7. ENVIRONMENTAL MANAGEMENT PROGRAMME

This chapter presents the Environmental Management Programme (EMP) has been compiled as part of the EIA in compliance with Regulation 33 of the EIA Regulations 2010.

The EMP lists the specific environmental protection activities and procedures required to avoid or minimise impacts on the environment from the proposed exploration well drilling programme. It also indicates who is the responsible party and includes a compliance audit column (✓) for auditing purposes and the requirements for closure.

The specific environmental protection activities and procedures are addressed under each of the project life cycle phases listed below.

7.1	PLANNING PHASE	7.1.1 Drilling timing / scheduling
		7.1.2 Preparation of subsidiary plans
		7.1.3 Stakeholder consultation and notification
		7.1.4 Permits / Exemptions
		7.1.5 Financial Provision
7.2	ESTABLISHMENT PHASE	7.2.1 Compliance with the EMP
		7.2.2 Environmental Awareness Training
		7.2.3 Notifying other users of the sea
		7.2.4 Ensure integrity of anchor system
		7.2.5 Anchor / well location to avoid topographic features / obstacles
		7.2.6 Drilling unit and equipment
7.3	OPERATIONAL PHASE	7.3.1 Adherence to the EMP and Environmental Awareness
		7.3.2 Prevention of emergencies
		7.3.3 Communication with other users of the sea and resource managers
		7.3.4 Dealing with emergencies including major oil spills
		7.3.5 Pre-drilling sonar survey
		7.3.6 Blow-out prevention
		7.3.7 Use and disposal of drilling muds, cuttings and cement
		7.3.8 Disposal of ballast water
		7.3.9 Pollution control and waste management
		7.3.10 Well testing
		7.3.11 Transport, storage and handling of radioactive devices
		7.3.12 Equipment loss
		7.3.13 Use of aircrafts / helicopters
		7.3.14 Oil bunkering / refuelling at sea
		7.3.15 Drilling unit lighting

7.4	DECOMMISSIONING AND CLOSURE PHASE	7.4.1 Suspension or abandonment of wells
		7.4.2 Drilling unit / vessels to leave area
		7.4.3 Inform key stakeholders of survey completion
		7.4.4 Final waste disposal
		7.4.5 Compile well drilling “close-out” report
		7.4.6 Information sharing

7.1 PLANNING PHASE						
PROJECT PHASE AND ACTIVITIES:	**ENVIRONMENTAL OBJECTIVES:**	**AUDITABLE MANAGEMENT ACTIONS TO BE TAKEN TO MEET THE ENVIRONMENTAL MANAGEMENT PROGRAMME OBJECTIVES:**	✓	**RESPONSI-BILITY:**	**TIMING:**	**REQUIREMENT FOR "CLOSE-OUT" REPORT:**
7.1.1 DRILLING TIMING / SCHEDULING	Drill in a favourable fair weather period to reduce impacts in the unlikely event of a blow-out	Since the probability and extent of shoreline oiling in the unlikely event of a blow-out is significantly influenced by the season in which drilling is undertaken, it is recommended that drilling be undertaken during the summer months.		Thombo	Prior to commencement of operation	Confirm drilling period
7.1.2 PREPARATION OF SUBSIDIARY PLANS	Preparation for any emergency that could result in an environmental impact	Ensure the following plans are prepared and in place: • A project-specific Oil Spill Contingency Plan approved by competent authorities, namely the Petroleum Agency of South Africa, Department of Environmental Affairs (DEA): Coastal Pollution Management and South African Maritime Safety Authority (SAMSA); • Shipboard Oil Pollution Emergency Plan (SOPEP) for support vessels as required by MARPOL; • Emergency Response Plan (including MEDIVAC plan); • South African Search and Rescue (SASAR) Manual; • Waste Management Plan (see contents in Section 7.3.9); and • Ballast Water Management Plan (see Section 7.3.8). In addition to the above, ensure that: • Drilling unit has Pollution Safety Certificate(s) issued by SAMSA; • There is adequate protection and indemnity insurance cover for oil pollution incidents; • There is a record of the drilling units and support vessels' seaworthiness certificate and/or classification stamp; and • Thombo is a member of or subscribes to Oil Spill Response Limited (OSRL) for the duration of the exploration drilling programme, so that it has ready access to the advanced well intervention and capping equipment available in Saldanha Bay.		Thombo and Drilling Contractor	Prior to commencement of operation	Confirm compliance and justify any omissions
7.1.3 STAKEHOLDER CONSULTATION AND NOTIFICATION	PASA and DEA notification	Compile the specific details of each drilling operation into a Drilling Notification document and submit to PASA and DEA. The notification should provide, *inter alia*, the details on the following: • Drilling programme (timing, co-ordinates and duration); • Contractor details; • Drilling unit and support vessel specifications (including relevant certification and insurance); • Oil Spill Contingency Plan and SOPEPs; and • Emergency Response Plan.		Thombo	30 days prior to commencement of operations or as required by PASA and / or DEA	Confirm that notification was sent to PASA and DEA

