

9. ACTION PLAN, PROCEDURES AND ENVIRONMENTAL SPECIFICATIONS

This chapter presents the detail of the action plan, procedures and environmental specifications developed for implementation during the proposed project. This is considered as equivalent to an Environmental and Social Management Programme (ESMP).

9.1 INTRODUCTION

9.1.1 Scope and Objectives

The objectives of the action plan, procedures and environmental specifications chapter include the following:

- Meet South African EIA legislation, notably Appendix 4 of the EIA Regulations 2014, as amended, and international laws and conventions.
- Operationalise oil and gas industry good practices and the operator's own project standards.
- Set out mitigation required to ensure the negative impacts (as assessed in Chapter 8) are avoided or minimised.
- Provide an implementation mechanism by project phase for project controls and mitigation measures identified in the EMP document (as presented in Chapter 8).
- Establish a monitoring programme and record-keeping protocol against which the operator and its contractor's/sub-contractor's performance can be measured and to allow for corrective actions or improvements to be implemented when needed.
- Provide protocols for dealing with unforeseen circumstances such as unplanned events or ineffective mitigation measures.

9.1.2 Chapter Structure

Description of the structure and content of this chapter is given in Table 9-1: Description Of The Structure And Content Of The Action Plan, Procedures And Environmental Specification Chapter below.

Table 9-1: Description of the structure and content of the action plan, procedures and environmental specification chapter

Section	Contents
Section 9.1	Introduction Objectives and structure of the action plan, procedures and environmental specifications chapter.
Section 9.2	Summary of the Key Environmental and Social Sensitivities Key sensitivities in the study area and implications for the project.
Section 9.3	Supporting Documentation Main documentation supporting the implementation of the action plan, procedures and environmental specifications.
Section 9.4	Roles and Responsibilities Key roles and responsibilities for the implementation and management of the action plan, procedures and environmental specifications.
Section 9.5	Training, Awareness and Competency Training and awareness provisions for the operator's staff and Contractors involved in the project.

Section	Contents
Section 9.6	Compliance Verification and Corrective Actions Inspections, monitoring and auditing requirements to ensure compliance with the action plan, procedures and environmental specifications, and implementation of corrective actions.
Section 9.7	Management of Change Procedure to be followed to respond to changes to the survey design or the action plan, procedures and environmental specifications.
Section 9.8	Communication Communication channels between the operator, the contractor(s) and external stakeholders.
Section 9.9	Document Control and Reporting Document control and reporting requirements (internal and external).
Section 9.10	Environmental and Social Mitigation Management Commitment Register Commitments that will be implemented to prevent, minimise or manage significant negative impacts, and also optimise and maximise any potential benefits of the project.

9.2 SUMMARY OF THE KEY ENVIRONMENTAL AND SOCIAL SENSITIVITIES

Key sensitivities in the project's area of influence and implications for the project are provided in Table 9-2.

Table 9-2: Key sensitivities in the project's area of influence

Receptor/ Variable	Key sensitivities in the area of influence
1. Bio-physical considerations	
Conservation Areas and Marine Protected Areas	The area of interest overlaps with the Port Elizabeth Corals. Vessel movement between the area of interest and Port of Gqeberha might also pass in close proximity to the western edge of the Addo Elephant MPA inshore of the proposed survey area of interest. The area of interest also overlaps with a portion of the eastern extent of the Kingklip Corals EBSA and a small portion of the western extent of the Algoa to Amathole EBSA. Vessel movement between the survey area of interest and Port of Gqeberha would also pass through the Algoa to Amathole EBSA.
Marine Fauna	The taxa most likely to be encountered in the survey area are pelagic seabirds, turtles, and large migratory pelagic fish and cetaceans, some of which, potentially occurring in the survey area, are considered regionally 'Critically Endangered' (e.g. southern bluefin tuna, leatherback turtle, Leach's storm petrel, blue whale), 'Endangered' (e.g. African penguin, Cape gannet, Atlantic and Indian yellow-nosed albatross, Subantarctic skua, shortfin mako shark, whale shark, Indo-Pacific humpback dolphin, fin whale and sei whale), 'Vulnerable' (e.g. bigeye tuna, blue marlin, loggerhead turtle, thresher shark, great hammerhead shark, dusky shark, great white shark, longfin mako shark, and sperm, Bryde's and humpback whales). Although species listed as regionally Endangered or Critically Endangered may potentially occur in the survey area, their numbers are expected to be low.
Underwater features	Underwater features, which are key focus points for marine fauna, in close proximity to the proposed survey area include Kingklip Ridge and Kingklip Koppies along the inshore edge of the area of interest.
2. Socio-economic considerations	
Commercial Fisheries	The inshore areas of the proposed survey area of interest overlaps marginally with the Southeast Coast fishing grounds of the squid jig and small-scale fisheries (squid) sectors (<0.1%) (% of national catch indicated in brackets). Five other fisheries overlap with the majority of the proposed survey area of interest, including demersal trawl (13.3%), midwater trawl (29.2%), hake-directed demersal longline

Receptor/ Variable	Key sensitivities in the area of influence
	(7.1%), large pelagic longline (5%) and South Coast rock lobster (15.3%). Interaction with fishing activities can be expected in the area of interest.
Marine traffic	Most international shipping traffic is located on the outer edge of the continental shelf. The proposed survey area is located within the main traffic route along the Southeast Coast. The majority of commercial and fishing vessels remain relatively close inshore, but a significant amount of ship traffic can be anticipated to pass through the area of interest.
Port of Gqeberha	The Port of Gqeberha is well established and serviced. The port facilities, including the port services, suppliers and accommodation, are sufficiently developed and have the capacity to serve as supply port for the proposed survey.

9.3 SUPPORTING DOCUMENTATION

9.3.1 Survey Design

CGG will develop and finalise the survey design prior to going out for tender to survey contractors, including survey extent, survey line orientation, seismic array specifications, etc.

9.3.2 Contractor HSE Plan

The purpose of the Contractor HSE Plan is to present its company Health, Safety and Environment Management System (HSE-MS) applicable to the seismic vessel, possibly based on the IOGP 432 “Managing HSE in a Geophysical Contract”. It details the specificities and equipment of the vessel related to the operations and associated environmental, socio-economic and health aspects, as well as the organisation supporting the vessel management system (objectives, resources, documentation, risk management and control, etc.). Part of this document are the aspects related to the management of air emissions, discharges to the sea, waste, spill and related log books.

All staff and sub-contractors are required to comply with this document when working on the project.

9.3.3 Contractor Project Plan

The seismic contractor will also prepare a Contractor Project Plan, which deals with HSE aspects specific to the project (e.g. operation specificities, project impact assessment main outcomes, specific Emergency Response Plan (ERP), waste management with local facilities, planning, organogram, FLO scope, local content, MMO and PAM scope, etc).

9.3.4 Contractor HSE-MS Bridging document

The seismic contractor will also prepare a Bridging Document with his sub-contractors (including support vessels, etc.). This will provide, through dedicated key procedures, for effective interfacing of the HSE Management Systems used by the various companies involved in executing the work both on location and throughout the supply chain.

9.3.5 Contractor Kick-Off Meeting and Crew Awareness

The objective of the Kick-Off Meeting is to introduce the team, understand the project background, the key environmental and social sensitivities, what needs to be undertaken to mitigate risks and impacts, and also to agree on how the work should be undertaken to ensure that it is completed effectively.

Prior to operation, as part of the kick-off meeting, CGG's on-board representative and/or seismic contractor will provide HSSE awareness introduction training to ensure that the project personnel (including seismic and support vessels, MMO, PAM operator, FLO) are appropriately informed of the purpose and requirements of the overall HSE system and plan, including emergency procedures, spill management, etc., as well as the specifics of the project.

The information presented at the training will be communicated by the seismic contractor to any new staff coming onto the survey or support vessels after the initial training course and to all suppliers.

9.3.6 Commitments Register

Table 9-6 details the specific management commitments that will be implemented during all project phases (planning, mobilisation, operation and demobilisation) to prevent, minimise or manage significant potential negative impacts and optimise and maximise any potential benefits of the project.

9.3.7 Plans and Procedures

This EMP will form part of an overall HSE management system which will be prepared before the start of the seismic acquisition campaign. It will include at least the documents listed below and will include all the project controls and mitigation measures detailed in the Environmental and Social Mitigation Management Commitments register (see Section 9.10).

9.3.7.1 Marine Fauna Management Procedure

Objectives

The Marine Fauna Management Procedure will set out the specific measures to be taken to minimise the impacts of the Project on marine fauna.

These impacts are essentially:

- The impacts linked to noise emissions in the marine environment, mainly during the operation of airguns.
- Possible impacts related to direct collisions with cetaceans or turtles.

This procedure will implement the relevant mitigation measures described in the detailed Environmental and Social Mitigation Management Commitment Register (see Section 9.10).

Monitoring and detection of marine fauna

MMOs and PAM operators will be onboard the vessel for the duration of the survey operations. Their functions will be to identify and monitor the presence of marine fauna in the 500m mitigation zone and to inform the seismic contractor when measures must be taken to avoid or reduce the potential impacts on these species.

As a minimum, one MMO will be on watch during daylight hours for the pre-shoot observations and when the acoustic source is active, and one PAM operator will be on duty during daylight and night-time hours for the pre-shoot observations and when the acoustic source is active.

The roles, responsibilities and necessary qualifications/experience of the MMOs and PAM operators are defined in Sections 9.4.3 and 9.4.4, respectively.

Reporting

Once the seismic acquisition is complete, the MMOs and PAM operators will compile a report summarising their findings and observations during the survey, and compliance levels with achieving the performance objectives as detailed in the commitment register. This report will be included as part of the EMP close-out compliance report, which will be submitted to the competent authority (PASA) at the end of the seismic campaign.

9.3.7.2 Waste and Discharge Management Plan

Objectives

The Waste and Discharge Management Plan establishes procedures for the storage, collection and disposal of waste, including liquid and solid waste and hazardous and non-hazardous wastes. Certain wastes will be treated and disposed of offshore, while other wastes will be transported ashore. The plan will, therefore, describe the procedures to be followed to ensure the safe transport and disposal of wastes to appropriately licenced onshore facilities.

Principles

The seismic acquisition campaign will be planned in accordance with the waste prevention and management principles described in Table 9-3: Waste Prevention And Management Principles below.

Table 9-3: Waste prevention and management principles

Principle	Rules to be implemented
Minimisation of waste generated	<ul style="list-style-type: none"> In the Project supply policy, select the equipment and supplies that generate the least waste (by minimizing packaging) wherever practicable. Select the equipment and supplies that generate the least hazardous waste, wherever practicable.
Storage security	<ul style="list-style-type: none"> The waste will be handled and stored according to its nature and its risk class, in compliance with hygiene and safety rules. A waste storage area will be defined on the seismic vessel. Compatible wastes will be stored together. All hazardous wastes will be retained and stored separately. The area will be adequately ventilated if the waste is flammable. Access to waste storage areas will be controlled. The waste storage areas will be kept in good order and clean.
Waste management hierarchy	<p>Waste will be managed by applying the following order of priority:</p> <ul style="list-style-type: none"> Avoid generating waste. Minimise the generation of waste. Reuse waste (especially for reusable non-hazardous waste). Recycle waste. Onboard treatment and incineration (when relevant and authorized). Dispose of waste in compliance with applicable regulations and rules of good practice.
Recording and monitoring of waste generated	<ul style="list-style-type: none"> A register of the waste generated will be kept up to date in order to identify the nature and quantity of the waste generated, ensure its traceability, and identify if possible, the types of wastes that can be avoided. This register will include monitoring of waste transported to shore and its disposal, specifying the service providers mandated for its management and the agreed disposal method. The transfer and waste disposal forms/certificates will be kept for traceability.

