Chapter 1: Introduction

1.1 Project Background

The Sakhalin II project is one of two current Production Sharing Agreements (PSAs) that have been signed for oil and gas fields offshore from Sakhalin Island. Sakhalin Island is one of the administrative regions of the Russian Federation. The island is located in the Sea of Okhotsk; the northwest coast is about 20 km from the Russian mainland, and the south-west coast is about 60 km north of the Japanese Island of Hokkaido.

In May 1991, the Russian Federation Government and the Sakhalin Local (Oblast) Administration invited international companies to tender proposals for the right to conduct a Feasibility Study for the development of the Piltun-Astokhskoye (PA) and Lunskoye oil and gas fields off the northeast coast of Sakhalin Island. The tender was won by the MMM (Marathon, McDermott, Mitsui) Consortium, who were later joined by Shell and Mitsubishi. In April 1994, the consortium established Sakhalin Energy Investment Company (SEIC) as a business entity for the purpose of developing the PA and Lunskoye fields. In June 1994, SEIC signed a PSA Contract with the Russian Federation Government and the Sakhalin Oblast Administration. In May 1996, SEIC received the licenses based on the PSA.

McDermott sold their share in SEIC to the other four shareholders in 1997. In 2000, Marathon's interest was transferred to Shell. SEIC's shareholders now consist of Shell (55%), Mitsui (25%), and Mitsubishi (20%).

SEIC proposed a phased development of the PA field, starting with the Astokhskoye feature and conducting a programme of appraisal and designing facilities deployment. Phase 1 resulted in first production from the PA-A (Molikpaq) platform in 1999. Phase 2 is a comprehensive and much larger development of both licences, incorporating existing production from PA-A into a major integrated oil, gas, and LNG project. The development of the PA field is for production of oil and natural gas. The expected output of the Lunskoye field is mostly a gas condensate field with the development of an oil rim. The Plan of Development for Phase 2 of the Sakhalin II project was approved in June 2001 by the Sakhalin-II Supervisory Board (a body overseeing the PSA and consisting of representatives of the Russian Federation shareholders and SEIC).

1.2 Regulatory Framework

Regulatory instruments and industry standards relevant to the Sakhalin II project are described in this chapter. The Constitution of the Russian Federation (1993 as amended in 2001) defines general principles of legislative regulations in the area of natural resource management and protection of the environment. It also secures the right of each citizen to favourable environment, reliable information on its condition, and compensation for damage to health or property as a result of environmental violation (Article 42). The Constitution states that land and other natural resources of Russia are used and protected as the basis of the life and activities of people inhabiting a respective territory (Article 9).

The regulatory instruments and industry standards regarded in this project are as follows:

- terms and conditions of the Agreement on development of the PA and Lunskoye oil and gas fields on the basis of the PSA between the Government of the Russian Federation and SEIC;
- requirements of the environmental legislation of the Russian Federation and the Sakhalin Oblast;
- relevant guidelines of international organisations and the companies participating in the Project; and
- SEIC's approach to environmental protection.

1.2.1 Production Sharing Agreement

The Sakhalin-II PSA between the Russian Federation and SEIC is the legal basis for the development of the PA and Lunskoye oil and gas fields. The PSA was concluded in June 1994, before the enactment of the Federal Law "*Law on Production Sharing Agreements"* of 30 December 1995 No. 225 (as modified on January 7, 1999) (the "PSA Law"). SEIC will take all measures required to ensure compliance of any decisions taken with the above Law.

The PSA Law requires the following:

> *"The works under the agreement shall be accomplished in compliance with requirements of the legislation of the Russian Federation ... concerning the safe conduct of works, and protection of the subsoil, the natural environment and the health of the population. In this respect, the agreement shall stipulate the investor's obligations for taking of measures aimed at preventing harmful effects of the said works on the natural environment, as well as to eliminate the consequences of such effects".*

The PSA states that the activities will be conducted in accordance with

- laws, regulations, decrees, and other governmental acts applicable on the territory of the Russian Federation, officially enacted, and publicly available; and
- environmental standards generally accepted in the international oil and gas industry. Such standards are subsequently defined in the PSA as "construction and operation codes, standards and industry practices, and environmental, health and safety norms, policies and practices, generally accepted in the international oil, gas, pipeline, and LNG industries".