7.1 PLANNING PHASE						
PROJECT PHASE AND ACTIVITIES:	**ENVIRONMENTAL OBJECTIVES:**	**AUDITABLE MANAGEMENT ACTIONS TO BE TAKEN TO MEET THE ENVIRONMENTAL MANAGEMENT PROGRAMME OBJECTIVES:**	**✓**	**RESPONSI-BILITY:**	**TIMING:**	**REQUIREMENT FOR "CLOSE-OUT" REPORT:**
7.1.3 cont.	Stakeholder notification	• Notify relevant government departments and other key stakeholders of the proposed drilling programme (including navigational co-ordinates of well location, timing and duration of proposed activities) and the likely implications thereof (specifically the 500 m exclusion zone and the movement of support vessels). Stakeholders include: > Fishing industry / associations: - South African Tuna Long-line Association; - South African Deep-sea Trawling Industry Association; - South African Tuna Association; - Fresh Tuna Exporters Association; - South African Commercial Linefish Association; - West Coast and Peninsula Commercial Skiboat Association; and - West Coast Rock Lobster Industry Association; > SAMSA; > South African Navy (SAN) Hydrographic office; > Department of Agriculture, Forestry and Fisheries (DAFF), including the fisheries research managers, Deon Durholtz (DeonD@daff.gov.za) and Janet Coetzee (JanetC@nda.agric.za); > Transnet National Ports Authority (ports of Cape Town and / or Saldanha Bay); and > Overlapping / adjacent prospecting, exploration, mining and production right holders. • Any dispute arising with overlapping / adjacent prospecting / exploration right holders should be referred to the Department of Mineral Resources and / or PASA for resolution.		Thombo	30 days prior to commencement of operations	Provide copies of all correspondence

7.1 PLANNING PHASE						
PROJECT PHASE AND ACTIVITIES:	**ENVIRONMENTAL OBJECTIVES:**	**AUDITABLE MANAGEMENT ACTIONS TO BE TAKEN TO MEET THE ENVIRONMENTAL MANAGEMENT PROGRAMME OBJECTIVES:**	**✓**	**RESPONSI-BILITY:**	**TIMING:**	**REQUIREMENT FOR "CLOSE-OUT" REPORT:**
7.1.4 PERMITS / EXEMPTIONS	Compliance with legislative requirements	If necessary, apply to DEA for a permit or exemption to approach to or remain within 300 m of whales (see note below). The application for a permit or request for an exemption should be submitted to: - Zintle Mapekula, email: zmapekula@environment.gov.za; or - Gcobani Popose, email: gpopose@environment.gov.za. <u>Notes:</u> In terms of the Marine Living Resources Act, 1998 (No. 18 of 1998): • No person may approach within 300 m of a whale by vessel, aircraft or other means without a permit; • A vessel approached by a whale is required to distance itself at 300 m from the whale, unless in possession of a permit; • A vessel may not proceed directly through a school of dolphins or porpoises; and • No person shall attempt to feed, harass, disturb or kill great white sharks, dolphins, seals or turtles.		Thombo	Prior to commencement of operations	Provide copy of permit / exemption
		• If necessary, apply to the South African Heritage Resource Agency (SAHRA) (John Gribble, email: jgribble@sahra.org.za) to disturb any cultural heritage material (e.g. shipwrecks) older than 60 years. Refer to Section 7.2.5 with regard to the avoidance of historic shipwrecks. • Comply with any requirements specified by SAHRA.		Thombo	Prior to commencement of operations or when identified	
7.1.5 FINANCIAL PROVISION	Compliance with legislative requirements	Ensure that financial provision is in place to execute the requirements of the EMP. Financial provision is to be approved by PASA.		Thombo	Prior to commencement of operations	Confirm that financial provision for EMP has been put in place

7.2 ESTABLISHMENT PHASE						
PROJECT PHASE AND ACTIVITIES:	**ENVIRONMENTAL OBJECTIVES:**	**AUDITABLE MANAGEMENT ACTIONS TO BE TAKEN TO MEET THE ENVIRONMENTAL MANAGEMENT PROGRAMME OBJECTIVES:**	**✓**	**RESPONSI-BILITY:**	**TIMING:**	**REQUIREMENT FOR "CLOSE-OUT" REPORT:**
7.2.1 COMPLIANCE WITH EMP	Operator and contractor to commit to adherence to EMP	• Ensure that a copy of the approved EMP and associated approvals are supplied to the Drilling Contractor and is on board the drilling unit and support vessels during the operation. • Operator to commit organisation and Contractor to meet the requirements of the EMP. • Ensure procedures and systems for compliance are in place. • Ensure correct equipment and personnel are available to meet the requirements of the EMP.		Thombo and Drilling Contractor	Prior to commencement of operation	Ensure that a copy of the EMP report is provided to the Drilling Contractor and that an acknowledgment of receipt form is signed by the Contractor
7.2.2 ENVIRONMENTAL AWARENESS TRAINING	Ensure personnel are appropriated trained	• Undertake Environmental Awareness Training to ensure the drilling unit's / vessel's personnel are appropriately informed of the purpose and requirements of the EMP. • Ensure that responsibilities are allocated to personnel.		Thombo and Drilling Contractor	Prior to commencement of operation	Copy of attendance register and training records
7.2.3 NOTIFYING OTHER USERS OF THE SEA	Ensure that other users are aware of the drilling programme	Request, in writing, the SAN Hydrographic office to release Radio Navigation Warnings and Notices to Mariners throughout the drilling period. The Notice to Mariners should give notice of (1) the co-ordinates of the well location, (2) an indication of the proposed drilling timeframes, (3) an indication of the 500 m safety zone around the drilling unit, and (4) provide details on the movements of support vessels servicing the drilling operation. These Notices to Mariners should be distributed timeously to fishing companies and directly onto vessels where possible.		Thombo	7 days prior to start	Confirm that request was sent to the SAN Hydrographic office
7.2.4 ENSURE INTEGRITY OF ANCHOR SYSTEM	Reduce environmental risk by minimising risk of failures during operation	Undertake and/or have in place the following in order to minimise environmental risk: • A hazard identification and risk assessment document; • The Contractor must apply relevant national codes and standards in accordance with good oil / gas field practice; • The Contractor must operate in accordance with procedures laid down in the vessel's marine operations manual as approved by the relevant classification society; • All anchor chains and anchors must be certified; and • The drilling unit and support vessels must be maintained to class standard throughout the project.		Drilling Contractor	Prior to and throughout drilling operations	Provide copies of relevant classification documents and certificates