Principle	Rules to be implemented
Staff training	<p>The workforce will be trained in:</p> <ul style="list-style-type: none"> • Waste management. • Protection of the environment and the impacts associated with poor waste management, and how to avoid these impacts. • Promoting the reuse and recycling of waste. • Treatment of waste in accordance with the management plan by type and risk class. • Adopting the necessary safety measures when handling hazardous waste. • Maintaining traceability records.

Compliance with International Conventions

All vessels will have equipment, systems and protocols in place for prevention of pollution by oil, sewage and garbage in accordance with the MARPOL convention. MARPOL 73/78 was developed by the IMO with an objective to minimise pollution of the oceans and seas, including dumping, oil and air pollution.

Specific MARPOL requirements are included in the detailed Environmental and Social Mitigation Management Commitment Register (see Section 9.10).

Management of discharges and emissions

The Waste Management Plan will also provide for the management of discharges linked to operational activities. The plan will include procedures that comply with national regulations and international good practice guidelines. The plan will include the following:

- Identification and characterisation of discharges and emissions.
- Identification of qualitative and quantitative treatment objectives for discharges and emissions.
- Identification of responsibilities for the measurement, recording and reporting of discharge / emission characteristics.
- Identification of resources, tools and methods to be used to measure, record and report discharges and emissions.
- Identification of the means (equipment and procedures) used to treat these discharges and emissions in accordance with the defined limits.

9.3.7.3 Stakeholder Engagement Procedure

Objectives

This procedure, prepared by CGG in collaboration with the contractor, will provide the framework to ensure effective engagement with external stakeholders and detail the planning for information disclosure, stakeholder engagements and management of expectations / grievances. It will ensure that the appropriate stakeholders are notified timeously about the project activities and their concerns and grievances are responded to and addressed in an efficient and coordinated manner.

This procedure will set out the specific measures to be taken to ensure the project is communicated to stakeholders and to minimise the potential negative impacts of the Project on human and socio-economic receptors. These potential impacts are linked to the presence of the project vessels and the safe operational zone around the survey vessel and seismic array. Specific measures to be taken include the following:

- A public information and disclosure programme covering CGG's exploration activities in the Algoa, Gamtoos and Outeniqua Basins; and
- Establishment of a functional grievance mechanism that allows stakeholders to lodge specific grievances related to operations.

Stakeholder Database

A stakeholder database will be developed and maintained. At a minimum, the database will contain the contact details of:

- Any person that submitted a request to be included in the database at any time;
- Any person that has submitted written comments or attended any public meetings; and
- All organs of state which have jurisdiction in respect of the Project.

Notifications

Notifications will be distributed to key stakeholders before and during the survey.

The notifications will provide the details and timing of the survey, including:

- Initial survey notification to key stakeholders (including local authorities, the key fishing associations and civil society) prior to survey commencement.
- Notification during the survey via:
 - Radio navigational warnings via Navigational Telex (Navtext) for the duration of the activity.
 - A daily survey schedule (look-ahead) which is circulated to key fishing associations for the duration of the survey.

Monitoring of and engaging with other vessels

At least one escort vessel (or "chase boat") will support the survey. The escort vessel will be equipped with appropriate radar and communications to patrol the area during the seismic survey to ensure that other vessels adhere to the safe operational limits. This vessel would assist in alerting other vessels (e.g. fishing, transport, etc.) about the survey and the lack of manoeuvrability of the survey vessel.

At a minimum, one FLO (speaking English and Afrikaans) will be on board the escort vessel to facilitate communication in the local language with the fishing vessels that are in the area. The responsibilities of the FLO are defined in Section 9.4.5.

Concerns and Grievances Management

For projects with potential environmental and social impacts, concerns¹² and grievances¹³ are a common occurrence. Procedures will be put in place by the contractor, in consultation with CGG, to deal with concerns and grievances and will be implemented during operations throughout the life of the project. A concern and grievance mechanism will be scaled to fit the level of risks and impacts of the project. Due to the distance of the proposed project offshore, the key stakeholder from which concerns and grievances could be anticipated are the commercial fishing sectors operating beyond the 500 m depth contour within the proposed survey area.

The grievance procedure will be underpinned by the following principles and commitments:

- Disseminate key information to directly impacted and interested stakeholders;

¹² A "concern" is a matter of interest or importance to someone.

¹³ A "grievance" is an official statement of a complaint over something believed to be wrong or unfair.

- Seek to resolve all grievances timeously; and
- Maintain full written records of each grievance case and the associated process of resolution and outcome.

The process will manage stakeholder concerns and grievances related to negative or perceived negative impacts caused by project related activities, including contractor activities. This consists of:

- Receiving and registering concerns / grievances;
- Acknowledgement of concerns / grievances received and informing stakeholders about the follow-up actions; and
- Following internal investigation, as necessary, proposing settlement of concerns / grievances in collaboration with the stakeholders.

Monitoring and reporting to ensure the traceability of the entire process and analysing the process to identify improvements to be put in place will form part of the grievance management. As such, a grievance form and templates for acknowledgement and acceptance will be developed and made available and a register of all grievances will be kept by the contractor and shared with CGG on a regular basis.

Stakeholders will be informed about the existence of the grievance mechanism.

9.3.7.4 Preventive Maintenance Plan

A Preventive Maintenance Plan will be implemented on board all project vessels in order to minimise the risk of mechanical failure likely to lead to reduced efficiency (e.g. sewage treatment plan, incinerator, macerator/grinder, oil/water separator, etc.) and other unplanned events (e.g. oil leaks or diesel spills, lifting and survey equipment, etc.). Control and maintenance procedures will be implemented at regular intervals by the various service providers.

This plan will provide for the implementation of leak detection and maintenance programmes for:

- valves, flanges, fittings, seals, hydraulic systems, hoses, etc.;
- all diesel motors and generators in order to minimise soot and unburnt diesel released to the atmosphere; and
- waste treatment facilities, e.g. sewage treatment plant, incinerator, macerator/grinder, etc.

This plan will also detail the procedure to follow if certain facilities (e.g. oil/water separator) are not available due to maintenance or overload.

This plan will also ensure that all equipment (e.g. arrays, streamers, tail buoys, etc.) that has been used in other regions is thoroughly cleaned prior to deployment.

9.3.7.5 Shipboard Oil Pollution Emergency Plan (SOPEP)

Before mobilisation to site, the seismic contractor will submit for approval to CGG and SAMSA a SOPEP and procedures to be implemented in the event of an accidental spill of oil (or other polluting substances) at sea.

This plan will notably require:

- the implementation of measures to immediately stop the spill (sealing the leak, repairing leaking tanks, etc.);
- recovery of spilled fluids;
- notification to CGG and the South African authorities of the spill; and
- implementation of external response measures in the event of a large spill.

Any oil or chemical spills in water must be reported immediately to CGG and regular updates must be sent during pollution clean-up operations.

The plan will include procedures in line with international good practice for the accidental release of chemicals and fuels during seismic activities. The plan will include the following:

- definition of roles and responsibilities;
- identification of potential sources of accidental pollution (storage, use, etc.);
- definition of design standards adopted to ensure the integrity and reliability of the equipment;
- description of the security systems in place to prevent pollution;
- inspection reports for the proper maintenance of safety equipment and systems; and
- procedures for handling chemicals and fuels to reduce the risk of accidental pollution (also refer to Section 9.3.7.8 for the Chemical Management Plan).

9.3.7.6 Emergency Response Plan (ERP)

A site-specific ERP is compiled by the contractor in line with the overarching CGG ERP. The ERP will establish the procedures for addressing potential emergency situations (e.g. fuel / oil spill, injury, damage to or loss of company / private property or equipment, etc.) that could occur during the project at the various project sites. The ERP addresses these situations and provides information and direction for addressing the situation as quickly as possible.

The ERP will classify emergencies into severity levels and include emergency procedures that address the potential degrees of disruptions to the Project.

- A low-level emergency (accident or incident) is one that can be handled at the site and involves no serious injuries, no disruptions of operations and no publicity. There are no national or international implications.
- A moderate-level emergency (emergency) may involve a single serious injury, temporary disruption of operations, some publicity or the likelihood thereof, with possible implications at the national level.
- A high-level emergency (crisis) would involve one or more fatalities or multiple serious injuries, sustained disruption of operations, significant publicity or the certainty thereof, plus implications at the national and possibly international level. There might be a potential threat to the viability of a company.

9.3.7.7 Ballast Water Management Procedure

Ballast water discharge will follow the requirements of the IMO 2004 International Convention for the Control and Management of Ships' Ballast Water and Sediments. All ships engaged in international traffic are required to manage their ballast water to a certain standard, according to a ship-specific Ballast Water Management Procedure. This deals with the ballast water management system on each of the project vessels, including how it operates and procedures for monitoring and reporting, including a ballast log book.

9.3.7.8 Chemical Management Plan

A Chemical Management Plan will be developed by the contractor to detail the measures to minimise potential pollution. The plan will be applied to all phases of the Project and will include all hazardous products used during the Project. The Chemical Management Plan is based on the principles of life cycle assessment. A standard plan will include:

- Inventory of chemical products (identification, classification, quantification and method of delivery);
- Product properties (dangerousness, toxicity, health and safety recommendations) based on product safety sheets (Safety data sheets, eco-toxicological data);
- Evaluation of the use of alternative products;
- Storage and handling procedures including personal protective equipment for personnel;
- Emergency procedures;
- Evaluation of recycling possibilities; and
- Disposal procedures for unused products (return to the supplier for example).

9.3.7.9 Corrective Action Plan

Incidents and non-compliances identified as part of the audit findings (see Section 9.6.2) will undergo a root cause analysis to identify underlying causes to non-compliance events. Management actions will be taken to correct the underlying causes behind the audit findings and improvements will be made before another audit is conducted. This audit process allows for problems to be corrected, compliance to be improved and prevention of the same findings during subsequent audits.

Where corrective actions are deemed necessary, specific measures will be developed, with designated responsibility and timing, and implemented. In this way, continuous improvement in performance will be achieved. Corrective actions will be captured in a Corrective Action Plan, which will document the actions to correct an issue, problem, non-compliance or underperformance. It is essentially a plan to improve performance and/or reduce risk.

9.4 ROLES AND RESPONSIBILITIES

The project will have dedicated competent personnel that will manage and oversee the HSSE aspects over the project lifecycle. The Reconnaissance Permit holder will retain the primary responsibility for meeting environmental and social commitments throughout the project life span.

The key HSSE management roles and responsibilities supported by a project specific organogram will be defined by the seismic contractor and validated by the permit holder prior to the commencement of any exploration activities.

9.4.1 CGG

CGG will be responsible for the overall implementation of the EMP and meeting the environmental and social commitments. CGG will have the following key responsibilities:

- Develop the survey design for the Tender Document(s), which will include this EMP;
- Selecting the preferred contractor and ensuring that the EMP forms part of the contract for all survey contractors;
- Ensuring the seismic contractor implements the EMP and any additional approval conditions contained in the EMP approval and Reconnaissance Permit issued by PASA and DMRE;
- Ensuring that environmental audits are undertaken to measure compliance with the agreed environmental performance objectives;
- Ensuring that environmental monitoring and reporting are undertaken by the contractors (including seismic and support vessels);
- Engaging with PASA, DMRE, DFFE and relevant stakeholders when necessary at key stages of the project;

- Coordinating with the contractor to ensure that key stakeholders are timely informed about the project activities and that concerns and questions are responded to and grievances are managed properly; and
- When considered necessary and possible (e.g. space on vessel, COVID-19 restrictions, etc.), appoint a CGG representative onboard the seismic vessel for all or part of the survey duration to ensure compliance with the various commitments and supervise seismic contractor coordination especially with MMO, PAM and FLO personnel.

9.4.2 Seismic Contractor

The seismic contractor shall be appointed by CGG. The contractor shall have overall responsibility for the seismic activities and the management of any sub-contractors. All obligations endorsed by CGG shall apply to the contractor and any sub-contractors. CGG shall inform the Contractor/s of these obligations.