The use of international industry norms and standards with respect to environmental protection is further supported by the following international conventions to which the Russian Federation is a signatory party:

- *United Nations Convention on Law of the Sea* of 1982 (entering into force in 1994) ("UNCLOS");
- *International Convention for the Prevention of Pollution from Ships,* November 2, 1973 as modified by Protocol of February 17, 1978 ("MARPOL"); and

- *Convention on the Prevention of Marine Pollution by Dumping of Wastes and other Materials*, December 29,1982, as modified by Protocol of November 8, 1996 ("'London Convention").
- *Convention on the Conservation of Migratory Species of Wild Animals* (1983) and the *Agreement on Conservation and Management of Migrating Species of Birds and Mammals and their Habitats* (1994). Those set out the need for special consideration to be given to the protection of the unique richness of animal populations inhabiting the areas of planned operations.

1.2.2 Russian Federation Environmental Legislation

1.2.2.1 Environmental Protection in the Territorial Sea

The Piltun-Astokhskoye (PA) and Lunskoye Licence areas are located within the 12 nautical mile limit of Russian Territory, therefore belonging to the Russian Territorial Sea. The main issues that define the Territorial Sea's regulatory and legal regime with regard to oil and gas development projects have to do with jurisdiction over the Territorial Sea and its natural resources, management of those resources, and environmental protection.

Pursuant to Decrees of the President of the Russian Federation "*On the Conservation of the Natural Resources of the Territorial Waters, Continental Shelf, and Economic Zone of the Russian Federation*" (5 May 1992, #436) and on "*Federal Natural Resources*" (16 December 16 1993, #2144), the Territorial Sea and its natural resources are under federal jurisdiction. That legal principle is detailed in the *Water Code* of the Russian Federation (1995). It establishes that the Territorial Sea can, in accordance with the Russian Federation Constitution, be managed jointly by federal and regional executive agencies (Art, 36). The Federal Law "*On Inland Sea Waters, the Territorial Sea and the Contiguous Zone of the Russian Federation*" (1998) specifies that with regard to issues of aquatic life and other natural resource exploration, development and protection, the powers granted to regional agencies of the Russian Federation shall be governed by an agreement with the federal authorities. Pursuant to those main provisions, executive agencies at both the federal and Sakhalin Oblast level will jointly regulate oil and gas development in the Territorial Sea.

The Law of the Russian Federation "*On the Protection of the Environment*" No. 2060-1 of 19 December 1991 (as modified on 2 June 1993), the Federal Law "*On State Environmental Review*" (1995, Art. 11-12), and the "*Federal Law on the Inland Sea Waters, the Territorial Sea, and the Contiguous Zone of the Russian Federation, 1998*" (Article 34) lay down the following main principles of environmental protection applicable to operations in the Territorial Sea:

- limiting (controlling) environmental impact;
- payment for using natural resources and polluting the environment; and
- the requirement for a State environmental review.

1.2.2.2 Protection Of Wildlife

According to Article 22 of the Federal Law No. 52-FZ of 24 April 1995 "*On Wildlife*", and Article 65 of the Russian Federation Law "*On Protection of the Environment*", any

activity that entails potential changes in wildlife habitat and migration routes, reproduction, feeding, and resting conditions of animals should be carried out only in compliance with requirements that ensure wildlife protection.

Article 24 of the Law "*On Wildlife*" prohibits activities that may result in death, reduction of number, or deterioration of habitats of wildlife species entered in a Red Data book. In accordance with the above definition, the nature of potential impacts of construction and operations facilities and activities should be assessed in order to qualify them as admissible or inadmissible by that legal provision. At the same time, the "presumption of potential ecological hazard of any planned activity" principle also requires such an assessment.