7.2 ESTABLISHMENT PHASE						
PROJECT PHASE AND ACTIVITIES:	**ENVIRONMENTAL OBJECTIVES:**	**AUDITABLE MANAGEMENT ACTIONS TO BE TAKEN TO MEET THE ENVIRONMENTAL MANAGEMENT PROGRAMME OBJECTIVES:**	✓	**RESPONSI-BILITY:**	**TIMING:**	**REQUIREMENT FOR "CLOSE-OUT" REPORT:**
7.2.5 ANCHOR / WELL LOCATION TO AVOID TOPOGRAPHIC FEATURES / OBSTACLES	Ensure that well positions will not affect obstacles / installations and sensitive habitats on the seabed	• Use data gathered from the seabed survey (see Section 7.3.5) and existing seismic data to conduct a pre-drilling geohazard analysis of the seabed and near-surface substratum in order to map and avoid any potentially significant topographic features (e.g. rocky outcrops), vulnerable habitats (e.g. hard grounds) and cultural heritage material (e.g. wrecks). • Use a Remotely Operated Vehicle (ROV) to survey the seafloor prior to drilling in order to confirm the presence or absence of any significant topographic features, vulnerable habitats and / or species (e.g. cold-water corals, sponges) and cultural heritage material (e.g. wrecks) in the area. • Adjust final well / anchor locations to avoid identified vulnerable habitats / communities and any identified or known shipwrecks. • Contact SAHRA regarding requirements to disturb any shipwrecks or any cultural heritage / archaeological material (see Section 7.1.4 for permit requirements). Any further activities in the directly affected area must cease until there has been compliance with any additional mitigation as specified by SAHRA.		Thombo and Drilling Contractor	Prior to drilling or as required	Copy of permit from SAHRA (if required) Provide photographic evidence from ROV coverage
7.2.6 DRILLING UNIT AND EQUIPMENT	Minimise disturbance to seabed	• Where practical and cost effective, dynamically positioned drill units should be used in preference to vessels requiring anchoring.		Thombo	Prior to drilling	
	Minimise risk of the introduction of non-indigenous invasive marine species	• Ensure all infrastructure (e.g. wellheads, Blow-out Preventers (BOPs) and guide bases) that has been used in other regions is thoroughly cleaned before use in South Africa.		Drilling Contractor	Prior to drilling	

7.3 OPERATIONAL PHASE						
PROJECT PHASE AND ACTIVITIES:	**ENVIRONMENTAL OBJECTIVES:**	**AUDITABLE MANAGEMENT ACTIONS TO BE TAKEN TO MEET THE ENVIRONMENTAL MANAGEMENT PROGRAMME OBJECTIVES:**	**✓**	**RESPONSI-BILITY:**	**TIMING:**	**REQUIREMENT FOR "CLOSE-OUT" REPORT:**
7.3.1 ADHERENCE TO THE EMP AND ENVIRONMENTAL AWARENESS	Operate in an environmentally responsible manner	• Comply fully with the EMP (compliance would mean that all activities were undertaken successfully and details recorded). • Undertake appropriate monitoring (as per specific topics) and track performance against objectives and targets. Document all activities and results for internal and external auditing. • Subscribe to the principles of an internationally acceptable Environmental Management System onboard the drilling unit and support vessels. This includes environmental awareness training, waste management and environmental monitoring, record keeping and continuous improvement.		Thombo and Drilling Contractor	Throughout programme	Provide copies of records
7.3.2 PREVENTION OF EMERGENCIES	Minimise the chance of emergency occurring with subsequent damage to the environment	• Prevent collisions by ensuring that the drilling unit and support vessels display correct signals by day and lights by night (including twilight), by visual radar watch and standby vessel(s). • Maintain 500 m safety zone around drilling unit through Notices to Mariners and Navigation Warnings. • Ensure that a support vessel, equipped with appropriate radar and communications, is kept on 24-hour standby in order to enforce the 500 m safety zone around the drilling unit. • Maintain standard vessel watch procedures (also see Section 7.3.3). • Ensure all hazardous materials are correctly labelled, stored, packed and sealed with proper markings for shipping. • Practice weekly emergency response drills. • Establish lines of communication with the following emergency response agencies / facilities: SAMSA, SAN Hydrographic Office (Silvermine), DEA (Directorate of Marine Pollution) and PASA.		Thombo and Drilling Contractor	Throughout operation	Provide record of any incidents and interaction with other vessels Provide records of emergency response drills
7.3.3 CONTINUE TO COMMUNICATE WITH OTHER USERS OF THE SEA AND RESOURCE MANAGERS	Promote co-operation and successful multiple use of the sea, including promotion of safe navigation	• Through normal communication channels, Radio Navigation Warnings and Notices to Mariners, keep relevant government departments and other key stakeholders (see Section 7.1.3) updated on the drilling programme. • Co-operate with other legitimate users of the sea to minimise disruption to other marine activities.		Thombo	During operations as required	Provide copies of written notices and list of those to whom it was sent

