8 ENVIRONMENTAL MANAGEMENT PLAN

8.1 INTRODUCTION

The Environmental Management Plan (EMP) highlights the key environmental issues associated with the proposed Lunskoye seismic survey and sets out the specific mitigation measures and monitoring programmes (introduced in *Chapter 7*) to be implemented by contracted parties and SEIC. The measures are designed to eliminate, offset or reduce any identified adverse environmental impacts to a level that is as low as reasonably practicable (ALARP). The EMP incorporates SEIC environmental policy commitments, best practice guidelines (*eg* the International Institute of Geophysical Contractors and JNCC), and relevant international and Russian Federation standards. The Environmental Management Plan is presented in *Table 8.1*.

8.2 IMPLEMENTATION OF THE EMP

The successful implementation of the EMP will require the adoption of the protection measures presented in *Table 8.1* and their integration into the contractor's own HSE management systems as well as ongoing commitment from SEIC.

In addition, the contractor's HSE management systems will be required to include the provisions described below to ensure that the EMP is effective.

- Clearly defined roles and responsibilities for the completion and execution of the EMP will be communicated to the appropriate individuals (*eg* vessel captain, company quality and HSE advisors, line managers).
- The provision of permit and agency information to appropriate crewmembers.
- On board operational supervision to ensure compliance with the HSE Management System, additional HSE regulations and permit conditions.
- On board training to ensure that all crew are familiar with the environmental protection procedures.
- Appropriate reporting and remedial action procedures to ensure that any incidents are reported promptly and dealt with effectively.
- Assessment and revision of the EMP as required.
- Auditing of the EMP's implementation by SEIC.

8.3 *MONITORING*

The field crew will implement an environmental monitoring programme that will be consistent with the EMP requirements and with the specific marine mammal monitoring requirements reported in the Western Gray Whale Protection Plan that has been produced under separate cover.

8.4 *COMMUNICATION AND REPORTING*

HSE issues and information will be communicated through daily, weekly and monthly reports, safety logs, near-miss reports, production logs, incident reports and on-site meetings.

Marine mammal recording logs and fisheries interaction logs will be prepared and presented to SEIC on completion of the survey.

Stakeholder requirements regarding HSE procedures and reporting will be incorporated into the contractor's HSE management system.

The contractor will produce a final report after the completion of the survey. The report will incorporate all the HSE information collected and recorded during the survey together with required inventories, logs and sub stage reports.

8.5 *COMPLETION OF THE SEISMIC SURVEY OPERATIONS*

On completion of the Lunskoye seismic survey operations, the EMP will be reviewed by SEIC to assess its effectiveness in reducing the environmental impact of the survey programme.

Table 8.1 Environmental Management Plan

Issue	Key Associated Impacts / Risks	Key Controls	Actions Required
Disturbance and Noise Impacts on Marine Biota			
Impacts on marine biota relating to the physical presence of survey vessels and the effects of seismic sound sources	• Injury to / fatality of marine mammals and other biota from collisions with vessels and deployed equipment (*eg* streamers) • Disturbance of, injury to and fatality of marine mammals and other biota from underwater airgun noise • Temporary interference of survey equipment with echolocation pulses used by certain marine mammals for the location of prey and other objects (navigation) • Temporary interference of survey equipment with marine mammal interactions and communications	• Specification of seismic source arrangement to maximise the proportion of energy directed downward • Specification of seismic source energy level to be no larger than required to meet the objectives of the survey • Trained marine mammal observers with clear mandates and authorities • Management controls and enforcement plans to prevent waste release or the attraction of marine organisms by personnel	• Audit of vessel equipment specifications to ensure that they meet with SEIC requirements • Aerial marine mammal surveys to be conducted before, during and after the seismic survey • Working and reporting procedures to be established with marine mammal observers to ensure safety zones are observed and the behaviour of marine mammals is recorded • Airgun ramp (soft-start) up over 20-minute period to be conducted each time firing commences • The establishment of a system to record that ramp-up procedures are followed every time the airguns are to be fired • Measures to be established to prevent food wastes from being disposed overboard • Training of all personnel to highlight marine ecological sensitivities to aid in the prevent ion of actions that might result in harm to marine biota • Post–survey reporting on the location and behaviour of any marine mammals observed in relation to survey location and activities • Safety zones to be established for marine mammals prior to the survey by acoustic measurements • Ceasing of operations if the risk of danger to marine mammals is considered to be unacceptable by observers • Collation of existing information on marine mammal activity in the area