Pursuant to the generally accepted methodology of scientific analysis, such an assessment should be based on results of field studies and/or results of experimental investigations. The present Environmental Impact Assessment (EIA) is based on the analysis of several years of detailed studies of western gray whales in the project area, knowledge of the types of noise and disturbance produced by many of the facilities and activities, and observations of the behaviour of gray whales and other baleen whales exposed to similar facilities and activities.

In accordance with the requirements of the Law "*On Wildlife*", the planned Sakhalin II oil and gas development project will be conducted with the provision for relevant measures to protect wildlife as a whole and western gray whales in particular, and to preserve their resting and feeding grounds (habitat, feeding and resting conditions), migration routes, and reproduction (by protecting their calves; western gray whales do not breed near Sakhalin Island).

1.2.3 Sakhalin Oblast Legislation

The key legislative acts of Sakhalin Oblast that regulate environmental issues and natural management relevant to this EIA are as follows:

- "Regulations of the Sakhalin Oblast" (9 July 2001, #270), which states (Chapter 10) basic principles of natural management on the territory of the Oblast;
- the Sakhalin Oblast Law "On Red Book of Sakhalin Oblast" (10 March1999, #104), which regulates activities related to protection and preservation of rare and engangered wildlife species, including animals, plants, other vegetation, and mushrooms that inhabit Sakhalin Oblast territories, and;
- the decree of the Governor of Sakhalin Oblast "On urgent measures on prevention and liquidation of emergency oil and oil products' spills in Sakhalin Oblast" (27 November 2000, #482) and other documents regulate issues of organisation of the oil and gas extraction on the shelf of adjacent seas.

1.2.4 Guidelines of International Organisations and Shareholders

The World Bank requires environmental assessment of projects proposed for Bank financing to help ensure that they are environmentally sound and sustainable, and thus to improve decision making. The World Bank (*Operational Policies*, OP 4.01 – Annex A) defines environmental impact assessment as

> *An instrument to identify and assess the potential environmental impacts of a proposed project, evaluate alternatives, and design appropriate mitigation, management, and monitoring measures. Projects and subprojects need EIA to address important issues not covered by any applicable regional or sectoral EIA.*

The borrower is responsible for carrying out the EA. A proposed project is classified as Category A if it is likely to have significant adverse environmental impacts that are sensitive, diverse, or unprecedented. For Category A projects, the borrower retains independent EA experts not affiliated with the project to carry out the EA. This EIA has been prepared by such an independent EA expert not affiliated with the project, LGL Limited, environmental research associates, of Canada.

The content of an Environmental Assessment Report for a Category A Project is specified in the World Bank's *Operational Policies*, OP 4.01 – Annex B. This EIA conforms to those specifications. Key supporting guidelines are

- World Bank Pollution Prevention and Abatement Handbook 1998;
- Environmental Assessment Sourcebook 1991 and Updates; and
- IFC Guidelines No 15 Offshore Oil and Gas Developments.

The Royal Dutch/Shell mandatory *1997 Group Procedure for an HSE Management System* includes a requirement to carry out an EIA of all new developments. The document *Technical Guidance for Environmental Assessment* (Shell HSE Advisers Panel, December 1999, 58 p.) describes the environmental assessment process, including collection of information, the hazard and effects management process, and communication of assessment results. This EIA conforms to those guidelines, in particular the recommendations in Section 3.2.2.1 regarding description and quantification of effects, and of significance of effects.

1.2.5 SEIC's Approach to Environmental Protection

SEIC has developed comprehensive management systems for Health, Safety, Environmental and Social issues in the course of SEIC business since 1994 and in preparation for the Phase 2 development. In that framework, SEIC developed and adopted several documents that reflect the policy of the SEIC in the sphere of environmental protection, principles of management, instruments of control, and mechanisms of implementation.