7.3 OPERATIONAL PHASE						
PROJECT PHASE AND ACTIVITIES:	**ENVIRONMENTAL OBJECTIVES:**	**AUDITABLE MANAGEMENT ACTIONS TO BE TAKEN TO MEET THE ENVIRONMENTAL MANAGEMENT PROGRAMME OBJECTIVES:**	✓	**RESPONSI-BILITY:**	**TIMING:**	**REQUIREMENT FOR "CLOSE-OUT" REPORT:**
7.3.3 cont.	7.3.3 cont.	• Keep constant watch for approaching vessels during the drilling programme and warn by radio and support vessel, if required. • Call, via radio, any vessel targets at a radar range of 24 nm from the drilling unit to inform them of the safety requirements around the drilling unit. • Keep a record of any interaction with other vessels.		Drilling Contractor	During operations as required	Provide record of interaction with other vessels
7.3.4 DEALING WITH EMERGENCIES INCLUDING MAJOR OIL SPILLS (owing to collision, vessel break-up, refuelling etc.)	Minimise damage to the environment by implementing response procedures efficiently	• Adhere to obligations regarding other vessels in distress. • Notify SAMSA (safety and pollution) and the Department of Finance (salvage, customs, royalties) about wrecked vessels. Provide location details to SAN Hydrographer. • In the event of an oil spill immediately implement emergency plans (see Section 7.1.2). In the case of an oil spill to sea with serious potential consequences to marine and human life notify (a) the Principal Officer of the nearest SAMSA office, (b) the DEA's Chief Directorate of Marine & Coastal Pollution Management in Cape Town, (c) PASA and (d) Smit Amandla Marine. Information that should be supplied when reporting a spill includes: > Name and contact details of person reporting the incident; > The type and circumstances of incident, ship type, port of registry, nearest agent representing the ships company; > Date and time of spill; > Location (co-ordinates), source and cause of pollution; > Type and estimated quantity of oil spilled and the potential and probability of further pollution; > Weather and sea conditions; > Action taken or intended to respond to the incident; and • Support vessels must have the necessary spill response capability to deal with small to medium accidental spills in a safe, rapid, effective and efficient manner. • 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.		Thombo and Drilling Contractor	In event of spill	Record of all spills (Spill Record Book), including spill reports; emergency exercise reports; audit reports. Incident log

7.3 OPERATIONAL PHASE						
PROJECT PHASE AND ACTIVITIES:	**ENVIRONMENTAL OBJECTIVES:**	**AUDITABLE MANAGEMENT ACTIONS TO BE TAKEN TO MEET THE ENVIRONMENTAL MANAGEMENT PROGRAMME OBJECTIVES:**	**✓**	**RESPONSI-BILITY:**	**TIMING:**	**REQUIREMENT FOR "CLOSE-OUT" REPORT:**
7.3.4 cont.	7.3.4 cont.	• Dispersants should not be used without authorisation of DEA. Dispersants should not be used: > On diesel or light fuel oil. > On heavy fuel oil. > On slicks > 0.5 cm thick. > On any oil spills within 5 nautical miles off-shore or in depths less than 30 metres. > In areas far offshore where there is little likelihood of oil reaching the shore. • Dispersants are most effective: > On fresh crude oils; under turbulent sea conditions (as effective use of dispersants requires mixing). > When applied within 12 hours or at a maximum of 24 hours. • The volume of dispersant application should not exceed 20-30% of the oil volume.				
7.3.5 PRE-DRILLING SONAR SURVEY	Reduce disturbance of marine fauna, particularly cetaceans (whales and dolphins), seals, seabirds (particularly penguins) and turtles.	• For a source level less than 190 dB re 1 µPa at 1 m: > Appoint a MMO for the duration of the survey. The MMO should conduct visual scans for the presence of diving birds, marine mammals and/or turtles around the survey vessel prior to the initiation of any acoustic impulses; > Surveying must only commence (subject to the need for a "soft-start") once it has been confirmed for a 15-minute period (visually during the day) that there is no marine mammal, diving seabird and/or turtle activity within 500 m of the vessel. However, if after a period of 15 minutes cetaceans smaller than 3 m, seals and/or diving seabirds are still within 500 m of the vessel, the survey may commence; > Terminate the survey if marine mammals, diving seabirds and/or turtles show obvious negative behavioural changes within 500 m of the survey vessel or equipment. The survey should be terminated until such time it is confirmed that the identified animal(s) has moved to a point that is more than 500 m from the source or despite continuous observation or 15 minutes has elapsed since the last sighting of the identified animal(s) within 500 m of the source; and > PAM technology should be used if surveying is undertaken during the key cetacean migration and breeding period from the beginning of June to the end of November.		Thombo and Survey Contractor	Prior to and during surveys	MMO and PAM operator close-out reports (where applicable)

