

Health Impact Assessment

SEIC Phase 2
Development



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Chapter

1



Executive summary

Chapter 1

Executive summary

1.1 INTRODUCTION

The Health Impact Assessment (HIA) was conducted by Sakhalin Energy Investment Company, with the support and participation of the Sakhalin Island health community. The HIA addresses the impact on the health of the island population during the construction and operation phases of the Project.

Sakhalin Energy's objective is to ensure the health of its workforce as well as promoting improvements in the health of the community. The HIA seeks to predict the impact on health of the Project before it is implemented, so that any negative effects can be reduced or avoided and positive effects enhanced.

The HIA focuses on non-occupational health issues - i.e. it does not address occupational exposures for the workforce such as exposure to noise. Occupational exposures are identified and assessed in the health risk assessments for each location.

1.2 THE SAKHALIN HEALTH SITUATION

Sakhalin Energy drew on a number of public health and environmental health baseline studies and arranged additional baseline studies over the period 1999-2000 (HIA, Section 5). These studies established that the health situation in the Russian Federation (RF) in general and on Sakhalin Island in particular is related to the changing socio-economic situation. Changes in the political and economic systems have affected every important RF-managed public service structure including the healthcare system, the drinking water distribution system and waste management system. The transition from a centrally planned health service to a regional system has led to more autonomy for the Sakhalin region's health services but has led to a reduction in financial support from the central government. Decreased funding resulted in a deterioration of island health institutions, particularly in staffing levels, equipment, materials, medication supply and maintenance. As a result, health standards declined and morbidity and mortality rose. This is demonstrated by statistics from Sakhalin Island, the RF and the World Health Organisation.

Up to 2001, the basic requirements for good health were lacking, for example reliable drinking water supply, adequate sewage water treatment and waste management, good food and medication. Recently this situation has improved in some urban areas. There is a high risk of infections, particularly infectious and parasitic diarrhoeal diseases, sexually transmitted diseases and tuberculosis.

Specific concerns raised by those working in the health system relate to poor standards of medical equipment limiting diagnostic, treatment and ambulance capabilities. Community concerns include the lack of skilled medical care, dissatisfaction with the attitude of medical practitioners, high levels of smoking and alcohol use and the poor quality of drinking water.

1.3 PROJECT IMPACTS AND MITIGATION MEASURES

The Sakhalin community, Sakhalin Energy's employees and contractors, and their families, may be affected by the Project. The HIA also addresses health impacts on other specific groups, such as camp followers.

The principal health impacts are:

- Improved access to healthcare for the local population who are members of the workforce
- Improvement in general access to healthcare due to improvements in the transport system
- Improved living conditions for those directly associated with the Project
- Decrease in smoking amongst the workforce
- Increase in drug use, hepatitis B and C, HIV and other sexually transmitted diseases
- Risk of tuberculosis for incoming workforce
- Risk of water-borne disease for workforce
- An increase in road-traffic accidents
- Risk of zoonoses and insect-borne diseases for the workforce, e.g. Lyme disease,
- Increased demand on the healthcare system

The impacts on health from the Project principally relate to the influx of people, including construction workers and others during the construction phase. The temporary increase in the population is likely to increase demand on an already stretched healthcare system.

However, the direct impact on public health is likely to be minimal. Camp facilities will be self-sufficient and extensive measures are being undertaken to minimise the risk of contamination of water sources during construction.

Depending on the approach taken to camp management, the spread of communicable diseases including hepatitis, sexually transmitted diseases (STDs), HIV and tuberculosis (TB) may increase between the workforce and camp followers. Changes in the socio-economic circumstances for some population sectors may have a negative impact on the incidence of lifestyle-related diseases including drug and alcohol abuse. An increase in project related traffic may lead to an increase in road traffic accidents.

Measures to mitigate negative effects will be developed and focus on supporting local programmes. The approach to camp management will also play an important role in risk reduction.

Some changes may have both positive and negative effects on the community. For example, while changes in the structure of the healthcare system and upgrading of transport systems may improve access to medical care, the resulting anticipated increase in Project-related traffic means that road traffic accidents are more likely during construction.

Due to the geographical extent of the development there were no clear boundaries that identified specific communities at that would be completely unaffected by the project. The health impacts primarily relate to the change in workforce demography. Importation of labour, mainly from mainland Russia will be required to supplement the available skilled labour on Sakhalin.