The contractor shall:

- Be responsible for and convey the requirements of the EMP to all staff and any sub-contractors (including MMOs, PAM operators, FLOs and other subcontractors, e.g. support vessels, helicopter, emergency support, catering, etc.), and ensure that they comply with their obligations.
- Ensure that sufficient resources are deployed in order to efficiently implement this EMP.
- Ensure that all staff are given an Environmental and Social Induction and that further training is undertaken at crew changes.
- Establish and maintain a functional grievance mechanism that allows stakeholders to submit specific grievances related to operations, by ensuring they are informed about the process and that resources are mobilized to manage the resolution of all grievances.

The contractor shall be responsible for ensuring the health and safety of all personnel on the project vessels.

9.4.3 Marine Mammal Observers (MMOs)

As a minimum, the MMOs must have the following qualifications/experience:

- Experience in seabird, turtle, large pelagic fish and marine mammal identification and observation techniques;
- Certification from the Joint Nature Conservation Committee (JNCC) or an equivalent body, e.g. Bureau of Ocean Energy Management (BOEM);
- The lead MMO should have an appropriate graduate degree and relevant seafaring experience;
- Safety certificate (BOSIET or equivalent); and
- Medical certificate (OGUK, ENG1 or equivalent).

The MMO shall have the following responsibilities during survey operations:

- Provide effective regular briefings to crew members, and establish clear lines of communication and procedures for onboard operations;
- Record airgun activities, including sound levels, “soft-start” procedures and pre-firing regimes;
- Observe and record responses of marine fauna to seismic shooting from optimum vantage points, including seabird, large pelagic fish (e.g. shoaling tuna, sunfish, sharks), turtle, seal and cetacean incidence and behaviour and any mortality or injuries of marine fauna as a result of the seismic survey. Data captured should include species identification, position (latitude/longitude), distance/bearing from the vessel, swimming speed and direction (if applicable) and any obvious changes in behaviour (e.g. startle

responses or changes in surfacing/diving frequencies, breathing patterns) as a result of the seismic activities. Both the identification and the behaviour of the animals must be recorded accurately along with current seismic sound levels. Any attraction of predatory seabirds, large pelagic fish or cetaceans (by mass disorientation or stunning of fish as a result of seismic survey activities) and incidents of feeding behaviour among the hydrophone streamers should also be recorded;

- Record sightings of any injured or dead marine mammals, large pelagic fish (e.g. sharks), seabirds and sea turtles, regardless of whether the injury or death was caused by the seismic vessel itself. If the injury or death was caused by a collision with the seismic vessel, the date and location (latitude/longitude) of the strike, and the species identification or a description of the animal should be recorded and included as part of the daily report;
- Record meteorological conditions at the beginning and end of the observation period, and whenever the weather conditions change significantly;
- Request the delay of start-up or temporary termination of the seismic survey or adjusting of seismic shooting, as appropriate. It is important that MMO decisions on the termination of firing are made confidently and expediently, and following dialogue between the observers on duty at the time. A log of all termination decisions must be kept (for inclusion in both daily and “close-out” reports);
- Use a recording spreadsheet (e.g. JNCC, 2017) in order to record all the above observations and decisions;
- Prepare daily reports of all observations, to be forwarded to the necessary authorities on a daily or weekly basis to ensure compliance with the mitigation measures; and
- Prepare a survey close-out report summarising the findings of the MMO observations with the records database appended.

9.4.4 PAM Operators

As a minimum, the PAM operators must have the following qualifications/experience:

- Experience in marine mammal detection and identification techniques;
- Experience in appropriate deployment of PAM equipment;
- Certification from JNCC or an equivalent body (e.g. BOEM);
- The lead PAM operator should have an appropriate training certificate and relevant seafaring experience;
- Safety certificate (BOSIET or equivalent); and
- Medical certificate (OGUK, ENG1 or equivalent).

The PAM operator will have the following responsibilities during survey operations:

- Provide effective regular briefings to crew members, and establish clear lines of communication and procedures for onboard operations;
- Ensure that the PAM hydrophone cable is optimally placed, deployed, tested and repaired / replaced (when necessary) for acoustic detections of marine mammals;
- Recording all airgun activities, including timeline log, sound levels, “soft-start” procedures and pre-firing regimes.
- Confirm that there is no marine mammal activity within 500 m of the airgun array prior to commencing with “soft-start” procedures;
- Record species identification, position (latitude/longitude), distance and bearing from the vessel and acoustic source, where possible;
- Record general environmental conditions; and

- Request the delay of start-up and temporary shut-down of the seismic survey, as appropriate.

9.4.5 Fisheries Liaison Officer (FLO)

The FLOs must, at a minimum, be able to speak English and Afrikaans and must be familiar with fisheries operations in the survey area. The FLO will have the following responsibilities during survey operations:

- Facilitate communication with fishing vessels in the area;
- Provide effective regular briefings to crew members, and establish clear lines of communication and procedures for onboard operations;
- For the duration of the survey, circulate a daily survey schedule (look-ahead), via email, to the interested stakeholders (maritime authorities and key fishing associations);
- Record and respond to stakeholder concerns and questions, receive grievances and follow-up on the resolution process in coordination with the HSE representative and CGG representative;
- Relay information about the survey, safety zone and lack of manoeuvrability of the survey vessel to fishing and other maritime vessels via appropriate lines of communication; and
- Keep a log of all incidents and communications with fishing and other maritime vessels.

9.5 TRAINING, AWARENESS AND COMPETENCY

CGG will, at the Kick-Off meeting, highlight the seismic contractor's responsibility in terms of identifying, planning, monitoring and recording the training needs of personnel whose work may have a significant adverse impact upon safety, the environment and in the community. Employees at all levels will be made aware of the potential impacts of their activities, and the roles and responsibilities in achieving conformance with the internal policy and procedures.

The personnel with responsibilities in specific HSSE practices will be adequately trained to ensure effective implementation of the works instructions and procedures for which they have responsibilities. This training will include awareness and competency with respect to the following:

- General awareness relating to seismic surveying activities, including environmental and social impacts that could potentially arise from project activities.
- Legal requirements in relation to safety and environmental performance.
- Necessity of conforming to the requirements of the Reconnaissance Permit and EMP, including reporting requirements (i.e. such as incident reporting).
- Activity-specific training (i.e. waste management practices, grievance management).
- Roles and responsibilities to achieve compliance, including change management and emergency response.

Training will take cognisance of the level of education, designation and language preferences of the personnel.

The appointed contractor (and any sub-contractors) will also be required to institute training programmes for its personnel. Each contractor will be responsible for site HSSE awareness training for personnel working on the project and for identification of any additional training requirements to maintain required competency levels. The contractor training programme will be subject to approval by the operator and it will be audited to ensure that:

- Training programmes are adequate;
- All personnel requiring training have been trained; and
- Competency is being verified.

9.6 COMPLIANCE VERIFICATION AND CORRECTIVE ACTIONS

Monitoring and auditing will be undertaken to confirm appropriate implementation of the EMP, as well as the effectiveness of mitigation measures. Corrective actions include those intended to improve performance, non-compliances and non-conformances.

9.6.1 Monitoring

Monitoring will be conducted to ensure compliance with regulatory requirements and the performance objectives specified in the EMP, as well as to evaluate the effectiveness of operational controls and mitigation measures. The main objectives of the monitoring programme include:

- Gathering, recording and analysing data required for regulatory and EMP purposes.
- Verifying the predictions and conclusions made in the EMP.
- Identifying changes in the physical, biological and social environment.
- Producing information to evaluate environmental performance specified in the EMP.
- Producing information about emergencies that require an immediate response.
- Obtaining information on the actual and potential environmental and social impacts of exploration activities.
- Using monitoring results as a source of information and as grounds for decision making regarding the design of new mitigation measures.
- Describing whether and to what extent discharges from exploration activities have had impacts on the marine environment.

Monitoring will include, but not limited to, those criteria listed in Table 9-4.

Table 9-4: Monitoring Requirements for Seismic Surveys

No.	Risk	Associated Plans and Procedures	Criteria to be monitored	Inspections	Accountability (indicative)
M1	Waste and Discharge Management Plan				
M1-1	Galley waste and air emissions	Waste and Discharge Management Plan	<ul style="list-style-type: none"> Type and volume discharged/incinerated Estimation of air emissions from incineration 	Recorded daily in the operational log inspection	Contractor (Vessel Captain)
M1-2	General waste	Waste and Discharge Management Plan	<ul style="list-style-type: none"> Type and volume of waste generated Type and volume transferred for onshore disposal/incinerated Compliance with Waste Management Plan 	Prior to waste transfers to supply vessel / port	Contractor (Vessel Captain)
M1-3	Hazardous waste	Waste and Discharge Management Plan	<ul style="list-style-type: none"> Volume of waste generated Volume transferred for onshore disposal Compliance with Waste Management Plan 	Prior to waste transfers to supply vessel / port	Contractor (Vessel Captain)
M1-4	Fuel usage and air emissions	Waste and Discharge Management Plan	<ul style="list-style-type: none"> Type and volume on board Volume consumed Air emissions from fuel combustion 	Daily operational log inspection Fuel transfer log sheet	Contractor (Vessel Captain / Pilot)
M1-5	Sewage	Waste and Discharge Management Plan	<ul style="list-style-type: none"> Discharge volumes Residual chlorine concentration 	Recorded daily in the operational log inspection	Contractor (Vessel Captain)
M2	Preventive Maintenance Plan				
M2-1	Deck drainage/ machinery space/ bilge water	Preventive Maintenance Plan	<ul style="list-style-type: none"> Correct operation of oil separating/filtering equipment and oil content meter (compliance with MARPOL 73/78 standards) 	Prior to surveying and once during campaign	Contractor (Vessel Captain)
M2-2	Sewage discharge	Preventive Maintenance Plan	<ul style="list-style-type: none"> Correct operation of sewage treatment system (compliance with MARPOL 73/78 standards) 	At start and once during campaign	Contractor (Vessel Captain)
M2-3	Galley waste and air emissions	Preventive Maintenance Plan	<ul style="list-style-type: none"> Correct operation of macerator 	At start and once during campaign	Contractor (Vessel Captain)
M3	Marine Fauna Management Plan				
M3-1	Fauna interaction	Marine Fauna Management Plan	<ul style="list-style-type: none"> Presence of marine mammal activity within 500 m of the vessel prior to commencing with the "soft-start" procedures (visually during the day) 	Daily throughout operations	Marine Mammal Observer (MMO)

No.	Risk	Associated Plans and Procedures	Criteria to be monitored	Inspections	Accountability (indicative)
			<ul style="list-style-type: none"> Responses of marine fauna to seismic shooting, including seabird, fish (e.g. sharks, schooling tuna, sunfish), turtle, seal and cetacean incidence and behaviour and any mortality of marine fauna as a result of the seismic survey. Data captured should include species identification, position (latitude/longitude), distance/bearing from the vessel, swimming speed and direction (if applicable) and any obvious changes in behaviour (e.g. startle responses or changes in surfacing/diving frequencies, breathing patterns) as a result of the seismic activities A log of all seismic activity and shut-down decisions 		
M3-2			<ul style="list-style-type: none"> Presence of marine mammal activity within 500 m prior to commencing with the “soft-start” procedures Species, position (latitude/longitude) and distance from the vessel, where possible A log of all seismic activity and shut-down decisions 	Daily throughout operations	Passive Acoustic Monitoring (PAM) Operator
M4	Stakeholder Engagement Plan				
M4-1	Disruption/interference to fishing/shipping	Stakeholder Engagement Plan	<ul style="list-style-type: none"> Number of meetings/phone calls with interested stakeholders Interactions with other vessels (via radio) Number of grievances/incidents logged Regular reporting and documentation 	Continuous throughout operations	FLO