7.3 OPERATIONAL PHASE						
PROJECT PHASE AND ACTIVITIES:	**ENVIRONMENTAL OBJECTIVES:**	**AUDITABLE MANAGEMENT ACTIONS TO BE TAKEN TO MEET THE ENVIRONMENTAL MANAGEMENT PROGRAMME OBJECTIVES:**	**✓**	**RESPONSI-BILITY:**	**TIMING:**	**REQUIREMENT FOR "CLOSE-OUT" REPORT:**
7.3.5 cont.	7.3.5 cont.	• For a source level greater than 190 dB re 1 µPa at 1 m the following should be implemented, in addition to the above: > A "soft-start" procedure should be implemented after the pre-watch survey (see above) for a period of 20 minutes when initiating surveying. This requires that the sound source be ramped from low to full power rather than initiated at full power, thus allowing a flight response by diving birds, marine mammals and/or turtles to outside the zone of injury or avoidance. Where the equipment does not provide for a "soft-start", the equipment should be turned on and off over a 20 minute period to act as a warning signal and allow the above-mentioned animals to move away from the sound source; > "Soft-starts" should, as far as possible, be planned to commence within daylight hours; and > "Soft-start" procedures must also be implemented after breaks in surveying (for whatever reason) of longer than 20 minutes. Breaks of shorter than 20 minutes should be followed by a "soft-start" of similar duration.		Thombo and Survey Contractor	Prior to and during surveys	MMO and PAM operator close-out reports (where applicable)
7.3.6 BLOW-OUT PREVENTION	Ensure that the necessary safeguards are in place and avoid any uncontrolled release of drilling fluids, oil and/or gas	• Fully inspect the BOPs on the drilling unit in accordance with the American Petroleum Industries recommended practices (or equivalent) prior to well drilling. • Ensure that all responsible personnel are qualified in accordance with International Well Control Forum requirements or equal and are adequately trained in both accident prevention and immediate response. • Follow written and internationally established procedures for well control. • Identify hazards and put risk control systems in place. • Implement monitoring and management measures in accordance with normal well control practise to assist in the detection and control of uncontrolled releases.		Drilling Contractor	Prior to and during drilling	Provide relevant certification and / or evidence of BOP inspection and application of risk control system

7.3 OPERATIONAL PHASE						
PROJECT PHASE AND ACTIVITIES:	**ENVIRONMENTAL OBJECTIVES:**	**AUDITABLE MANAGEMENT ACTIONS TO BE TAKEN TO MEET THE ENVIRONMENTAL MANAGEMENT PROGRAMME OBJECTIVES:**	**✓**	**RESPONSI-BILITY:**	**TIMING:**	**REQUIREMENT FOR "CLOSE-OUT" REPORT:**
7.3.7 USE AND DISPOSAL OF DRILLING MUDS, CUTTINGS AND CEMENT	Minimise discharges into the sea	Drilling fluids and cuttings: • Maximise the use of water-based fluids (WBF) at all times, using risered non-aqueous drilling fluid (NADFs) only when necessary. • Only low-toxicity and partially biodegradable Group III NADF should be used. • If the extent of cuttings dispersion overlaps with any vulnerable seabed communities identified in the vicinity of the proposed well location the seabed survey data and / or ROV (see Section 7.2.5), innovative technologies and operational procedures for drilling solids discharges should be considered (e.g. the use of weighted mud when drilling tophole sections to limit the extent of dispersion). • Centrifuge the returning mud and cuttings stream to remove finer drilled particles. • The treatment of NADF drill cuttings should aim to reduce their oil content to less than 5% of dry cuttings weight. • Ensure regular maintenance of the onboard solids control package. • The dispersion of the discharged cuttings should be aided by placing the cuttings chute at least 5 m below the sea surface. • All recovered NADF should be stored on board and taken to shore for treatment and / or reuse. • Where they are used ROV's should obtain video footage of the seabed before and after drilling operations to assess the status of cuttings disposal on the benthos. Cement: • Ensure only low-toxicity and partially biodegradable cement additives are used. • Avoid excess cement usage by using a ROV to monitor discharges to the seafloor around the drill casing.		Drilling and Mud Contractor	During drilling operation	Provide estimates of actual volumes of muds, cuttings and cement disposed Provide photographic evidence from ROV coverage