The HIA found that none of the identified effects on the health of the community would warrant a major modification to the project design. Close co-ordination with local authorities will be required to minimise some indirect impacts, especially those related to 'boomtown' effects following construction. Anticipated improvements for the general public will include better socio-economic circumstances and an overall improvement in the standard of living.

With the appropriate management of identified health impacts there is unlikely to be a major adverse direct impact on health related to the development of the Phase 2 Project. By managing camps appropriately and providing good primary and emergency care on site, the general health of the workforce is likely to improve. Similarly, by supporting some improvements to secondary care facilities, Sakhalin Energy will assist in the sustainable development of the healthcare sector, benefiting the island's community.

SEIC has an opportunity to develop and establish a strategic health management process aimed at improving health status for both the project workforce and the host community. The emphasis will be on co-operation and support of identified community health priority programmes rather than major upgrading of health infrastructure. However, in order to ensure that emergency response facilities are adequate for Sakhalin Energy, a certain amount of investment will be needed by the company to upgrade emergency support at some hospitals. These investments could be made together with other stakeholders and industry partners.

SEIC will develop an action plan as a result of the HIA, which will be discussed and reviewed with stakeholders in the Sakhalin health community. SEIC will work closely with the health community on Sakhalin Island to optimise healthcare in a cost-effective way.

Chapter 1

Executive summary

Chapter

2



Introduction

Chapter 2 Introduction

Major oil and gas developments have an impact on the socio-economic structure in a community. However, it is not always recognised that projects can also have an impact on the health of the community if the project is not a health-focused development.

SEIC's strategy during the development of Sakhalin II is based on ensuring the good health of the workforce, as well as promoting improvements in the health of the host community. This strategic health management approach focuses on incorporating workforce and community health considerations systematically and co-operatively into project planning and management. The HIA is an important core element of strategic health management.

The HIA seeks to predict the impact on health of the project before it is implemented, so that any negative effects can be reduced or avoided, positive effects enhanced and the probability of sustainable development increased (Ref. 1). This required an assessment of increased demand on infrastructure, especially health infrastructure. During consultation with stakeholders other health issues, not related directly to the project, were raised as concerns. These are recognised in this report.

The HIA is one of the Health, Safety and Environment (HSE) studies required by SEIC for Phase 2. The HIA requirements are based on the SEIC Minimum Health Management Standards (Ref. 2), which set down minimum requirements for the management of health.

This report presents the findings and recommendations of the Phase 2 HIA carried out between May 2001 and February 2002. It includes the results of evaluations, conclusions and proposed mitigation measures developed during the HIA workshop for Sakhalin Island health stakeholders which took place on 24-25 January, 2002.

This document should be read in conjunction with the Social Impact Assessment (SIA) and the Environmental Impact Assessment (EIA), which together with the HIA and the Executive Summary form the Environmental, Social and Health Impact Assessment (ESHIA).

Chapter

3



Description of Project

Chapter 3

Description of project

In 1994, SEIC signed a Production Sharing Agreement (PSA) with the Russian government to develop oil and gas fields in Sakhalin, in the Russian Far East. This project will be completed in two phases, the first of which (Phase 1) has already been undertaken. The major construction activity for Phase 2 is expected to commence in 2003.

3.1 PHASE 1

SEIC completed the first phase of development in July 1999 when the Molikpaq platform (the first element of the Vityaz production complex) began to produce oil. Phase 1 of the Sakhalin II project comprises the Molikpaq, an arctic drilling and production platform, a floating storage and offloading unit (FSO), a sub-sea pipeline connecting the Molikpaq to the FSO, a Base Office in Yuzhno-Sakhalinsk (SEB), and logistical support structures in Nogliki, Okha and Kholmsk Districts.