No.	Risk	Associated Plans and Procedures	Criteria to be monitored	Inspections	Accountability (indicative)
M5	Emergency Management Plan				
M5-1	Faunal strikes	Emergency Management Plan Marine Fauna Management Plan	<ul style="list-style-type: none"> Vessel transit speed between the survey area and port – maximum 12 knots (22 km/hr), except within 25 km of the coast where it is reduced further to 10 knots (18 km/hr). 	Continuous during transit	Contractor (Vessel Captain and MMO)
M5-2	Lost equipment	Emergency Management Plan	<ul style="list-style-type: none"> Establish a hazards database listing: <ul style="list-style-type: none"> the type of gear left on the seabed date of abandonment/loss location; and where applicable, the dates of retrieval 	Ongoing through daily operational log and incident reporting system	Contractor (Vessel Captain) and MMO
M5-3	Oil / fuel spill	Emergency Management Plan SOPEP	<ul style="list-style-type: none"> Record of all spills (Spill Record Book), including spill reports; emergency exercise reports; contacts update, audit reports 	Ongoing through daily operational log and incident reporting system	Contractor (Vessel Captain)
M6	Ballast Water Management Plan				
M6-1	Ballast water	Ballast Water Management Plan	<ul style="list-style-type: none"> Volume discharged and location (start and finish coordinates) Start and finish times for pumping water during an exchange Actual pumping times Residual volume remaining in the tank at the end the empty cycle prior to refill (empty refill method only) 	After de-ballasting	Contractor (Vessel Captain)
M7	Chemical Management Plan				
M7-1	Chemicals and hazardous materials		<ul style="list-style-type: none"> Volume stored Volume consumed 	Routine operational inspection of the: <ul style="list-style-type: none"> Storage area Management and transfer procedures Log sheet update 	Contractors (Vessel Captain)
M7-2	Accidental oil and chemical spills	Chemical Management Plan	<ul style="list-style-type: none"> Type Volume 	Ongoing through daily operational log and incident reporting system	Contractor (Vessel Captain)

9.6.2 Auditing

Contractors will be required to conduct routine internal HSSE inspections to monitor compliance and implement conditions stipulated in this EMP. The results of the inspection and monitoring activities will be reported to the operator.

Beyond the routine inspection and monitoring activities conducted by the seismic contractor, formal audits will be carried out internally by CGG's on-board HSSE representative to ensure compliance with the EMP and its own HSSE standards and policies. The audit data will include the contractor's monitoring and inspection records.

The audit will include amongst other things, checking:

- Completeness of HSSE documentation, including planning documents and inspection records.
- Conformance with monitoring requirements.
- Efficacy of activities to address any non-conformance with monitoring requirements.
- Training activities and record keeping.

Findings will be documented in audit reports, which will be submitted to the relevant Department Managers for action and follow-up.

9.1.1.1 Audit methodology

An audit methodology, programme and protocol will be developed for the internal audits and the external EMP close-out compliance audits. These audits are an integral part of the implementation of the EMP and audit findings can be used as a basis to measure compliance and confirm the efficacy and efficiency of the mitigation measures. The proposed approach to auditing consists of four basic steps:

- Planning the audit.
- Conducting the audit.
- Producing audit findings (measuring compliance and identifying problems).
- Reporting audit findings for management action.

A four-level rating scale is proposed to assess the performance of the EMP against each individual element. Elements are rated individually as "full compliance", "partial compliance", "non-compliance" or "not applicable" as per the Table 9-5: Audit Rating Scale below.

Table 9-5: Audit Rating Scale

Full compliance	All of the requirements of the EMP element have been fulfilled. Element has been documented and monitored and upon verification is found to be fully implemented.
Partial compliance	Only certain of the key requirements have been fulfilled and a plan is in place to progress to full compliance. Element has been documented and monitored but not consistently or completely implemented.
Non-compliance	The requirements of the EMP have not been fulfilled. No evidence or incomplete evidence of compliance.
Not applicable	The EMP elements are not applicable.

9.6.3 Corrective Actions

CGG and the contractor's HSSE staff will implement a formal non-compliance and corrective action tracking procedure for investigating cause and identifying corrective actions in response to accidents, HSSE and/or social non-compliances.

Audit findings will undergo a root cause analysis to identify underlying causes to non-compliance events. Management actions will be taken to correct the underlying causes behind the audit findings and improvements will be made before another audit is conducted. This audit process allows for problems to be corrected, compliance to be improved and prevention of the same findings during subsequent audits.

Where corrective actions are deemed necessary, specific measures will be developed in a Corrective Action Plan, with designated responsibility and timing, and implemented. In this way, continuous improvement in performance will be achieved.

CGG and the contractor's HSSE staff will be responsible for keeping records of corrective actions and for overseeing the modification of environmental or social protection procedures and/or training programmes to avoid repetition of non-conformances and non-compliances.

9.7 MANAGEMENT OF CHANGE

The development and implementation of the EMP is an ongoing process that is iterative in nature. This document must thus be seen as a 'living' document and amendments may need to be implemented during the course of the project. Typical changes that can affect the EMP include:

- A material project design change that occurs after the EMP has been compiled and approved.
- Changes in the feasibility/availability of specific mitigation measures.
- Personnel changes and/or planning on the project.
- Equipment failure during the survey.

Certain aspects of this document may be further expanded/made more specific during the detailed design stage to ensure, firstly, that it includes all conditions of approval and, secondly, that it addresses all impacts related to the detailed design.

It may also need to be amended if audit findings indicate:

- insufficient mitigation of environmental impacts associated with the undertaking of the activity; or
- insufficient levels of compliance with the permit conditions or EMP.

These changes will be subject to a management of change procedure.

Where use of the EMP results in suggestions for revisions or updates, these should be directed to the HSE Department. Any significant revisions to the EMP document must be approved by DMRE before the revised EMP is implemented. As per EIA Regulation 36, amendments to Management Actions specified in an EMP may be effected immediately and communicated to the DMRE later. Amendments to Management Outcomes of an EMP may only be effected on application to the DMRE. When the EMP is updated, the relevant responsible persons must be informed thereof.

9.8 COMMUNICATION

9.8.1 Internal Communication

Channels of communication will be established between CGG, the seismic contractor, MMOs, PAM operators, FLOs and external stakeholders. CGG will establish and implement procedures for internal communication between the various levels and functions of the project staff organisation.

9.8.2 Stakeholder Engagement

As noted in Section 9.3.7.3, the contractor will develop and implement a Stakeholder Engagement Procedure in coordination with CGG, providing the framework to guide the establishment of an effective engagement with external interested parties and detailing the plan for engagements, in accordance with local requirements. Notification documents, meetings and expressed concerns will be documented and recorded.

A grievance procedure will also be established and implemented by the contractors, and overseen by CGG to deal with concerns and grievances and shall be maintained throughout operations through to the end of project life (see Section 9.3.7.3).

9.9 DOCUMENT CONTROL AND REPORTING

9.9.1 Documentation

CGG will control HSE documentation, including project permits, approvals, management plans, associated procedures, checklists, forms and reports, through a formal procedure. The document control procedure will describe the processes that the project will employ for official communication of both hardcopy and electronic documents and the requirement for electronic filing, document tracking and version control numbers.

The contractor will be required to develop a system for maintaining and controlling its own HSSE documentation and describe these systems in their respective HSSE plans.

9.9.2 Incident Reporting

Following every HSE incidents, CGG will conduct an incident investigation and prepare a report detailing the events, root causes of the incident(s) and corrective and preventative measures implemented as a result. All incidents where local regulatory standards are exceeded will be reported to DFFE / PASA, as well as SAMSA for any spill-related incidents.

9.9.3 EMP Close-Out Compliance Report

CGG will submit an EMP close-out compliance report to the competent authority (PASA) at the end of the seismic campaign. Amongst other things, this report will outline the implementation of the mitigation measures and compliance levels with achieving the performance objectives as detailed in the EMP.

This report will be submitted to the competent authority within 60 days of the seismic survey completion.

9.10 ENVIRONMENTAL AND SOCIAL MITIGATION MANAGEMENT COMMITMENT REGISTER

Table 9-6 details the specific management commitments that will be implemented to avoid, minimise or manage significant potential negative impacts and optimise and maximise any potential benefits of the project.

This table is structured in the following manner so that the mitigation measures have a clear and logical context within which they are designed, implemented, monitored and evaluated:

- **Activities:** Activities are the operational activities that occur as a result of a project.
- **Aspect:** Environmental and social aspects are defined as ‘an element of an organisation’s activities, products or services that can interact with the natural and human environment’ e.g. atmospheric emissions, underwater noise levels or discharge of waste to sea.
- **Environmental and Social Performance Objectives / Impact Management Outcomes or Targets:** Every environmental and social management requirement must be translated into an objective, namely an outcome or target that is to be achieved. This is not to say that every requirement must be expressed as an objective, but requirements can be combined as appropriate into single objectives. If the outcome / target is met then the objective will have been deemed to be met, but if the target is not achieved then suitable corrective action must be defined and implemented so as to ensure that the performance is improved to the point that the target is met and the performance is sustained.
- **Associated Plan and Procedure:** The corresponding plan or procedure to which the commitment relates is listed in this column.
- **Mitigation / Management Actions:** A key component of the EIA process is to explore practical ways of avoiding or reducing potentially significant impacts of the proposed exploration programme. These are commonly referred to as mitigation measures and are incorporated into the project as part of the EMP. Mitigation is aimed at avoiding, minimising or managing potential negative impacts to as low as reasonably practicable (ALARP) and optimising and maximising any potential benefits of the proposed project.
- **Responsibility:** Defining who is responsible for the implementation, monitoring and recording of the mitigation measure.
- **Timing:** Timing refers to the schedule. The ‘timing’ can be specified in terms of a specific date or relative to other actions (i.e. before project mobilisation, or during seismic acquisition, as examples) or frequency.
- **Monitoring and Record Keeping:** Monitoring and record keeping requirements must be defined, whereby the organisation responsible for implementing the action/s is given a prescribed reporting mechanism, limited as far as possible to documents plans, correspondence, records, registers, etc.

Table 9-6: Environmental and Social Mitigation Management Commitment Register for seismic surveys

Project Activities	Aspect	Environmental and Social Performance Objectives / Impact Management Outcomes or Targets	Associated Plan and Procedure	Mitigation / Management Actions	Responsibility	Frequency / Timing	Monitoring and record keeping
1. PLANNING PHASE							
1.1 SEISMIC SURVEY SCHEDULING	Survey Planning	Avoidance of sensitive periods and protect marine fauna Minimise disturbance to marine fauna Minimise disturbance to other users of the sea	Survey Design	<ul style="list-style-type: none"> Plan seismic survey to avoid the periods of movement of migratory cetaceans (particularly baleen whales) from their southern feeding grounds into low latitude waters (June to November inclusive) and ensure that migration paths are not blocked by seismic operations. Thus, surveying should, therefore, be undertaken between December and May (inclusive). Coordinate survey design and timing with marine authorities (specifically managers of the DFFE fisheries research programme), taking into account their respective surveys and programmes in order to minimise or avoid disruptions to all parties, as well as other operators / permit holders, if required and as far as possible, to avoid potential cumulative noise impacts associated with more than one survey occurring at the same time in adjacent areas. As far as possible, plan the survey to avoid inshore fishing areas early in Summer, thus surveying inshore areas from March onwards. Avoid key fish spawning periods from September to December (inclusive) 	CGG, Seismic Contractor	Prior to finalising of survey schedule	MMO confirmation / report