7.3 OPERATIONAL PHASE						
PROJECT PHASE AND ACTIVITIES:	**ENVIRONMENTAL OBJECTIVES:**	**AUDITABLE MANAGEMENT ACTIONS TO BE TAKEN TO MEET THE ENVIRONMENTAL MANAGEMENT PROGRAMME OBJECTIVES:**	**✓**	**RESPONSI-BILITY:**	**TIMING:**	**REQUIREMENT FOR "CLOSE-OUT" REPORT:**
7.3.8 DISPOSAL OF BALLAST WATER	Minimise the discharge of ballast water into the sea and reduce the possibility of an impact	• Implement a Ballast Water Management Plan (see Section 7.1.2). • De- and re-ballasting of vessels must be undertaken only under strict adherence to International Maritime Organisation (IMO) Guidelines governing discharge of ballast waters at sea (Guideline A.868(20)). • Avoid unnecessary discharge of ballast water. • Whenever possible, conduct the exchange of ballast water at least 200 nm 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 from the nearest land and preferably in water at least 200 m in depth. Thus in terms of these guidelines, the drilling unit and support vessels would be required, if necessary, to exchange ballast water outside of the area of interest for well drilling. • Other precautionary guidelines suggested by the IMO include: > During the loading of ballast, every effort should be made to avoid the uptake of potentially harmful aquatic organisms, pathogens and sediment that may contain such organisms, through adequate filtration procedures; > Where practicable, routine cleaning of the ballast tank to remove sediments should be carried out in mid-ocean or under controlled arrangements in port or dry dock, in accordance with the provisions of the ship's ballast water management plan; and > Avoidance of unnecessary discharge of ballast water.		Drilling Contractor	Throughout drilling operation	Provide estimates of actual volumes of ballast water disposed, distance and water depth ballast water was disposed

7.3 OPERATIONAL PHASE						
PROJECT PHASE AND ACTIVITIES:	**ENVIRONMENTAL OBJECTIVES:**	**AUDITABLE MANAGEMENT ACTIONS TO BE TAKEN TO MEET THE ENVIRONMENTAL MANAGEMENT PROGRAMME OBJECTIVES:**	**✓**	**RESPONSI-BILITY:**	**TIMING:**	**REQUIREMENT FOR "CLOSE-OUT" REPORT:**
7.3.9 POLLUTION CONTROL AND WASTE MANAGEMENT of products disposed of: into the air (exhausts, CFCs and incinerators), to sea (sewage, food, oils), to land (used oils etc, metals, plastics, glass, etc.)	Minimise pollution, and maximise recycling by implementing and maintaining pollution control and waste management procedures at all times	• Implement a Waste Management Plan (see Section 7.1.2). The plan must comply with legal requirements (including MARPOL) for waste management and pollution control (for air and water quality levels at sea) and ensure "good housekeeping" and monitoring practices: > General waste: - Initiate a waste minimisation system. - No disposal overboard. - Ensure on-board solid waste storage is secure. - Transport ashore for disposal. Retain waste receipts. Note: Incineration would require an Atmospheric Emissions Licence. > Galley (food) waste: - No disposal within 3 nm of the coast. - Disposal between 3 nm and 12 nm needs to be comminuted to particle sizes smaller than 25 mm. - Disposal beyond 12 nm requires no treatment. - Minimise the discharge of waste material should obvious attraction of fauna be observed. > Deck drainage: - Deck drainage should be routed to a separate drainage system (oily water catchment system). - Ensure all process areas are bunded to ensure drainage water flows into the closed drainage system. - Use drip trays to collect run-off from equipment that is not contained within a bunded area and route contents to the closed drainage system. - Ensure that weather decks are kept free of spillage. - Mop up any spills immediately with biodegradable low toxicity detergents. - Low-toxicity biodegradable detergents should be used in cleaning of all deck spillage. - Ensure compliance with MARPOL standards (15 ppm).		Drilling Contractor	Throughout drilling operations	Provide summary of waste record book / schedule and receipts Report occurrence of minor oil spills and destination of wastes

7.3 OPERATIONAL PHASE						
PROJECT PHASE AND ACTIVITIES:	**ENVIRONMENTAL OBJECTIVES:**	**AUDITABLE MANAGEMENT ACTIONS TO BE TAKEN TO MEET THE ENVIRONMENTAL MANAGEMENT PROGRAMME OBJECTIVES:**	**✓**	**RESPONSI-BILITY:**	**TIMING:**	**REQUIREMENT FOR "CLOSE-OUT" REPORT:**
7.3.9 CONT.	7.3.9 cont.	> Machinery space drainage: Vessels must comply with international agreed standards regulated under MARPOL. All machinery space drainage would pass through an oil/water filter to reduce the oil in water concentration to less than 15 ppm. > Sewage: - Use approved treatment plants to the MARPOL standards. - No disposal within 4 nm of the coast. - Disposal between 4 nm and 12 nm needs to be comminuted and disinfected prior to disposal into the sea. - Disposal beyond 12 nm requires no treatment. > Medical waste: Seal in aseptic containers for appropriate disposal onshore. > Metal: Send to shore for recycling or disposal. > Other waste: Transport ashore for disposal. Retain waste receipts. Ensure waste disposal is carried out in accordance with appropriate laws and ordinances. Note: Incineration would require an Atmospheric Emissions Licence. > Waste oil: Return used oil to a port with a registered facility for processing or disposal. > Wastewater: Comply with MARPOL. > Minor oil spill: Use oil absorbent. > Emissions to the atmosphere: - Comply with MARPOL Annex VI, which limits the main air pollutants contained in ships exhaust gas and prohibits deliberate emissions of ozone depleting substances. - Properly tune and maintain all engines, motors, generators and all auxiliary power to contain the minimum of soot and unburned diesel. - Implement leak detection and repair programmes for valves, flanges, fittings, seals, etc. > Other hazardous waste: - Record types and volumes of chemical and hazardous wastes (e.g. radioactive devices/materials, neon lights, fluorescent tubes, toner cartridges, batteries, etc.) and destination thereof. - Send to designated onshore hazardous disposal site. Retain waste receipts. • Ensure all crew is trained in spill management.				