3.2 PHASE 2

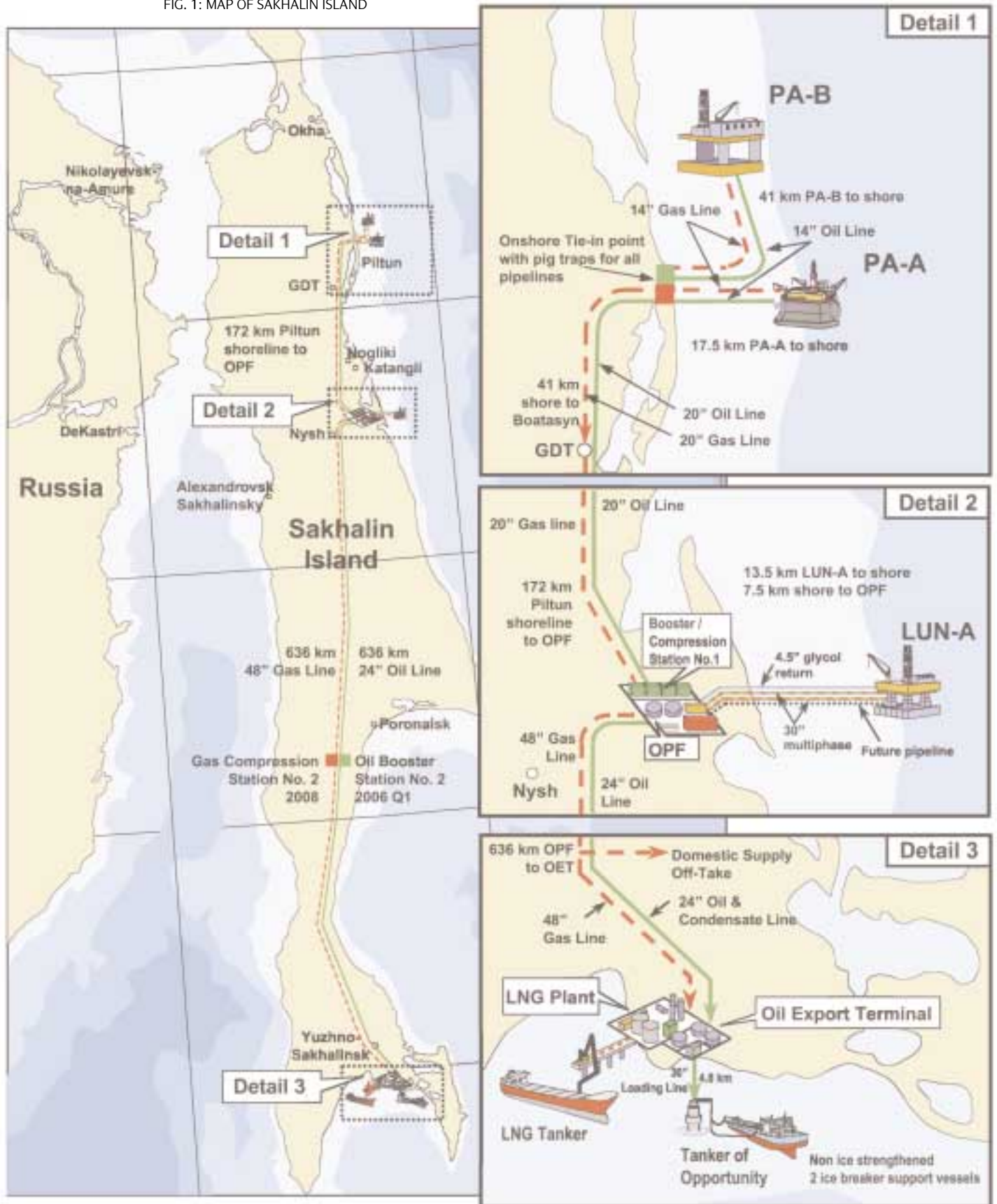
Phase 2 is an integrated oil and gas project costing in excess of USD 10 billion. It involves the development of the Piltun-Astokhskoye and Lunskeye fields, which entails the construction of two offshore platforms; an onshore processing facility (OPF); 1600 km (2 x 800 km) of onshore pipeline and some 120km of offshore pipeline; a two-train Liquefied Natural Gas (LNG) plant and export facilities with throughput of 9.6 million tonnes per annum (mtpa); a tanker loading unit and an oil export terminal. The development will enable year round production from early 2006, with the first shipment of LNG planned for November 2006. The oil is a sweet crude with low hydrogen sulphide content. The project is within known technology boundaries although the extreme climate on Sakhalin poses an additional challenge.

Prior to development, infrastructure will be upgraded to support the Project. This will include upgrading roads, ports, airports, and the railway. This initial phase also includes the preparation of construction camps and pipe laydown areas. The right of way for the pipeline is near the railway and, as demonstrated on Figure 2 is close to a number of communities along its 800 km route.

The details of potential camp locations are described in Chapter 5 of the SIA. The EIA contains a detailed Project description.