Project Activities	Aspect	Environmental and Social Performance Objectives / Impact Management Outcomes or Targets	Associated Plan and Procedure	Mitigation / Management Actions	Responsibility	Frequency / Timing	Monitoring and record keeping
				<ul style="list-style-type: none"> Plan survey, as far as possible, so that the first commencement of airgun firing in the survey area (including gun tests) is undertaken during daylight hours. Prohibit the use of airguns outside the area of operation or in Marine Protected Areas. 	Seismic Contractor		
1.2 PREPARATION OF SUBSIDIARY PLANS	Planning and Management	Identification of all parties and their responsibilities documented and communicated	Emergency Response Plan SOPEP Waste and Discharges Management Plan	Ensure the following subsidiary plans are in place to deal with all emergencies: <ul style="list-style-type: none"> CGG's Emergency Procedures document and Medical Emergency Response Plan. Seismic Contractor Emergency Response Plan (including MEDIVAC plan). Shipboard Oil Pollution Emergency Plan (SOPEP) as required by MARPOL. Waste and Discharges Management Plan. Preventive Maintenance Plan. Chemical Management Plan. Corrective Action Plan. In addition to the above, ensure that: <ul style="list-style-type: none"> There is adequate protection and indemnity insurance cover for oil pollution incidents. Submit copies of all insurances to PASA and SAMSA (see Row 2.1). There is a record of the vessel's seaworthiness certificate and/or classification stamp. Submit copies of all certificates to PASA (see Row 2.1). A valid International Sewage Pollution Prevention Certificate, as required by vessel class. 	Seismic Contractor	30 days prior to commencement of operation	Copies of all plans and certificates Confirm compliance and justify any omissions

Project Activities	Aspect	Environmental and Social Performance Objectives / Impact Management Outcomes or Targets	Associated Plan and Procedure	Mitigation / Management Actions	Responsibility	Frequency / Timing	Monitoring and record keeping
				<ul style="list-style-type: none"> International Oil Pollution Prevention (IOPP) Certificate, as required by vessel class. 			
1.3 PREPARATION FOR SEISMIC ACQUISITION	Survey personnel for faunal and vessel monitoring	Minimise impact on and disturbance of marine fauna	Marine Faunal Management Procedure	<ul style="list-style-type: none"> Make provision for the placing of a qualified MMO on board the seismic vessel. As a minimum, one must be on watch during daylight hours for the pre-shoot observations and when the acoustic source is active. Make provision for placing of a qualified PAM operator on board the seismic vessel. As a minimum, one must be on "watch" during the pre-shoot observations and when the acoustic source is active. 	Seismic Contractor	Prior to commencement of operations	MMO / PAM monitoring (see Row M3-1 & M3-2 in Table 9-4)
		Minimum disruption to fishing operations and other users of the sea Clear liaison with fisheries and other users of the sea	Stakeholder Engagement Procedure	<ul style="list-style-type: none"> Make provision for placing an independent FLO on board the seismic/escort vessel. Establish a grievance mechanism to deal with concerns and grievances throughout operations through to the end of project life. 	Seismic Contractor		FLO monitoring (see Row M4-1 in Table 9-4) FLO log / report
	Survey equipment	Minimise impacts on cetaceans	Survey design	<ul style="list-style-type: none"> Provide PAM technology onboard the seismic vessel for use 24-hours a day. Ensure the PAM hydrophone streamer is fitted with at least four hydrophones, of which two are HF and two LF, to allow directional detection of cetaceans. Ensure sufficient spare PAM hydrophone streamers are readily available in the event that PAM breaks down, in order to ensure timeous redeployment. 	Seismic Contractor		PAM operator confirmation / report

Project Activities	Aspect	Environmental and Social Performance Objectives / Impact Management Outcomes or Targets	Associated Plan and Procedure	Mitigation / Management Actions	Responsibility	Frequency / Timing	Monitoring and record keeping
1.3 PREPARATION FOR SEISMIC ACQUISITION	Survey equipment	Minimise impacts on marine fauna	Survey design	<ul style="list-style-type: none"> Define the use of the lowest practicable airgun volume for production. Ensure a display screen for the acoustic source operations is provided to the marine observers. All information relating to the activation of the acoustic source and the power output levels must be readily available to support the independent observers in real time via the display screen and to ensure that operational capacity is not exceeded. 	Seismic Contractor	Prior to commencement of operations	MMO confirmation / report
		Minimise impacts on turtles from tail buoy strikes	Survey design	<ul style="list-style-type: none"> Use 'turtle-friendly' tail buoys. Alternatively, the existing tail buoys should be fitted with either exclusion or deflector 'turtle guards'. 			MMO confirmation / report
		Protect marine environment from contamination from streamer breaks Minimise risk of spills or leaks	Survey design	<ul style="list-style-type: none"> A solid seismic streamer rather than fluid-filled streamer is to be used. Alternatively, a low toxicity fluid-filled streamer could be used. 			MMO confirmation / report
	Identification and appointment of suppliers	Ensure fair, transparent and reasonable preferential contracting of local companies	Local Employment and Supply chain management procedure	Apply fair, transparent and reasonable preferential contracting of local companies to maximise local benefits.	Seismic Contractor	During contracting	Contracts
				Include as a condition of contracting that any non-local service providers will apply reasonable preferential sub-contracting of local companies.			

Project Activities	Aspect	Environmental and Social Performance Objectives / Impact Management Outcomes or Targets	Associated Plan and Procedure	Mitigation / Management Actions	Responsibility	Frequency / Timing	Monitoring and record keeping
2. MOBILISATION PHASE							
2.1 STAKEHOLDER CONSULTATION AND NOTIFICATION	Interaction, engagement & communication with national authorities and key stakeholders	Inform Minister of Mines Energy about the commencement of the project	Stakeholder Engagement Procedure	<p>Compile the survey details into a notification document and submit to PASA. The notification should provide, <i>inter alia</i>, the details on the following:</p> <ul style="list-style-type: none"> Survey programme (timing, co-ordinates and duration). Contractor details. Survey vessel specifications (including relevant certification and insurance). 	CGG, Seismic Contractor	Notification to be submitted 30 days prior to survey commencement	Correspondence to PASA
		<p>Ensure that other users of the sea are aware of the survey and navigational safety and parties are aware of the mechanism to follow for raising concerns</p> <p>Minimise disruption to the survey and other users of the sea</p>	Stakeholder Engagement Procedure	<p>Notify key stakeholders of the navigational co-ordinates of the operational area (inclusive of the acquisition area, run-ins and vessel turning circles), timing and duration of the activities, and implications of the safety clearance requirements. The following stakeholders shall be notified:</p> <ul style="list-style-type: none"> Fishing industry / associations: SA Tuna Association, SA Tuna Longline Association, Fresh Tuna Exporters Association, South African Deep Sea Trawling Industry Association (SADSTIA), South African Hake Longline Association (SAHLLA), South Coast Inshore Trawl Fishing Industry Association (SECIFA), South Coast Rock Lobster Association, South African Squid Management Industrial Association (SASMIA), South African Pelagic Fishing Industry Association (SAPFIA), South African Midwater Trawling Association, South African Linefish Associations (various) and South African Mane Line Fish Management Association (SAMLMA). 	CGG, Seismic Contractor	3 weeks prior to commencement of operations	Provide copies of all correspondence and list of those to whom it was sent

Project Activities	Aspect	Environmental and Social Performance Objectives / Impact Management Outcomes or Targets	Associated Plan and Procedure	Mitigation / Management Actions	Responsibility	Frequency / Timing	Monitoring and record keeping
2.1 STAKEHOLDER CONSULTATION AND NOTIFICATION	Interaction, engagement & communication with national authorities and key stakeholders	Ensure that other users of the sea are aware of the survey and navigational safety and parties are aware of the mechanism to follow for raising concerns Minimise disruption to the survey and other users of the sea	Stakeholder Engagement Procedure	<ul style="list-style-type: none"> Government departments with jurisdiction over marine activities: DFFE: Oceans and Coasts and PASA. DFFE Vessel Monitoring, Control and Surveillance Unit. South African Maritime Safety Association (SAMSA). South African Navy Hydrographic Office (HydroSAN). Transnet National Ports Authority (TNPA) and Port Captains. 	CGG, Seismic Contractor	3 weeks prior to commencement of operations	Provide copies of all correspondence and list of those to whom it was sent
				Request, in writing, the SAN Hydrographic Office (Silvermine) to broadcast a navigational warning via Navigational Telex (Navtext) for the duration of the survey activities.	Seismic Contractor	7 days prior to commencement of operations	Confirm that request was sent to the SAN Hydrographer
				Maintain a functional grievance mechanism / procedure for recording any complaints or comments received from the public prior to and during the seismic campaign. Include resources to permit the investigation, resolution and close-out of all grievances.	CGG, Seismic Contractor	Throughout the survey campaign	Grievance monitoring (see Row M4-1 in Table 9-4) Copy of grievance register and responses

Project Activities	Aspect	Environmental and Social Performance Objectives / Impact Management Outcomes or Targets	Associated Plan and Procedure	Mitigation / Management Actions	Responsibility	Frequency / Timing	Monitoring and record keeping
2.2 MOBILISATION OF PROJECT STAFF	Training and allocation of responsibilities	Project staff have the capability and competence to achieve the EMP objectives and know what the EMP environmental requirements are All staff receive HSE training as part of their HSE induction, refresher training and an ongoing awareness and behaviour system	Environmental and Social awareness	<ul style="list-style-type: none"> Ensure that a copy of the EMP is supplied to the contractor and sub-contractors and is in on board all project vessels during the operation. 	CGG	At survey commencement meeting and before new staff commence with work on the project	Acknowledgement of Receipt
				<ul style="list-style-type: none"> Undertake HSE Awareness Training, including induction training to ensure the project personnel (including seismic and support vessels, MMO, PAM operator, FLO) are appropriately informed of the purpose and requirements of the EMP, including emergency procedures, spill management, etc. 	CGG, Seismic Contractor	At survey commencement meeting (Kick-off Meeting) and before new staff commence with work on the project	Copy of attendance register and training records
				<ul style="list-style-type: none"> Ensure that EMP responsibilities are clearly defined in Job Descriptions of relevant staff. 			
				<ul style="list-style-type: none"> Establish training and exercise programmes to ensure that the response activities can be effectively executed. 			
				<ul style="list-style-type: none"> Ensure that MMOs and PAM operators are briefed on the area-specific sensitivities and on the seismic survey planning (including roles and responsibilities, and lines of communication). Ensure FLOs are briefed on their role regarding stakeholder engagement and grievance management. 			

Project Activities	Aspect	Environmental and Social Performance Objectives / Impact Management Outcomes or Targets	Associated Plan and Procedure	Mitigation / Management Actions	Responsibility	Frequency / Timing	Monitoring and record keeping
2.3 AIR POLLUTION CONTROL DURING TRANSIT TO SURVEY AREA	Emissions to the atmosphere during operation	Reduce amount of diesel burned and emissions to the air	Waste and Discharges Management Plan	Use a low sulphur fuel that has a maximum sulphur content as specified by MARPOL.	Contractors	Throughout mobilisation	Fuel consumption monitoring (see Row M1-4 in Table 9-4)
			Waste and Discharges Management Plan	Ensure no incineration of waste occurs within the port limits.			Inventory of volume and type of fuel used
			Maintenance and Discharges Management Plan	Implement a maintenance plan to ensure all diesel motors and generators receive adequate maintenance to minimise soot and unburnt diesel released to the atmosphere.			Incineration monitoring (see Row M1-1 & 1-2 in Table 9-4)
							Inventory of volume of waste discharged and discharge location
							Maintenance records

Project Activities	Aspect	Environmental and Social Performance Objectives / Impact Management Outcomes or Targets	Associated Plan and Procedure	Mitigation / Management Actions	Responsibility	Frequency / Timing	Monitoring and record keeping
2.4 POLLUTION CONTROL AND WASTE AND DISCHARGES MANAGEMENT DURING TRANSIT TO SURVEY AREA	Discharge of liquid and solid waste to sea	Reduce discharges and improve quality of liquid and solid waste to sea by fulfilling the requirements of MARPOL 73/78 standards	Waste and Discharges Management Plan	Implement the following plans: <ul style="list-style-type: none"> Waste and Discharges Management Plan. Shipboard Oil Pollution Emergency Plan (SOPEP). 	Contractors	Throughout mobilisation	Copy of all plans Report the total discharge waste stream volumes
			SOPEP				
			Waste and Discharges Management Plan	Vessels will have: <ul style="list-style-type: none"> an onboard sewage treatment plant; a sewage comminuting and disinfecting system, and/or a sewage holding tank. 		Throughout mobilisation	Sewage monitoring (see Row M1-5 & M2-2 in Table 9-4)
				Ensure sewage discharges comply with : <ul style="list-style-type: none"> a BOD of <25 mg/l (if the treatment plant was installed after 1/1/2010,) or <50 mg/l (if installed before this date); and minimal residual chlorine concentration of 0.5 mg/l. 		Throughout mobilisation, during discharges	Sewage Certificate containing the test results of the sewage treatment plant
				Sewage discharge to comply with the following: <ul style="list-style-type: none"> No visible floating solids must be produced or discolouration of the surrounding water must occur. Sewage must be comminuted and disinfected for discharges between 3 nm and 12 nm from the coast. Disposal of sewage from holding tanks must be discharged at a moderate rate while the ship is proceeding on route at a speed not less than 4 knots. 			

