vicinity of ships;
- ❖ In the event of entanglement, all activities must stop and the rescue actions to rescue the animal must be put into practice;
- ❖ Through the Petroleum Commissioner in the Ministry of Mines and Energy (MME) or directly, request from the Namibian Maritime Search and Rescue (SAR), Department of Maritimes Affairs in the Ministry of Works and Transport in their capacity as the national maritime authority, for instructions on the rules and procedures that shall be adhered to, prior-to and during the CSEM operations in Namibian territorial (jurisdictional) waters, and;
- ❖ It shall be ensured that the "Navigation Warnings" are issued and disseminated through the Petroleum Commissioner in the Ministry of Mines and Energy or directly through Namibian Maritime Search and Rescue (SAR), Department of Maritimes Affairs in the Ministry of Works and Transport maritime communications network, as well as through other means of dissemination as may be available while at sea.

3. Pollution Management:

- ❖ The procedures for deposition applied must comply with national legislation (e.g. Regulation for the Prevention of Pollution and Marine and Coastal Environmental Protection, Decree No. 45/2006 of 30 November) and international best practices (eg. International Convention for the Prevention of Pollution by Ships – Marpol 73/78);
- ❖ The treatment of sewage must be done before it is discharged into the sea, according to the recommendations by Marpol 73/78;
- ❖ The ships must perform the treatment of the bilge waters onboard or do the transshipment offshore, in compliance with the recommendations by Marpol 73/78;
- ❖ Implement a Pollution Control Programme, including the treatment, adequate disposal and minimizing waste, according to the recommendations by Marpol 73/78;
- ❖ The frequent monitoring of the disposed waters, as a means of ensuring that the levels of pollutants are within the recommended standards.
- ❖ The survey / support vessel shall possess a manual of procedures to deal with domestic garbage that if correctly applied, prevent and minimize the potential negative effects of this impact;
- ❖ EMGS must ensure that the survey / support vessel possesses a Plan for Domestic Residues Management that is in conformity with Annex V of the MARPOL Convention: Prevention of Pollution by Garbage from Ships;
- ❖ All atmospheric pollution emissions shall comply with the Mozambican Laws and International Guidelines;
- ❖ According to Annex VI of the MARPOL 73/78 Convention, the content of the oils sulphuric shall have a maximum value of 4.5% m/m except in cases that the survey / support vessel is equipped with an approved cleaning system for the treatment of exhaustion gases or any other technical method that is verifiable and that reduces the SO₂ emissions to a maximum of 6.0 g/kWh¹, and;
- ❖ The incineration of packaged contaminated materials on board the survey / support vessel and Polychlorinated Biphenyls (PCBs) is prohibited. Furthermore, the deliberate emission of substances that are prejudicial to the Ozone Layer, including halon and the chlorofluorcarbonates (CFCs) is also prohibited.

4. Spills Management:

- ❖ All equipment and machinery that could potentially leak or spill fuel must be regularly maintained, inspected and tested;
- ❖ An Emergency Response Plan for Oil Spills must be prepared and must include, at least, the requirements specified by the World Bank related to Health, Safety and the Environment during Offshore Petrol and Gas operations (World Bank Group, 2015);
- ❖ In the event of fuel spills or other chemicals, an Emergency Response Plan for Oil Spills must be put into action /implemented. The capacity to implement that plan must be proven before the start of any activities;
- ❖ The Emergency Response Plan for Oil Spills must consider the best measure and the state-of-the-art methods for containing spills or loss of fuels, oil and chemical products, in all the vessels involved in the Project;
- ❖ Regular adequate training must be provided for all Project workers, related to the prevention, containment and response to spills;
- ❖ All equipment involved in the response to spills must be frequently maintained, inspected and tested.

5. Overall Compliances:

- ❖ Compliance to all relevant national, regional and international (MARPOL) marine pollution prevention regulations, standards, guidelines and procedures, and;

6. Adoption of the Precautionary Principles:

- ❖ In the absence of any specific mitigation measures being provide in this EMP, the Proponent (EMGS) and / or Contractor shall always adopt the precautionary approach.

EMP END