7.3 OPERATIONAL PHASE						
PROJECT PHASE AND ACTIVITIES:	**ENVIRONMENTAL OBJECTIVES:**	**AUDITABLE MANAGEMENT ACTIONS TO BE TAKEN TO MEET THE ENVIRONMENTAL MANAGEMENT PROGRAMME OBJECTIVES:**	**✓**	**RESPONSI-BILITY:**	**TIMING:**	**REQUIREMENT FOR "CLOSE-OUT" REPORT:**
7.3.10 WELL TESTING	Ensure that there are minimal discharges into the sea and minimise product burned	• Use a high-efficiency flare to maximise combustion of hydrocarbons. • Only the minimum volume of hydrocarbons required for the test should be flowed, without compromising safety. • Reduce well test durations to the extent practical. • Maximise flare combustion efficiency by controlling and optimising flare fuel/air/stream flow rates. • Minimise the risk of pilot blow-out by ensuring sufficient exit velocity and providing wind guards. • Where appropriate, use a high integrity instrument pressure protection system to reduce over pressure events. • Minimise liquid carry over and entrainment in the flare stream using a suitable liquid separation system. • Minimise flame lift off and / or flame lick. • Monitor and control odour and visible smoke emissions (no visible black smoke). • Use well control procedures to ensure that there are no discharges to the sea. • For each drillstem flow test, provide an estimate of the volume of any oily discharge into the sea and the size of the resulting slick / sheen.		Drilling Contractor	During well testing	Quantity of oil / gas burned
7.3.11 TRANSPORT, STORAGE AND HANDLING OF RADIOACTIVE DEVICES	Avoid human and environmental exposure to radio-active material	• Comply with necessary regulations and licence requirements for the transport, storage and handling of radioactive devices. • Transport and store radioactive devices in specially designed secured (locked) storage containers. • Designate competent person/s in charge and to handle the radioactive devices. Follow strict approved procedures when handling the devices. Wear personal monitoring devices to measure any unusual exposure. • Follow radioactive sources procedure. When radioactive sources are to be used, secure the area between and around the storage containers and the floor and only allowed key personnel in the area. • Set up incident and emergency reporting procedures for actual or suspected individual over-exposure, theft or loss, logging tools stuck downhole in wells, and release or spillage into the environment. • Routinely test the sources according to industry requirements to document leak levels.		Thombo and Drilling Contractor	Throughout drilling operations	Provide copy of licence(s) and results from routine tests on radioactive sources to determine leak levels

7.3 OPERATIONAL PHASE						
PROJECT PHASE AND ACTIVITIES:	**ENVIRONMENTAL OBJECTIVES:**	**AUDITABLE MANAGEMENT ACTIONS TO BE TAKEN TO MEET THE ENVIRONMENTAL MANAGEMENT PROGRAMME OBJECTIVES:**	**✓**	**RESPONSI-BILITY:**	**TIMING:**	**REQUIREMENT FOR "CLOSE-OUT" REPORT:**
7.3.12 EQUIPMENT LOSS	Minimise hazards left on the seabed or floating in the water column, and inform relevant parties	• Keep a record of lost equipment and all items lost overboard and not recovered. • When any items that constitute a seafloor or navigational hazard are lost on the seabed, or in the sea, complete a standard form / record sheet, which records the location, date and cause of loss, details of equipment type, weather, sea state, etc. • Notify SAMSA and SAN Hydrographer. • Request that SAN Hydrographer send out a Notice to Mariners with this information.		Drilling Contractor	Throughout drilling operation	Provide a list of lost equipment and a copy of record sheet
7.3.13 USE OF AIRCRAFTS / HELICOPTERS for crew changes, servicing, etc.	Minimise disturbance / damage to marine and coastal fauna.	• Establish, with pilots, flight paths that do not pass over coastal reserves (MacDougall's Bay), seal colonies (Kleinzee and Strandfontein Point), bird colonies (Bird Island at Lambert's Bay) or Important Bird Areas (Olifants River Estuary, Velorenvlei, Lower Berg River wetlands and the West Coast National Park and Saldanha Bay Islands). • Low altitude coastal flights (<2 500 ft and within 1 nm of the shore) should also be avoided, particularly during the winter/spring (June to November inclusive) whale migration period and during the November to January seal breeding season. The flight path between the onshore logistics base in Kleinzee or Hondeklipbaai and drilling unit should be perpendicular to the coast. • Brief all pilots on ecological risks associated with flying at a low level along the coast or above marine mammals. • Comply with aviation and authority guidelines and rules. • Report deviations from set flight plans.		Aircraft / Helicopter Contractor	As required	Submit copy of set flight path. Report deviations from set flight paths.
7.3.14 OIL BUNKERING / REFUELLING AT SEA	Minimise disturbance / damage to marine life.	• No discharge of any oil whatsoever is permitted within 50 nm of the coast. • Transfer of oil at sea is not permitted within the economic zone (i.e. 200 nm from the coast) without the permission of the Minister or delegated authority (namely SAMSA). In terms of the Marine Pollution (Control and Civil Liability) Act, 1981 a Pollution Safety Certificate must be obtained before commencement of operations. • Submit an application in terms of Regulation 14 (Regulation under the Prevention and Combating of Pollution of the Sea by Oil Act) to SAMSA (Principal Officer) at the port nearest to where the transfer is to take place. • Inform SAMSA of location, supplier and timing, 5 days prior to refuelling at sea.		Vessel Captain	As required, 5 days prior to refuelling	Confirm that a notice was sent to SAMSA