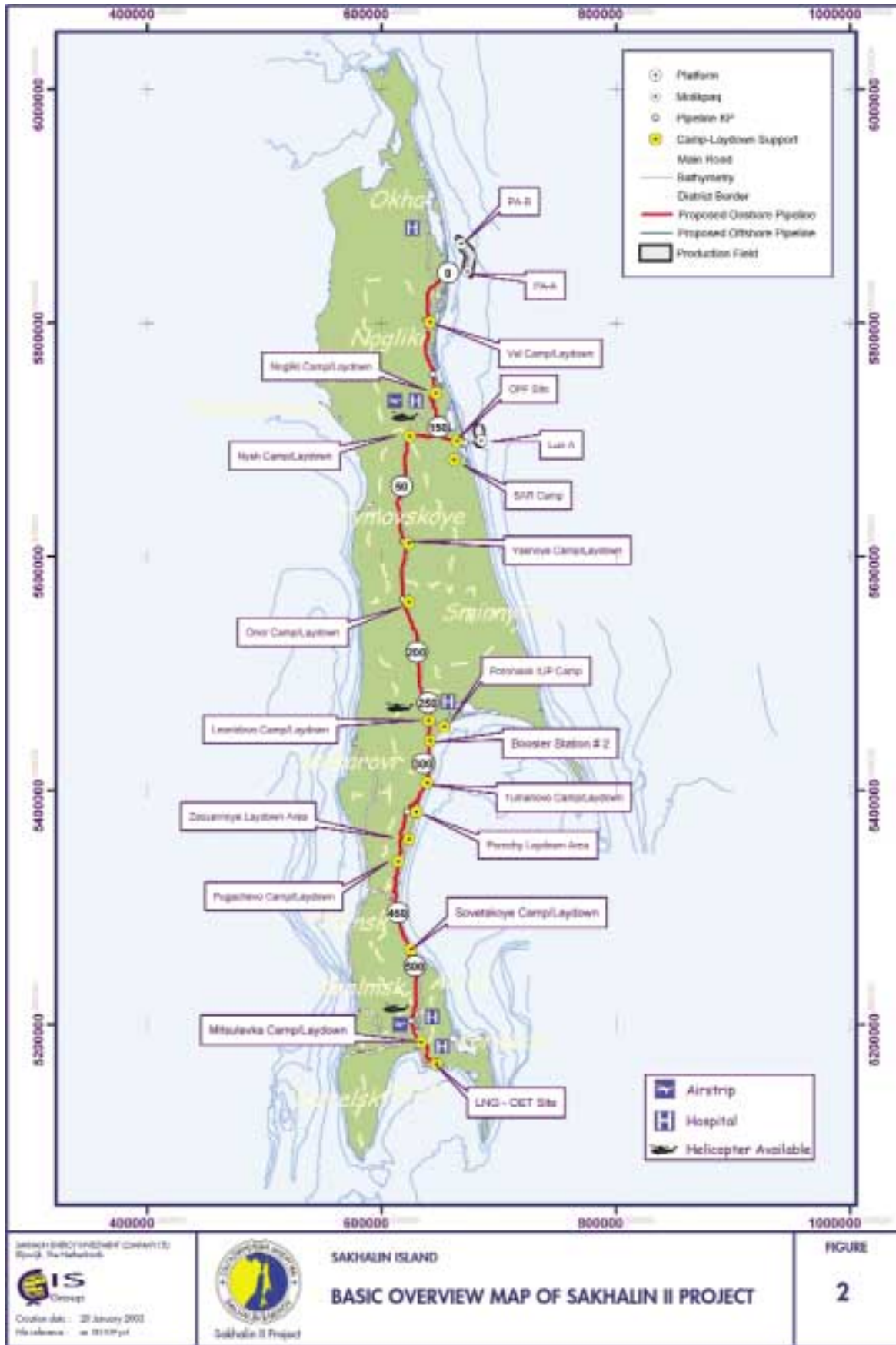
The following section describes the required workforce for each aspect of the Phase 2 Project, and the attached maps show the anticipated Project asset locations and the onshore pipeline route.