Project Activities	Aspect	Environmental and Social Performance Objectives / Impact Management Outcomes or Targets	Associated Plan and Procedure	Mitigation / Management Actions	Responsibility	Frequency / Timing	Monitoring and record keeping
2.4 POLLUTION CONTROL AND WASTE AND DISCHARGES MANAGEMENT DURING TRANSIT TO SURVEY AREA	Discharge of liquid and solid waste to sea	Reduce discharges and improve quality of liquid and solid waste to sea by fulfilling the requirements of MARPOL 73/78 standards	Waste and Discharges Management Plan	Galley waste discharge to comply with the following: <ul style="list-style-type: none"> No disposal to occur within 3 nm of the coast. Disposal at >3 nm from coast to be comminuted to particle sizes smaller than 25 mm. 	Contractors	Throughout mobilisation, during discharges	Waste monitoring (see Row M1-1 & 1-2 in Table 9-4) Inventory of volume of waste discharged and discharge location
				Minimise the discharge of waste material should obvious attraction of fauna be observed.			
				Ensure all deck and machinery drainage is routed to: <ul style="list-style-type: none"> equipment for the control of oil discharge from machinery space bilges and oil fuel tanks, e.g. oil separating/filtering equipment and oil content meter. oil residue holding tanks. oil discharge monitoring and control system. 			Waste monitoring (see Row M1-3 & M2-2 in Table 9-4) Oil Record Book
				Oil in water concentration must be less than 15 ppm prior to discharge overboard			
				Ensure all process areas are banded to ensure drainage water flows into the closed drainage system.			
				Use low-toxicity biodegradable detergents in cleaning of all deck spillage.			
				<ul style="list-style-type: none"> Mop up any spills immediately with biodegradable low toxicity detergents. Use oil absorbent. 		After Spills	Waste monitoring (see Row M1-3 & M2-2 in Table 9-4)

Project Activities	Aspect	Environmental and Social Performance Objectives / Impact Management Outcomes or Targets	Associated Plan and Procedure	Mitigation / Management Actions	Responsibility	Frequency / Timing	Monitoring and record keeping
2.4 POLLUTION CONTROL AND WASTE AND DISCHARGES MANAGEMENT DURING TRANSIT TO SURVEY AREA	Discharge of liquid and solid waste to sea	Reduce discharges and improve quality of liquid and solid waste to sea by fulfilling the requirements of MARPOL 73/78 standards	Waste and Discharges Management Plan	Use drip trays to collect run-off from equipment that is not contained within a bunded area and route contents to a closed drainage system.	Contractors	Throughout mobilisation, during discharges	Quantity of oil residue (sludge) produced.
				Implement leak detection and maintenance programmes for valves, flanges, fittings, seals, hydraulic systems, hoses, etc.		Throughout mobilisation	Record all discharges, together with date, time and method of discharge, disposal route, any system failure and accidental oil spills in the Oil Record Book
				• Initiate a waste minimisation system.		Throughout mobilisation	Waste monitoring (see Row M1 in Table 9-4)
				• No disposal of general waste overboard.			
				• Ensure on-board solid waste storage is secure.			
				• Incinerate (non-hazardous) waste or transport to a licensed onshore waste management facility for disposal/recycling. Retain waste receipts.			
				• Recycle metal waste onshore.			
				• Segregate, classify and store all hazardous waste in suitable receptacles on board in order to ensure the safe containment and transportation of waste			Inventory volume of waste generated
				• Dispose of hazardous waste at a facility that is appropriately licensed and accredited.			
							Inventory of volume transferred for onshore disposal / incinerated

Project Activities	Aspect	Environmental and Social Performance Objectives / Impact Management Outcomes or Targets	Associated Plan and Procedure	Mitigation / Management Actions	Responsibility	Frequency / Timing	Monitoring and record keeping
							Waste receipts
2.5 LIGHT POLLUTION CONTROL DURING TRANSIT TO SURVEY AREA	Increased ambient lighting	Protect marine fauna, migratory birds and seabirds by managing illumination of the project vessels Zero fatalities of marine fauna, migratory birds and seabirds	Marine Faunal Management Procedure	Reduce lighting to a minimum compatible with safe operations whenever and wherever possible by: <ul style="list-style-type: none"> – Minimising the number of lights and the intensity of the lights. – Automatically or manually controlling lighting in areas where it is not a continuous requirement through the process control system. – Positioning light sources in places where emissions to the surrounding environment are minimised. 	Contractors	During mobilisation	
				Keep disorientated, but otherwise unharmed, seabirds in dark containers (e.g. cardboard box) for subsequent release during daylight hours.	Contractors	During mobilisation	Record information on patterns of bird reaction to lights and real incidents of injury/death, including stray land birds resting on the project vessels

Project Activities	Aspect	Environmental and Social Performance Objectives / Impact Management Outcomes or Targets	Associated Plan and Procedure	Mitigation / Management Actions	Responsibility	Frequency / Timing	Monitoring and record keeping
2.6 EXCHANGE OF BALLAST WATER AND EQUIPMENT TRANSFER	Introduction of non-indigenous invasive marine species	Control the spread of non-native invasive species to vulnerable ecosystems by fulfilling the requirements of the International Convention for the Control and Management of Ships' Ballast Water and Sediments ("the Ballast Water Management Convention")	Ballast Water Management Procedure	<ul style="list-style-type: none"> Avoid the unnecessary discharge of ballast water. Avoid uptake of ballast in darkness when bottom-dwelling organisms may rise up the water column. Avoid uptake in very shallow water or where propellers may stir up sediment. Carry out routine removal and appropriate disposal of ballast water sediment. No discharging of ballast water in South African harbours. 	Contractors	During ballast water discharge	Waste monitoring (see Row M6-1 in Table 9-4) Copy of Ballast Water Management Plan
				Use filtration procedures during loading in order to avoid the uptake of potentially harmful aquatic organisms, pathogens and sediment that may contain such organisms.			
				Whenever possible, conduct the exchange of ballast water at least 200 nm (\pm 370 km) from the nearest land and in water of at least 200 m depth. Where this is not feasible, the exchange should be as far from the nearest land as possible, and in all cases a minimum of 50 nm (\pm 93 km) from the nearest land and preferably in water at least 200 m in depth.		During ballast tank cleaning	Records are to be maintained of ballast water uptakes, discharges and exchanges as per the Ballast Water Management Procedure
				Ensure that routine cleaning of the ballast tank is carried out, where practicable, in mid-ocean or under controlled arrangements in port or dry dock in accordance with Ballast Water Management Procedure.			
2.7 CONTROL OF NON-NATIVE SPECIES DURING TRANSIT TO SURVEY AREA	Introduction of non-indigenous invasive marine species	Control the spread of non-native invasive species to vulnerable	Preventive Maintenance Plan	Ensure all equipment (e.g. arrays, streamers, tail buoys, etc.) that has been used in other regions is thoroughly cleaned prior to deployment	Seismic Contractor	Prior to entry into South African waters	

Project Activities	Aspect	Environmental and Social Performance Objectives / Impact Management Outcomes or Targets	Associated Plan and Procedure	Mitigation / Management Actions	Responsibility	Frequency / Timing	Monitoring and record keeping
		ecosystems Ships' Ballast Water					
2.8 ACCIDENTAL OIL SPILLS DURING TRANSIT TO SURVEY AREA	Refer to Unplanned Events in Section 5 of this table.						
2.9 ACCIDENTAL FAUNAL STRIKES DURING TRANSIT TO SURVEY AREA	Refer to Unplanned Events in Section 5 of this table.						
2.10 EQUIPMENT LOSS DURING TRANSIT TO SURVEY AREA	Refer to Unplanned Events in Section 5 of this table.						

Project Activities	Aspect	Environmental and Social Performance Objectives / Impact Management Outcomes or Targets	Associated Plan and Procedure	Mitigation / Management Actions	Responsibility	Frequency / Timing	Monitoring and record keeping
3 OPERATIONAL PHASE							
3.1 STAKEHOLDER CONSULTATION AND NOTIFICATION OF VESSEL OPERATION	Exclusion zone around survey vessel	Ensure other users of the sea are notified and navigational safety, and prevention of emergencies / accidents	Stakeholder Engagement Procedure	If necessary, distribute an updated Notice to Mariners to fishing companies and directly onto vessels. The notice should give updated notice of: <ul style="list-style-type: none"> the co-ordinates of the survey area, including full operational area required for turning; and an indication of the proposed survey timeframes. 	CGG, Seismic Contractor under CGG supervision	7 days prior to surveying / sampling	Copies of all correspondence
		Minimum disruption to survey and other users of the sea		Circulate a daily survey schedule (look-ahead), via email, to key fishing associations.	FLO	Daily, throughout operation	Daly reports
				Maintain an effective grievance mechanism / procedure for recording any complaints or comments received from the public prior to and during the seismic campaign. Include resources to permit the investigation, resolution and close-out of all grievances.	CGG, Seismic Contractor	Throughout the survey campaign	Grievance monitoring (see Row M4-1 in Table 9-4) Copy of grievance register and responses
3.2 PREVENTION OF ACCIDENTS	Presence of survey vessel	Ensure navigational safety, prevention of accidents, preparation for emergencies and minimise the chance subsequent damage to the environment occurring	Stakeholder Engagement Procedure	Maintain standard vessel watch procedures.	Seismic Contractor, FLO	Throughout operation	FLO monitoring (see Row M4-1 in Table 9-4) Provide record of any incidents and
				Enforce the 500 m safety zone around the survey vessel and seismic array.			
				Notify any fishing vessels at a radar range of 12 nm from the survey vessel via radio regarding the safety requirements around the vessel.			
				Ensure project vessels fly standard flags and /or lights to indicate that they are engaged in towing surveys and are restricted in manoeuvrability.			