1.2.5.1 Sustainable Development

SEIC adopts the generally-accepted definition of Sustainable Development, *'meeting the needs of the present without compromising the ability of future generations to meet their own needs'* (WCED, 1987). Sustainable development comprises three areas that are closely linked: Economic development, environmental protection, and social responsibility. That means that in all SEIC's business activities and in all decision making in projects and processes, continuous attention is given to striking a balance between economic development, environmental protection, and social responsibility, in the context of Sakhalin Island and the Far East. That commitment is stated in SEIC's *Sustainable Development Policy*.

1.2.5.2 Environmental Policy

SEIC's Environmental Policy is as follows:

As a company, SEIC observes the following policies and practices:

They seek external certification of the environmental component of their HSE management systems against a recognised, independent system standard;

They seek to prevent pollution and minimise environmental impact from existing and planned activities. This includes identifying environmental hazards and risks and implementing appropriate controls to ensure that the risks are reduced to a level 'as low as reasonably practicable' (ALARP);

They recognise the priority of preventing oil and chemical spills, and maintain contingency arrangements in co-operation with the authorities and emergency services to respond responsibly and appropriately to environmental emergencies;

They promote a culture of environmental awareness and support environmental training;

Environmental matters are discussed with stakeholders, and environmental performance is reported both internally and externally;

Environmental Impact Assessments are conducted for new projects and significant changes in existing facilities and operations;

They contribute to sustainable development and support biodiversity;

Materials and energy are used efficiently;

They report all significant environmental incidents, and take measures to prevent reoccurrence;

In association with industry forums, SEIC works with Russian government authorities to help develop environmental policy, regulations, and standards, and promote best environmental practice in the Russian oil and gas industry;

They ensure compliance with relevant environmental laws and regulations, industry codes of practice, and other standards and policies that may be voluntarily subscribed to;

Minimum environmental expectations and performance improvement objectives are set, targets measure performance, and activities are adjusted accordingly;

They conduct internal and external audits and management reviews to ensure that appropriate resources are in place to carry out this policy, and ensure that policy objectives are being met;

SEIC requires contractors to manage environmental matters in line with this policy.

This general Environmental Policy is supported by a number of environmental guidance documents associated SEIC policies, including

- HSE Commitment and Policy;
- Contractor HSE Management Policy;
- key environmental requirements;
- biodiversity policy;
- air emissions and flaring policy;
- waste management policy; and
- sustainable development policy.

1.2.5.3 HSE Management

SEIC has adopted an integrated approach for the management of Health, Safety, and Environment (HSE). That is standard practice for the oil and gas industry. To achieve uniform standards across the entire SEIC, a structured approach is used based on a HSE Management System (HSE MS). The HSE MS is defined as a structured set of controls for managing HSE in the business to ensure and to demonstrate that HSE objectives are met.

The key elements of the SEIC HSE MS are

- SEIC HSE Commitment and Policy Statement;
- SEIC HSE manuals and plans;
- Hazard and Effects Management Process (HEMP) and HSE design processes;
- HSE risk assessment, management processes, and audits;
- Contractor HSE management systems; and
- Emergency Response System and plans.

SEIC HSE MS manuals are internal documents. The elements of the project HSE MS are briefly outlined below.

SEIC HSE Commitment and Policy statement

SEIC is committed to

- pursue the goal of no harm to people;
- protect the environment;
- use material and energy efficiently to provide our products and services;
- develop energy resources, products, and services consistent with those aims;
- publicly report on our performance;
- play a leading role in promoting best practice in industry;
- manage HSE matters as any other critical business activity; and
- promote a culture in which all SEIC employees share this commitment.

SEIC

- has a systematic approach to HSE management designed to ensure compliance with the law and to achieve continuous performance improvement;
- supports any staff (Company or Contractor) who requests that work on any location should stop if, in that person's considered professional opinion, the work is unsafe or may cause environmental damage;
- sets targets for improvement and measures, and appraises and reports performance;
- requires Contractors to manage HSE in line with SEIC policy;

- requires joint ventures under its operational control to apply SEIC policy, and uses its influence to promote it in its other ventures; and
- includes HSE performance in the appraisal of staff and rewards accordingly.