FIG. 1: MAP OF SAKHALIN ISLAND



Chapter 3 Description of project

FIG. 2: MAP OF PIPELINE AND LAYDOWN

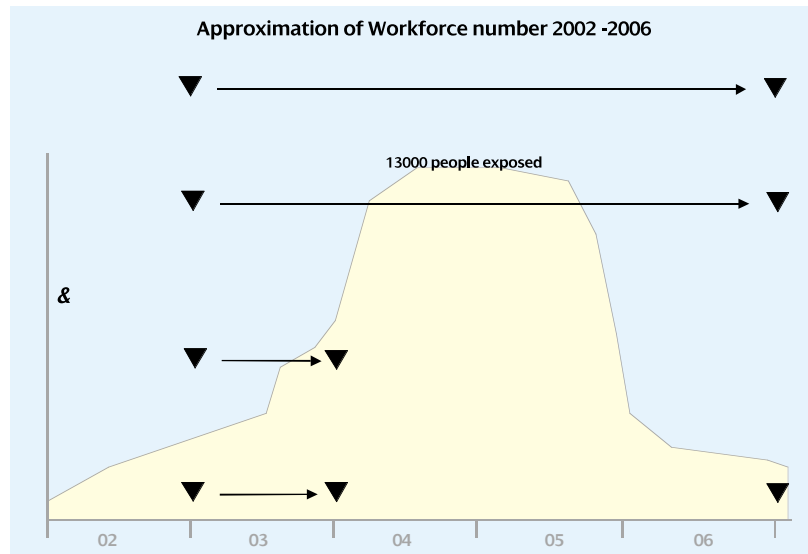


3.3 WORKFORCE AND CHANGES IN POPULATION

3.3.1 Construction

The initial phase of the Project involves infrastructure upgrade followed by major construction activities to develop the onshore processing facility, the LNG plant and oil export terminal and the pipeline. The estimated change in the overall workforce is illustrated in the graph below. It shows a major increase in activity in 2004 and 2005 with the workforce peaking at about 13,000.

FIG. 3: GRAPH OF WORKFORCE



Source: Company estimates

During construction the estimated peak workforce for the different project activity areas are as follows:

- Infrastructure upgrade (roads, bridges, ports, railway, airport) and preparation of camp and laydown areas: approximately 2,000 people
- Onshore Processing Facility (40 km from Nysh, 90 km. from Nogliki as the crow flies, although road distances are longer): 1,000 people
- LNG Plant/OET (12 km from Korsakov): 4,500 people
- Construction of pipeline and booster station 2: 4,000-6,000 people located in five spreads along the pipeline route

A major part of the infrastructure upgrade project (IUP) will be completed prior to the commencement of the other aspects of construction activities. This is because the infrastructure is required to support the logistics for facility construction. The workforce during the infrastructure upgrade consists mainly of local Sakhalin Island contractors.

Potential contractors have identified that there is not enough skilled labour on Sakhalin Island to fill all construction jobs. They estimate that 70 to 95% of the workforce will include labour from the Russian mainland. Further discussion about labour sources is included in the SIA in Chapter 11.

Evidence from other oil and gas projects suggests that there is likely to be an increase in support personnel and camp followers, including prostitutes, in the region. Although this influx has resulted in the establishment of additional and sometimes illegal settlements in other projects, the Russian legal framework and climate render this outcome less likely in Sakhalin. Current Sakhalin residents may also move in response to changing job opportunities on Sakhalin Island. This latter issue is further discussed in the SIA in Chapter 12.

Potential contractors have identified that there is not enough skilled labour on Sakhalin Island to fill all construction jobs. They estimate that 70 to 95 percent of the workforce will be Russian, and include labour from the Russian mainland. Further discussion about labour sources is included in the SIA in Chapter 11.

Chapter 3

Description of project

3.3.2 Operation Phase

A detailed description of the plant and operation is included for each asset in the EIA and has been summarised below. The health risks associated with operation 'inside the fence' are included in the health risk assessment (HRA) for each site. The objective of an HRA is to assess health risks and to demonstrate that risks are controlled to ensure that they are as low as reasonably practicable (ALARP). Initially, health risks in the workplace are managed by design. Controls also include the emergency response process in the event of an incident. The detailed HRAs for each location are not included in this report, but have been undertaken as part of the SEIC Health, Safety and Environment Management System (SEIC HSE MS).

3.3.2.1 Southern Assets LNG/OET

This plant is located at Prigorodnoye. It includes the LNG processing facility and the oil export terminal. At the mature phase of operation there will be about 250 workers there. Workers will not be accommodated on-site during operations.