Project Activities	Aspect	Environmental and Social Performance Objectives / Impact Management Outcomes or Targets	Associated Plan and Procedure	Mitigation / Management Actions	Responsibility	Frequency / Timing	Monitoring and record keeping
				Practice weekly emergency response drills. Ensure access to current weather information. Use flares or foghorn where necessary.			interaction with other vessels. Provide record of safety drills FLO Report
3.3 OPERATION OF AIRGUNS	Increased ambient underwater noise levels	Reduce disturbance of marine fauna, particularly cetaceans (whales and dolphins), seals, seabirds (particularly penguins) and turtles	Marine Faunal Management Procedure	<u>Acoustic Source</u> <ul style="list-style-type: none"> Define and enforce the use of the lowest practicable airgun volume for production. Ensure the ramp-up noise volumes do not exceed the production volume. Prohibit the use of airguns outside the area of operation and within MPAs. Ensure the PAM hydrophone streamer is towed in such a way that the interference of vessel noise is minimised. 	Seismic Contractor, MMO, PAM operator	During seismic survey	MMO / PAM monitoring (see Row M3-1 & M3-2 in Table 9-4) MMO confirmation / report
				<u>Airgun Testing</u> <ul style="list-style-type: none"> Maintain a pre-shoot watch of 60 minutes before any instances of airgun testing. If only a single airgun is tested, starting at its lowest power, the pre-shoot watch period can be reduced to 30 minutes. 	MMO, PAM operator	During airgun testing	MMO / PAM monitoring (see Row M3-1 & M3-2 in Table 9-4) Record information on faunal observations, seismic activities and any mitigation actions taken

Project Activities	Aspect	Environmental and Social Performance Objectives / Impact Management Outcomes or Targets	Associated Plan and Procedure	Mitigation / Management Actions	Responsibility	Frequency / Timing	Monitoring and record keeping
3.3 OPERATION OF AIRGUNS	Increased ambient underwater noise levels	Reduce disturbance of marine fauna, particularly cetaceans (whales and dolphins), seals, seabirds (particularly penguins) and turtles	Marine Faunal Management Procedure	<ul style="list-style-type: none"> Implement a “soft-start” procedure if testing multiple airguns. <ul style="list-style-type: none"> The “soft-start” should be carried out over a time period proportional to the number of guns being tested and not exceed 20 minutes; airguns should be tested in order of increasing volume. If testing all airguns at the same time, a 20 minute “soft-start” is required. If testing a single airgun, starting at its lowest power, a “soft-start” is not required. 	Seismic Contractor	During airgun testing	MMO / PAM monitoring (see Row M3-1 & M3-2 in Table 9-4)
				<u>Pre-start Protocols</u> Implement a dedicated MMO and PAM pre-shoot watch of at least 60 minutes (to accommodate deep-diving species in water depths greater than 200 m).	MMO, PAM operator	Prior to initiation of the seismic source at full power	Record information on faunal observations, seismic activities and any mitigation actions taken
				Implement a “soft-start” procedure of a minimum of 20 minutes’ duration on initiation of the seismic source if: <ul style="list-style-type: none"> during daylight hours it is confirmed: <ul style="list-style-type: none"> visually by the MMO during the pre-shoot watch (60 minutes) that there are no penguins or feeding aggregations of diving seabirds, shoaling large pelagic fish, turtles, seals or cetaceans within 500 m of the seismic source, and by PAM technology that there are no vocalising cetaceans detected in the 500 m mitigation zone. during times of poor visibility or darkness it is confirmed by PAM technology that no vocalising 	Seismic Contractor	During “soft-start” procedure	MMO / PAM monitoring (see Row M3-1 & M3-2 in Table 9-4)
							Record information on faunal observations, seismic activities and any mitigation actions taken

Project Activities	Aspect	Environmental and Social Performance Objectives / Impact Management Outcomes or Targets	Associated Plan and Procedure	Mitigation / Management Actions	Responsibility	Frequency / Timing	Monitoring and record keeping
				cetaceans are present in the 500 m mitigation zone during the pre-shoot watch (60 minutes).		During “soft-start” procedure	MMO / PAM monitoring (see Row M3-1 & M3-2 in Table 9-4)
3.3 OPERATION OF AIRGUNS	Increased ambient underwater noise levels	Reduce disturbance of marine fauna, particularly cetaceans (whales and dolphins), seals, seabirds (particularly penguins) and turtles	Marine Faunal Management Procedure	<p>Delay “soft-starts” if penguins or feeding aggregations of diving seabirds, shoaling large pelagic fish, turtles, seals or cetaceans are observed within the mitigation zone.</p> <ul style="list-style-type: none"> A “soft-start” should not begin until 30 minutes after cetaceans depart the mitigation zone or 30 minutes after they are last seen or acoustically detected by PAM in the mitigation zone. In the case of penguins, feeding aggregation of diving seabirds, shoaling large pelagic fish and turtles, delay the “soft-start” until animals are outside the 500 m mitigation zone. In the case of fur seals, which may occur commonly around the vessel, delay “soft-starts” for at least 10 minutes until it has been confirmed that the mitigation zone is clear of all seal activity. However, if after a period of 10 minutes seals are still observed within 500 m of the airguns, the normal “soft-start” procedure should be allowed to commence for at least a 20-minute duration. Seal activity should be carefully monitored during “soft-starts” to determine if they display any obvious negative responses to the airguns and gear or if there are any signs of injury or mortality as a direct result of the seismic activities. 	Seismic Contractor, MMO, PAM operator		
				<ul style="list-style-type: none"> Plan survey, as far as possible, so that the commencement of airgun firing in the survey area for the first time (including gun tests) is undertaken 	Seismic Contractor,	Prior to commencement	MMO / PAM monitoring (see

Project Activities	Aspect	Environmental and Social Performance Objectives / Impact Management Outcomes or Targets	Associated Plan and Procedure	Mitigation / Management Actions	Responsibility	Frequency / Timing	Monitoring and record keeping
3.3 OPERATION OF AIRGUNS	Increased ambient underwater noise levels	Reduce disturbance of marine fauna, particularly cetaceans (whales and dolphins), seals, seabirds (particularly penguins) and turtles	Marine Faunal Management Procedure	during daylight hours. However, if this is not possible due to prolonged periods of poor visibility (e.g. thick fog) or unforeseen technical issue which results in a night-time start, the initial acoustic source activation (including gun tests) may only be undertaken if the normal 60-minute PAM pre-watch and "soft-start" procedures have been followed.	MMO, PAM operator	of first survey line	Row M3-1 & M3-2 in Table 9-4)
				<ul style="list-style-type: none"> Schedule "soft-starts" so as to minimise, as far as possible, the interval between reaching full power operation and commencing a survey line. The period between the end of the soft start and commencing with a survey line must not exceed 20 minutes. If it does exceed 20 minutes, refer to breaks in firing below. 	Seismic Contractor	During "soft-starts" / surveying	Record information on faunal observations, seismic activities and any mitigation actions taken
				<u>Line Changes/Turns</u> If line changes are expected to take longer than 40 minutes : <ul style="list-style-type: none"> Terminate airgun firing at the end of the survey line and implement a pre-shoot search (60 minutes) and "soft-start" procedure (20 minutes) when approaching the next survey line. If line turn is shorter than 80 minutes (i.e. shorter than a 60-minute pre-shoot watch and 20-minute "soft-start" combined), the pre-shoot watch can commence before the end of the previous survey line. 	Seismic Contractor, MMO, PAM operator	During line changes	MMO / PAM monitoring (see Row M3-1 & M3-2 in Table 9-4) Record information on faunal observations, seismic activities and any mitigation actions taken

Project Activities	Aspect	Environmental and Social Performance Objectives / Impact Management Outcomes or Targets	Associated Plan and Procedure	Mitigation / Management Actions	Responsibility	Frequency / Timing	Monitoring and record keeping
3.3 OPERATION OF AIRGUNS	Increased ambient underwater noise levels	Reduce disturbance of marine fauna, particularly cetaceans (whales and dolphins), seals, seabirds (particularly penguins) and turtles	Marine Faunal Management Procedure	<p>If line changes are expected to take less than 40 minutes, airgun firing can continue during the line change if:</p> <ul style="list-style-type: none"> The power is reduced to 180 cubic inches (or as close as is practically feasible) at standard pressure. Airgun volumes of less than 180 cubic inches can continue to fire at their operational volume and pressure; The Shot Point Interval (SPI) is increased to provide a longer duration between shots, with the SPI not to exceed 5 minutes; and The power is increased and the SPI is decreased in uniform stages during the final 10 minutes of the line change (or geophone repositioning), prior to data collection re-commencing (i.e. a form of mini soft start). Normal MMO and PAM observations continue during this period when reduced power airgun is firing. 			
				<p><u>Shut-Downs</u></p> <ul style="list-style-type: none"> Terminate seismic shooting on: <ul style="list-style-type: none"> observation and/or detection of penguins or feeding aggregations of diving seabirds, turtles, slow swimming large pelagic fish (including whale sharks, basking sharks, manta rays) or cetaceans within the 500 m mitigation zone. observation of any obvious mortality or injuries to cetaceans, turtles, seals or mass 	Seismic Contractor, MMO and PAM Operator	As indicated	<p>MMO / PAM monitoring (see Row M3-1 & M3-2 in Table 9-4)</p> <p>Record information on faunal observations, seismic activities</p>

Project Activities	Aspect	Environmental and Social Performance Objectives / Impact Management Outcomes or Targets	Associated Plan and Procedure	Mitigation / Management Actions	Responsibility	Frequency / Timing	Monitoring and record keeping
3.3 OPERATION OF AIRGUNS	Increased ambient underwater noise levels	Reduce disturbance of marine fauna, particularly cetaceans (whales and dolphins), seals, seabirds (particularly penguins) and turtles	Marine Faunal Management Procedure	<p>mortalities of squid and fish (specifically large shoals of tuna or surface shoaling small pelagic species such as sardine, anchovy and mackerel) when estimated by the MMO to be as a direct result of the survey.</p> <ul style="list-style-type: none"> Depending the species, specific mitigation will be implemented to continue the survey operations, as specified below: <ul style="list-style-type: none"> For specific species such as turtles, penguins, feeding aggregation of diving seabirds and slow swimming large pelagic fish (including whale sharks, basking sharks, manta rays), terminate shooting until such time as the animals are outside of the 500 m mitigation zone (seismic "pause", no soft-start required). For cetaceans, terminate shooting until such time as there has been a 30 minutes delay from the time the animal was last sighted within the mitigation zone before the commencement of the normal soft start procedure. 			and any mitigation actions taken

Project Activities	Aspect	Environmental and Social Performance Objectives / Impact Management Outcomes or Targets	Associated Plan and Procedure	Mitigation / Management Actions	Responsibility	Frequency / Timing	Monitoring and record keeping
3.3 OPERATION OF AIRGUNS	Increased ambient underwater noise levels	Reduce disturbance of marine fauna, particularly cetaceans (whales and dolphins), seals, seabirds (particularly penguins) and turtles	Marine Faunal Management Procedure	<u>Breaks in Airgun Firing</u> <ul style="list-style-type: none"> If after breaks in firing, airguns can be restarted within 5 minutes, no soft-start is required and firing can recommence at the same power level provided no marine mammals have been detected in the mitigation zone during the break-down period. For all breaks in airgun firing of longer than 5 minutes, but less than 20 minutes, implement a “soft-start” of similar duration, assuming there is continuous observation by the MMO and PAM operator during the break. For all breaks in firing of 20 minutes or longer, implement a 60-minute pre-shoot watch and 20-minute “soft-start” procedure prior to the survey operation continuing. For planned breaks, ensure that there is good communication between the seismic contractor and MMOs and PAM operators in order for all parties to be aware of these breaks and that early commencement of pre-watch periods can be implemented to limit delays. 	Seismic Contractor, MMO and PAM operator	During surveying	MMO / PAM monitoring (see Row M3-1 & M3-2 in Table 9-4) Record information on faunal observations, seismic activities and any mitigation actions taken
				<u>PAM Malfunctions</u> <ul style="list-style-type: none"> If the PAM system malfunctions or becomes damaged during night-time operations or periods of low visibility, continue operations for 30 minutes without PAM if no marine mammals were detected by PAM in the mitigation zones in the previous 2 hours, while the PAM operator diagnoses the issue. If after 30 minutes the diagnosis indicates that the 	PAM operator	During PAM malfunctions	MMO / PAM monitoring (see Row M3-1 & M3-2 in Table 9-4) Record information on