HEMP and HSE in Design

SEIC and its contractors use a range of specialist tools to integrate safety and environmental considerations into design. A key tool is the Hazard and Effects Management Process (HEMP). It is a structured process used for safety, health, and environmental analysis used for predicting hazards and impacts. The process is summarised as follows:

- Potential hazards or events are identified using a range of assessments;
- Consequences are then evaluated in detail; and
- The entire chain of events and consequences are re-assessed to determine safeguarding (prevention) and recovery solutions to eliminate the hazard and/or limit the consequences.

Other specific safety related tools used in ensuring a safe design include:

- Hazard Identification (HAZID);
- Process Hazards and Operability (HAZOP);
- Fire Protection Analysis (FIREPRAN);
- Escape Evacuation and Rescue Analysis (EERA);
- Layout Methodology review;
- Instrumented Protective Function (IPF);
- Electrical Safety and Operability (SAFOP);
- Fire and Explosion Analysis (FEA); and
- Physical Effects Modelling (PEM).

HSE Risk Assessment and Management Process

The assessment part of HEMP (see above) will normally be qualitative, but in selected cases may be quantitative. Risks associated with each hazard are assessed and given a certain 'risk level', which is then compared against tolerability criteria. One of the key qualitative measures of risk tolerability is the Risk Assessment Matrix.

The process is generic in that it can be applied to facility siting, design, constructing, or operating issues. Intolerable grade risks are identified early and avoided by feasibility study and preliminary design. Identified risks in the yellow zone are subject to risk reduction accordingly to the ALARP principle, "As Low As Reasonably Practical". In summary, the term entails searching for and selecting practical and achievable options that lower previously-identified risks.

HSE Audit and Review Programme

SEIC HSE MS includes a HSE audit and review programme. The objectives are to verify HSE implementation and effectiveness and to check that any resultant actions and issues are addressed promptly. The use of external, independent bodies for auditing and public annual reporting of performance is a core part of this process.

Contractor HSE management Systems

Over 90% by value of the work managed by SEIC is performed by contractors. Accordingly, appropriate management of HSE by SEIC contractors is a fundamental part of the SEIC HSE Management System. The overall objective is to ensure that the SEIC HSE standards are always met or exceeded by the contractors working on behalf of the SEIC.

Emergency Response Planning

The approach of SEIC to emergencies is part of the HSE Management System and is focused, first and foremost, on prevention. However, Emergency Response Planning (ERP) and resources are also a fundamental part of the system. In summary, ERP is a management system and resources that when activated in any emergency situation will minimise the harmful effects on human life and health, the environment, and SEIC and third party assets, and will assist in the return to normal and safe operations.

1.3 Programme Need & Justification

Whales, and western gray whales in particular, are an issue that affects all of the Company's operations and plans. The western gray whale is classed as a critically endangered species and as such is the subject of detailed attention both by the Company and external specialist and non-specialist stakeholders. For that reason, the cumulative potential impacts of the entire Sakhalin II and to some extent Sakhalin I development need to be assessed and documented in a specialised technical EIA.

1.4 EIA Objectives

This Western Gray Whale Technical EIA for Phase 2 of the Sakhalin II deals strictly with the critically-endangered western population of the gray whale (*Eschrichtius robustus*). It has been prepared by SEIC with the participation of LGL Limited, environmental research associates, Canada.

The objectives of the EIA are to

- describe Sakhalin II project facilities and activities for construction and operations phases, and identify sources of potential impacts on western gray whales;
- describe what is known about western gray whale distribution and biology and identify gaps in the knowledge;
- describe potential impacts on western gray whales of project facilities and activities, and quantitatively assess the significance of those impacts;

- develop mitigation measures to eliminate or minimise predicted adverse impacts; and
- develop monitoring programmes to fill information gaps and determine whether mitigation measures are effective.