Issue	Key Associated Impacts / Risks	Key Controls	Actions Required
			• Frequent surveys of marine mammals before, during, and after the survey period to be conducted • Monitoring of the behaviour of any western gray whales in the survey area during the survey • Production of a technical report on completion of the survey, incorporating information on marine mammal sightings and behaviour and fisheries interactions
Impacts on Other Users of the Area			
Vessel and equipment interaction with other users of the area (*eg* marine traffic, fishing activities, submarine infrastructure)	• Potential for collision or other accident with other vessels, equipment and concomitant injury, loss of life, vessel damage and loss of property/cargo • Temporary interference with commercial fishing activities and damage to fishing equipment • Interference with any military use of the area • Direct damage to identified or unidentified wreck or non-wreck sites as a result of collision or disturbance	• Advance consultation with and notification of appropriate Sakhalin Oblast regulatory authorities, port authorities, oil and gas operators, fisheries organisations, military authorities and any other relevant parties • Provision of information on planned survey activities including vessel movements, survey location, safety zones and survey schedule • Issuing of a 'Notice to Mariners' • The presence of a support vessel during survey activities to warn other users in the area • The inclusion of a fisheries liaison officer onboard the seismic vessel or support vessel • Warning devices on streamer tail buoy • Vessel warning and navigational systems (lights, fog horn, radar) • Scheduling of a side-scan sonar survey and the identification of any wrecks or submerged items prior to survey operations	• Agreement of appropriate consultation and notification systems and the identification of, and consultation with, relevant government departments, regulators and other stakeholders of the planned survey programme • Stakeholders to be advised of planned programme in good time, checks to be made regarding the dissemination of warnings at a regional and local level and follow up to ensure that information has been received • Advance notification to stakeholders prior to survey commencing and notification of any programme changes • Complete records to be maintained of consultation with all stakeholders • All wrecks and other potential hazards within the survey area to be mapped using side scan survey results and 500 m exclusion zones to be established prior to the start of the seismic survey • All interactions with fishing activities or fishing equipment (including the exact location, type and identifying markings) to be recorded

Issue	Key Associated Impacts / Risks	Key Controls	Actions Required
			• Investigation and settlement of compensation claims within a reasonable timeframe (to be specified in due course) • All interactions, conflicts and accidents involving other users of the marine environment to be reported to the appropriate authorities • Any features of archaeological or cultural heritage importance to be reported to the Sakhalin Oblast Environmental Protection Committee or other relevant body on completion of the survey
Pollution Impacts from Effluents, Emissions and Wastes			
Effluent discharges	• Impacts on water quality from discharges of sewage, sanitary wastes, oily wastes, cooling water, run-off water and other discharges • Cooling water discharges may lead to localised and temporary areas of thermal stress and reduced levels of dissolved oxygen • Minor chlorine release from sewage treatment or water generator systems may cause localised and transient harm to organisms • Damage to marine organisms resulting from sea water intakes	• Good vessel operating procedures for handling liquids and controlling discharges • Compliance with MARPOL *Annex I* requirements (Oil Record Book, IOPP Certificate, slop oil tank *etc*) and Russian Federation legislation • Oily waste handling systems and equipment (no oily wastes to be discharged at sea) • Onboard sewage treatment systems • Use of biodegradable lubricants and rust preventatives on towed equipment • Monitoring procedures in place onboard in accordance with best practice procedures, MARPOL and Russian Federation legal requirements • Installation of filters to reduce the drawing-up of marine organisms with intakes of cooling and service water	• SEIC to review all operating procedures to ensure compliance with best practice and relevant legislation • SEIC to monitor contractor performance by reviewing the Oil Record Book • Periodical checks to ensure that procedures and controls are performing as required, including monitoring effluent discharges to check compliance with the MARPOL, checking the performance of oil / water separating equipment and chlorine dosing to service water systems (if provided) to check that they are operating to specification • Preventative maintenance regimes for effluent treatment systems to be implemented and monitored • Induction and training of vessel crews to ensure the dissemination of information on required effluent discharge practices • Inventory of effluent discharges to be collated and reported at end of survey