Project Activities	Aspect	Environmental and Social Performance Objectives / Impact Management Outcomes or Targets	Associated Plan and Procedure	Mitigation / Management Actions	Responsibility	Frequency / Timing	Monitoring and record keeping
3.3 OPERATION OF AIRGUNS	Increased ambient underwater noise levels	Reduce disturbance of marine fauna, particularly cetaceans (whales and dolphins), seals, seabirds (particularly penguins) and turtles	Marine Faunal Management Procedure	<p>PAM gear must be repaired to solve the problem, reduce power to 180 cubic inches. Firing of the reduced power gun may continue for 30 minutes while PAM is being repaired, the last 10 minutes of which is a 10-minute ramp up to full power (mini “soft-start”). If the PAM diagnosis and repair will take longer than 60 minutes, stop surveying until daylight hours or such time as a functional PAM system can be redeployed and tested.</p> <ul style="list-style-type: none"> – If the PAM system breaks down during daylight hours, continue operations for 20 minutes without PAM, while the PAM operator diagnoses the issue. If the diagnosis indicates that the PAM gear must be repaired to solve the problem, operations may continue for an additional 2 hours without PAM monitoring as long as: <ul style="list-style-type: none"> • No marine mammals were detected by PAM in the mitigation zones in the previous 2 hours; • MMO to maintain watch at all times during operations when PAM is not operational; and • The time and location in which operations began without an active PAM system is recorded. 			faunal observations, seismic activities and any mitigation actions taken
3.4 AIR POLLUTION CONTROL DURING OPERATION	Emissions to the atmosphere	As per mobilisation phase – refer to Row 2.3 above.					
		Reduce amount of diesel burned and emissions to the air	Survey design	Optimise survey line acquisition and vessel operations/logistics to minimise the survey time and the number of trips required to and from the onshore supply base.	Contractors, CGG	During operation	Fuel consumption monitoring (see Row M1-4 in Table 9-4)

Project Activities	Aspect	Environmental and Social Performance Objectives / Impact Management Outcomes or Targets	Associated Plan and Procedure	Mitigation / Management Actions	Responsibility	Frequency / Timing	Monitoring and record keeping
			Waste and Discharges Management Plan				Inventory of volume and type of fuel used
3.5 POLLUTION CONTROL AND WASTE AND DISCHARGES MANAGEMENT DURING OPERATION	Discharge of liquid and solid waste to sea	As per mobilisation phase – refer to Row 2.4 above.					
3.6 LIGHT POLLUTION CONTROL DURING OPERATION	Increased ambient lighting	As per mobilisation phase – refer to Row 2.5 above.					
3.7 BUNKERING / REFUELLING AT SEA (IF NOT IN PORT)	Spill of hydrocarbons to sea during bunkering	Protect marine environment	Stakeholder Engagement Plan	Submit an application to the Principal SAMSA officer at the port nearest to where the transfer is to take place. Inform SAMSA of the location, supplier and timing 7 days prior to refuelling at sea.	Contractors	As required, at least one week prior to date of refuelling	Provide copies of the correspondence with SAMSA and approval for bunkering
		Minimise disturbance / damage to marine life		Inform SAMSA, in writing, that the ship is, and will be kept, in a fit state to undertake the transfer operation and to contend with any emergency that may arise.		Not less than 24 hours prior to commencement of the transfer operation	
			Contractor HSE Plan Contractor Bridging Document	Offshore bunkering should not be undertaken in the following circumstances: <ul style="list-style-type: none"> Wind force and sea state conditions of ≥ 6 on the Beaufort Wind Scale; During any workboat or mobilisation boat operations; 		During bunkering	Spill monitoring (see Row M5-2 in Table 9-4) Record of all spills (Spill Record Book),

Project Activities	Aspect	Environmental and Social Performance Objectives / Impact Management Outcomes or Targets	Associated Plan and Procedure	Mitigation / Management Actions	Responsibility	Frequency / Timing	Monitoring and record keeping
			SOPEP	<ul style="list-style-type: none"> During the transfer of in-sea equipment; and At night or times of low visibility. 			including spill reports; emergency exercise reports; audit reports. Incident log
3.8 ACCIDENTAL OIL SPILLS DURING OPERATION	Diesel spills from refuelling or from tank rupture (e.g. vessel collision)	Refer to Unplanned Events in Section 5 of this table.					
3.9 EQUIPMENT LOSS DURING OPERATION	Obstruction on seafloor or in water column	Refer to Unplanned Events in Section 5 of this table.					
3.10 VESSEL COLLISION AND ACCIDENTAL FAUNAL STRIKES/ENTANGLEMENT	Vessel collision and strikes / entanglement of marine fauna	Refer to Unplanned Events in Section 5 of this table.					
3.11 OPERATION OF HELICOPTERS (IN EMERGENCIES AND IF USED FOR CREW CHANGES)	Increased ambient noise levels	Minimise disturbance / damage to marine and coastal fauna	Survey design	Ensure all flight paths avoid (except in medical emergency): <ul style="list-style-type: none"> Offshore islands by at least 1 852 m (i.e. 1 nm). Seal colonies. 	Seismic and Helicopter contractor	All flights between survey vessel and helicopter base	Copy of set flight path (including altitude)
		All pilots are briefed on sensitivity of bird		Maintain an altitude of at least 1 000 m when flying across MPAs and a cruising altitude of greater than	Helicopter contractor		Helicopter logs

Project Activities	Aspect	Environmental and Social Performance Objectives / Impact Management Outcomes or Targets	Associated Plan and Procedure	Mitigation / Management Actions	Responsibility	Frequency / Timing	Monitoring and record keeping
		and seal colonies and whale breeding areas		300 m, except when taking off and landing or in a medical emergency			Deviations from set flight paths
				Avoid extensive low altitude coastal flights (<762 m or 2 500 ft) by ensuring that the flight path is perpendicular to the coast, as far as possible.	Helicopter contractor		
			Environmental Awareness Training	Brief of all pilots, as part of the HSSE indication for pilots, on the ecological risks associated with flying at a low altitude along the coast or above marine mammals.	CGG and helicopter contractor		
4. DEMOBILISATION PHASE							
4.1 SURVEY VESSEL TO LEAVE AREA	Presence of survey vessel and towed array	Leave survey area as it was prior to survey Ensure navigational safety	Survey design	Ensure that all deployed equipment is retrieved.	Seismic Contractor	On completion of survey	On completion of survey
4.2 INFORM RELEVANT PARTIES OF SURVEY COMPLETION	Exclusion zone around survey vessel	Ensure navigational safety Notification of all key maritime stakeholders	Stakeholder Engagement Procedure	Inform all key stakeholders (refer to Row 2.1) that the vessels are off location.	CGG, Seismic Contractor	Within two weeks after completion of survey	Copies of notification documentation required.
				Maintain a functional grievance mechanism / procedure for recording any complaints or comments received from the public prior to and during the seismic campaign. Include resources to permit the investigation, resolution and close-out of all grievances.	CGG, Seismic Contractor	Throughout the survey campaign	Copy of grievance register and responses
4.3 AIR POLLUTION CONTROL DURING DEMOBILISATION	Emissions to the atmosphere	As per mobilisation phase – refer to Row 2.3 above.					

Project Activities	Aspect	Environmental and Social Performance Objectives / Impact Management Outcomes or Targets	Associated Plan and Procedure	Mitigation / Management Actions	Responsibility	Frequency / Timing	Monitoring and record keeping
4.4 POLLUTION CONTROL AND WASTE AND DISCHARGE MANAGEMENT DURING DEMOBILISATION	Discharge of liquid and solid waste to sea	As per mobilisation phase – refer to Row 2.4 above.					
		Minimise pollution discharges and ensure correct disposal of waste	Waste and Discharge Management Plan	Dispose all waste retained onboard at a licensed waste site using a licensed waste disposal contractor.	Contractors	When vessel is in port	Waste monitoring (see Row M1-2 in Table 9-4) Inventory volume of waste generated Inventory of volume transferred for onshore disposal / incinerated Waste Receipts
4.5 LIGHT POLLUTION CONTROL DURING DEMOBILISATION	Increased ambient lighting	As per mobilisation phase – refer to Row 2.5 above.					
4.6 ACCIDENTAL OIL SPILLS DURING DEMOBILISATION	Diesel spills from refuelling or from tank rupture (e.g. vessel collision)	Refer to Unplanned Events in Section 5 of this table.					
4.7 VESSEL COLLISION AND ACCIDENTAL FAUNAL STRIKES/ENTANGLEMENT	Vessel collision and strikes / entanglement of marine fauna	Refer to Unplanned Events in Section 5 of this table.					

Project Activities	Aspect	Environmental and Social Performance Objectives / Impact Management Outcomes or Targets	Associated Plan and Procedure	Mitigation / Management Actions	Responsibility	Frequency / Timing	Monitoring and record keeping
4.8 EQUIPMENT LOSS DURING DEMOBILISATION	Obstruction on seafloor or in water column	Refer to Unplanned Events in Section 5 of this table.					
5. UNPLANNED EVENTS							
5.1 ACCIDENTAL OIL SPILLS	Diesel spills from refuelling or from tank failure	Minimise impact to the marine fauna and the environment by implementing response procedures efficiently	SOPEP Emergency Response Plan	Implement emergency plans in Row 1.2.	Contractors	In event of spill	Spill monitoring (see Row M5-2 in Table 9-4)
				Ensure personnel are adequately trained in both accident prevention and immediate response, and resources are available on each vessel.			
				Attempt to control and contain the spill at sea, as far as possible and whenever the sea state permits, using suitable recovery techniques to reduce the spatial and temporal impact of the spill.			
				Where diesel, which evaporates relatively quickly, has been spilled, the water should be agitated or mixed using a propeller boat/dinghy to aid dispersal and evaporation.			
				<ul style="list-style-type: none">Use low toxicity dispersants that rapidly dilute to concentrations below most acute toxicity thresholds.Use dispersants only with the permission of DFFE: Oceans and Coasts.			
				<ul style="list-style-type: none">Ensure adequate resources are provided to collect and transport oiled birds to a cleaning station.			

Project Activities	Aspect	Environmental and Social Performance Objectives / Impact Management Outcomes or Targets	Associated Plan and Procedure	Mitigation / Management Actions	Responsibility	Frequency / Timing	Monitoring and record keeping
5.2 EQUIPMENT LOSS	Obstruction on seafloor or in water column	Protect sensitive seabed habitat	Preventive Maintenance Plan	Ensure that loads are lifted using the correct lifting procedure and within the maximum lifting capacity of crane system.	Contractors	During operation	Equipment monitoring (see Row M5-1 in Table 9-4)
				Minimise the lifting path between vessels.			
				Undertake frequent checks to ensure items and equipment are stored and secured safely on board each vessel and maintain a good inventory of equipment.			
		Minimise risk of collision / accident / entanglement and inform relevant parties	Emergency Response Plan	Retrieve lost objects / equipment, where practicable, after assessing the safety and metocean conditions.	Seismic Contractor	As required	<ul style="list-style-type: none"> • type of gear lost • date of abandonment / loss • location; and • where applicable, dates of retrieval
				Notify PASA, SAMSA and the SAN Hydrographer of any items left on the seabed or floating in the water column that constitute a seafloor or navigational hazard, and request that they send out a Notice to Mariners with this information.			Copies of all correspondence
5.3 FAUNAL COLLISIONS WITH PROJECT VESSELS	Ship strikes during transit of vessels to survey area	Minimise risk of collision with large cetaceans	Marine Faunal management Procedure	Ensure vessel transit speed between the survey area and port is a maximum of 12 knots (22 km/hr). Reduce speed to 10 knots (18 km/h) in the vicinity of sensitive marine species and within 25 km from the coast.	Seismic Contractor	During operation	MMO observations / report
5.4 DISCOVERY OF SHIPWRECKS	Discovery of cultural remains/ship-	Adding to knowledge of South Africa's maritime history	Standard Procedure	In the unlikely event that evidence of shipwrecks on the seafloor are identified during data analysis, SAHRA must be informed of such a discovery.	CGG	After data analysis	Correspondence with SAHRA

Project Activities	Aspect	Environmental and Social Performance Objectives / Impact Management Outcomes or Targets	Associated Plan and Procedure	Mitigation / Management Actions	Responsibility	Frequency / Timing	Monitoring and record keeping
	wrecks during data analysis						