1.5 Report Structure

Executive summary

The executive summary presents a summary of the results of the EIA.

Chapter 1. Introduction

The Introduction (this chapter) includes sections on Project Background, Regulatory Framework, Programme Need and Justification, EIA Objectives, and Report Structure.

Chapter 2. Description of Construction Activities

This chapter gives a detailed technical description of all major offshore facilities and activities during the construction phase of the project. The descriptions include programme locations (Piltun-Astokhskoye Licence Area, Lunskoye Licence Area, and Aniva Bay); principal construction activities (platforms, cables and pipelines, beach landing facility, tanker-loading unit, and jetty); construction schedule; and sources of potential impacts (effluents, solid wastes, air emissions, noise, and disturbance).

Chapter 3 Description of Operations Activities

This chapter gives a detailed technical description of all major offshore facilities and activities during the construction phase of the project. The descriptions include programme locations (Piltun-Astokhskoye Licence Area, Lunskoye Licence Area, Aniva Bay); principal operations activities (platforms, cables and pipelines, tanker-loading unit, vessels and aircraft); operations schedule; and sources of potential impacts (presence of structures, effluents, solid wastes, air emissions, discharges of drilling muds and cuttings, noise, and disturbance).

Chapter 4 Baseline Environmental Conditions

This chapter contains a detailed description of the physical and biological conditions of the northeast coast and waters of Sakhalin Island. The descriptions include regional setting (location, coastal regions and sea floor, climate, natural hazards, oceanography, tides and currents, sea water characteristics, ice conditions, and anthropogenic factors); the acoustic environment; distribution and biomass of western gray whale prey, and western gray whales (distribution, hearing, and condition).

Chapter 5: Environmental Impact Assessment

This chapters contains a description of the impact assessment methodology, and a description and quantitative assessment of potential impacts of exploration and construction facilities and activities (effluents, solid wastes, air emissions, underwater construction, physical presence of vessels, noise, seismic exploration), operations

facilities and activities (presence of structures and vessels, effluents, solid wastes, air emissions, drilling muds and cuttings, small chronic spills, noise, and major oil spills).

Chapter 6. Project Alternatives

This chapter provides a brief evaluation of the alternative technical and siting decisions for major project facilities and substantiation of the preferred alternatives.

Chapter 7: Mitigation Measures and Monitoring Programmes

This chapter contains a description of measures recommended to mitigate potential impacts of project facilities and activities on western gray whales during both construction and operations phases. Included are sections on presence of structures, control of discharges (water discharge, discharges of drilling muds and cuttings, control of accidental spills, solid waste management, air emissions control), mitigation and monitoring programmes for noise and disturbance (noise, aircraft/helicopter, seismic surveys, disturbance by vessel traffic), and oil spills.

This chapter also contains a description of western gray whale monitoring programmes, including literature/information reviews, aerial surveys, vessel-based marine mammal monitoring, photo-identification surveys, western gray whale prey studies, acoustic studies, tissue sampling, behavioural studies, integrated research and monitoring, and future studies (2003-2004).

Chapter 8: Residual Impacts after Mitigation

This chapter contains an assessment of predicted residual impacts on western gray whales after the mitigation measures recommended in Chapter 7 are applied.

Chapter 9: Cumulative Impacts

This chapter contains a description of sources of cumulative impacts, including Sakhalin I oil and gas development, the Sakhalin II oil and gas development, other oil and gas developments, vessel traffic, the fishing industry, whaling, marine environmental pressures outside of the Sakhalin region, and non-routine oil spills. It also contains a brief description of impacts of those sources on western gray whales, an assessment of cumulative impacts of oil spills and noise, and mitigation measures for cumulative impacts.

Chapter 10: Conclusions

This chapter contains the conclusions of the EIA.

Chapter 11: References

This chapter contains the references for the literature cited in the EIA.