Issue	Key Associated Impacts / Risks	Key Controls	Actions Required
Air emissions from survey vessels	• Reduction in local air quality • Reduced visibility due to smoke emissions from vessel exhausts or solid waste incineration • Contribution to regional and global atmospheric pollution phenomena *eg* acidic deposition, ozone layer depletion and the greenhouse effect	• Standard operating procedures and controls in place onboard • Routine maintenance and correct operation of vessel propulsion, exhaust systems, generator systems and incinerator systems • Controlled incineration of wastes • No ozone depleting substances to be used (except in older survey vessels where closed recovery systems will be employed on refrigeration equipment)	• Standard shipboard monitoring of operational systems to be implemented • Vessel propulsion, exhaust, generator and incinerator systems to be maintained and operated correctly (implementation of preventative maintenance regime) • Newly constructed geophysical vessels to be fitted with exhaust gas monitoring systems • Inventory of emissions to be collated and reported at end of survey
Solid and scheduled waste generation and disposal	• Impacts on marine organisms from waste management and disposal practices	• Good operating procedures and controls in place onboard including systems for recording generated and disposed wastes • Onboard labelled / segregated waste storage facilities • The availability of solid waste compaction and incineration facilities • Management of all wastes in accordance with MARPOL and Russian Federation legal requirements. No wastes to be disposed of overboard	• Policy to be implemented to minimise, reuse and recycle wastes • Oily wastes to be stored and disposed off in compliance with Russian Federation legislation and MARPOL requirements • No solid or scheduled wastes to be disposed of into the sea; including incinerator residues • Information and enforcement regarding waste management and disposal practices to be well disseminated to personnel • Properly licensed onshore contractors to be used to dispose of all solid and scheduled wastes in accordance with the legislations of the receiving port and the flag nation of the seismic survey vessel • Accurate manifestation and documentation of all wastes generated, disposed of or transferred to shore are to be maintained • Contractor performance to be monitored by reviewing waste transfer and disposal records

Issue	Key Associated Impacts / Risks	Key Controls	Actions Required
Accidental Spills, Leaks and Dropped Objects			

Accidental spills, leaks and dropped objects resulting from inter-vessel collisions, interactions with objects / equipment or onboard error	• Release of harmful substances (*eg* wastes, oil, fuel oil), objects and cargo resulting in a decrease in water quality, injury or fatality to marine organisms and obstruction to other vessels
	• Release of kerosene as a result of damage to the streamer, leading to a decrease in water quality and impacts on marine organisms
		• Consultations/notification of other potential users of the area
		• Survey activities are to be conducted according to the HSE management system, operational plan, activity catalogue, SOPEP, MARPOL, emergency response plans and hazard analysis documents and plans
		• Vessel crew to be inducted and trained and information to be effectively disseminated to personnel
		• Vessel to be equipped with appropriate containment and clean-up equipment *eg* cable deck, storage and under streamer reel areas constructed to contain spills
		• Crew to be trained in clean-up equipment use and routine spill clean-up exercises
		• Vessel navigation and communications aids and locational devices on tail buoy and streamer
		• Pre-survey side scan sonar survey to identify submerged objects
		• Operational depths maintained greater than 20 m to avoid grounding
		• Inflatable devices on streamer sections
		• Support vessel on site to warn other traffic/clear debris
			• Identification and consultation with other potential users of the area
			• Development and implementation of procedures to deal with emergency incidents
			• Induction and training in risk awareness, emergency response procedures and preventative measures such as:
			  • good practise in fuel storage and handling;
			  • regular inspection of fuel tanks;
			  • refuelling procedures for offshore refuelling.
			• Development and implementation of procedures to ensure that hazardous substances and wastes are identified, labelled, handled and stored appropriately and that safety regulations and manufacturer's directions are available to crew
			• Waste reception facilities to be clearly labelled and facilities to be closed or covered to prevent loss
			• Oil spill clean-up kit to be correctly maintained and personnel to be appropriately trained. Exercises to be conducted every three months
			• All portable tanks, drums, containers and equipment with capacities of 25 litres of more to be labelled with the contractor's name
			• The streamer must be filled by trained operatives in a dedicated bunded area and all pumping and filling equipment to be maintained regularly
			• All deployed equipment to be highly visible and securely fastened

Issue	Key Associated Impacts / Risks	Key Controls	Actions Required
			• Ensure the recording of lost materials and their recovery whenever possible and notify relevant stakeholders in the event of equipment loss, spill or accident • Review procedures in the event of an incident to reduce risk of recurrence