7.3 OPERATIONAL PHASE						
PROJECT PHASE AND ACTIVITIES:	**ENVIRONMENTAL OBJECTIVES:**	**AUDITABLE MANAGEMENT ACTIONS TO BE TAKEN TO MEET THE ENVIRONMENTAL MANAGEMENT PROGRAMME OBJECTIVES:**	**✓**	**RESPONSI-BILITY:**	**TIMING:**	**REQUIREMENT FOR "CLOSE-OUT" REPORT:**
7.3.15 DRILLING UNIT LIGHTING	Minimise attraction of marine fauna to drilling unit.	• Minimise non-essential lighting to reduce nocturnal attraction. However, such measures should not undermine work safety aspects or concerns. • Implement a monitoring programme of faunal attraction where all faunal injuries and mortalities are logged.		Drilling Contractor		Results of faunal monitoring

7.4 DECOMMISSIONING AND CLOSURE PHASE						
PROJECT PHASE AND ACTIVITIES:	**ENVIRONMENTAL OBJECTIVES:**	**AUDITABLE MANAGEMENT ACTIONS TO BE TAKEN TO MEET THE ENVIRONMENTAL MANAGEMENT PROGRAMME OBJECTIVES:**	**✓**	**RESPONSI-BILITY:**	**TIMING:**	**REQUIREMENT FOR "CLOSE-OUT" REPORT:**
7.4.1 SUSPENSION OR ABANDONMENT OF WELLS	Ensure that there are no leakages	• General: > Seal well by inserting cement plugs in the well bore at various levels according to good oilfield practice. Record volume of cement discharged on seafloor. > Test well integrity. > Remove BOPs. • Suspended wells: > Place a corrosion cap over wellhead to facilitate re-entry. > Notify the SAN Hydrographer regarding the positions of any suspended wells on the seafloor so that they there positions can be charted. • Abandoned wells: > Cut casings approximately 3 m below the seafloor. > Remove wellhead from seafloor.		Thombo and Drilling Contractor	On completion of well drilling	Quantity of cement discharged on seafloor Provide copies of correspondence with SAN Hydrographer
7.4.2 DRILLING UNIT / VESSELS TO LEAVE AREA	Leave area as it was prior to operation	Ensure that no construction debris or dropped equipment that may be detrimental to environment or other users of the sea is left on the seafloor.		Drilling Contractor	On completion of well drilling	Confirm through seabed scan and/or video
7.4.3 INFORM RELEVANT PARTIES OF SURVEY COMPLETION	Ensure that relevant parties are aware that the drilling operation is complete	Inform all key stakeholders (see Section 7.1.3) that the drilling unit and support vessels are off location.		Thombo	Within two weeks after completion of drilling	Copies of notification documentation required
7.4.4 FINAL WASTE DISPOSAL	Minimise pollution and ensure correct disposal of waste	• Dispose all waste retained onboard at a licensed waste site using a licensed waste disposal contractor. • All recovered NADF should be stored on-board and taken to shore for treatment and reuse.		Drilling Contractor	When drilling unit / support vessels are in port	Waste receipt required from contractor
7.4.5 COMPILE WELL DRILLING "CLOSE-OUT" REPORT	Ensure corrective action and compliance and contribute towards improvement of EMP implementation	• Compile an exploration drilling "Close-out" Report for each well based on the monitoring undertaken during drilling. • Provide information / records as indicated in the "Close-out" Report column of the EMP within 90 days of the drilling operation or as required by PASA and / or DEA. • Provide copy of report to PASA and DEA. • Provide a copy of any video footage that was shot during the course of the drilling operation to PASA, if requested.		Thombo	On completion of each well	

7.4 DECOMMISSIONING AND CLOSURE PHASE						
PROJECT PHASE AND ACTIVITIES:	**ENVIRONMENTAL OBJECTIVES:**	**AUDITABLE MANAGEMENT ACTIONS TO BE TAKEN TO MEET THE ENVIRONMENTAL MANAGEMENT PROGRAMME OBJECTIVES:**	✓	**RESPONSI-BILITY:**	**TIMING:**	**REQUIREMENT FOR "CLOSE-OUT" REPORT:**
7.4.6 INFORMATION SHARING	Expand knowledge base	Take steps to share data collected during the drilling programme (e.g. ROV video footage of the benthic environment), if requested, to resource managers (including DEA, South African National Biodiversity Institute and appropriate research institutes).		Thombo		As requested