3.3.2.2 Northern Assets

The northern assets include the offshore platforms, onshore processing facility (OPF), booster station and connecting pipelines. The total workforce is expected to be around 350-400. The majority of this workforce will work rotating shifts. Therefore, less than half will be 'on location' at any one time. The offshore workers will live on the platforms. While travelling to/from the platforms during their rotation cycle they are temporarily accommodated at the SEIC/ Exxon Neftegas Nogliki Operations Camp. There will be some full-time expatriate and Russian camp managers living on a longer term-basis at the operations camp.

The total number at the OPF and booster station will be about 180. Any employees working at the booster station are likely to live in nearby communities such as Poronaisk.

3.3.2.3 Yuzhno-Sakhalinsk

The head office in Yuzhno-Sakhalinsk is anticipated to employ about 350-400 people.

3.3.2.4 Workforce

Following commissioning and start-up, the total workforce including office staff is anticipated to be between 950-1,200. It is expected that other industries will expand to support the demand for logistics, food and other resources. The additional indirect increase in population is due to the multiplier effect, which is discussed in Chapter 10 of the SIA.

Chapter

4



Scope of HIA for SEIC phase 2 development

Chapter 4

Scope of HIA for SEIC phase 2 development

There has been no formal scoping exercise to identify the potential impacts on health for this HIA, however the key issues were highlighted by health stakeholders during a workshop on Sakhalin Island involving key medical stakeholders in early 2002. The workshop was held following a review of publicly available health information. Further details about the workshop are in Appendix 6.

The areas addressed by this study are as follows:

4.1 GEOGRAPHICAL BOUNDARY

This HIA reviewed the onshore geographical scope of Phase 2 to assess the impacts on health. It addresses potential health impacts during the construction and operation of:

- Infrastructure Upgrade Project (IUP),
- Onshore Processing Facility (OPF),
- Gas Disposition Terminal (GDT),
- Onshore and offshore pipelines and booster stations,
- LNG/OET, and
- Tanker Loading Facility.

Pipeline route selection and project alternatives are discussed in Volume 1, Chapter 5 of the EIA.

4.2 PROJECT TIMESCALE

This HIA focuses predominately on construction activity and the early commissioning and operation phases. The IUP activities commenced in 2002 and the bulk of the remaining construction is planned to take place between 2003-2006. This HIA does not address decommissioning which is not anticipated for over 35 years, and does not include fabrication sites outside Sakhalin Island.

4.3 DEMOGRAPHY - PIPELINE ROUTE AND TEMPORARY WORKS

The focus of the HIA is on non-occupational health issues because health risks 'inside the fence' are considered in site-specific health risk assessments. This process is managed within the SEIC HSE MS.

Those who may be affected by the project include Sakhalin Island residents and SEIC employees, contractors, subcontractors and their families. Evidence from the implementation of other projects has shown that the HIA should also address impacts on the health of communities and groups who may follow the project such as camp followers.

This development project extends almost the length of Sakhalin Island and includes upgrading infrastructure which may not be directly adjacent to the pipeline or the major facility, such as ports. It is likely, therefore, that the majority of the Sakhalin Island population will be affected to some extent (either positively or negatively) by this development and therefore the effect on the general population needs to be considered.

4.4 AREAS OUTSIDE THE SCOPE OF THE HIA

The study does not address occupational health risks 'inside the fence'. These issues are included in the health risk assessment (HRA) for each location. The HIA is not a quantitative risk assessment, as is carried out by some authorities in Russia. Further information on the SEIC HRA and the Russian model for HRA is described below.

4.4.1 Health Risk Assessment (HRA)

The SEIC minimum health standards require that an HRA and human factors review is included in all new projects. Health hazard inventories have been compiled for the project. The detailed health risk assessments for employees 'inside the fence' are one of the company risk assessments integral to the

HSE MS. Health risk assessments and human factor reviews will be undertaken at several stages during detailed design, construction and operational phases.

Front-end engineering of plant design for the project has kept the level of health risk to 'as low as reasonably practicable' (ALARP), taking into account RF sanitary design requirements (Basis of Design). The project design has considered key health issues including control of physical and chemical hazards and ergonomics. Studies will be completed according to the project schedule. Each study considers the potential impact of operational activities both inside and outside the plant boundary.

4.4.2 Russian Model for Health Risk Assessment

The Russian Ministry of Health has an initiative to implement a programme of quantitative environmental health risk assessment. This programme started in 1997 and is being piloted in several regions. The programme at this stage is not mandatory for private companies. The approach makes use of the following:

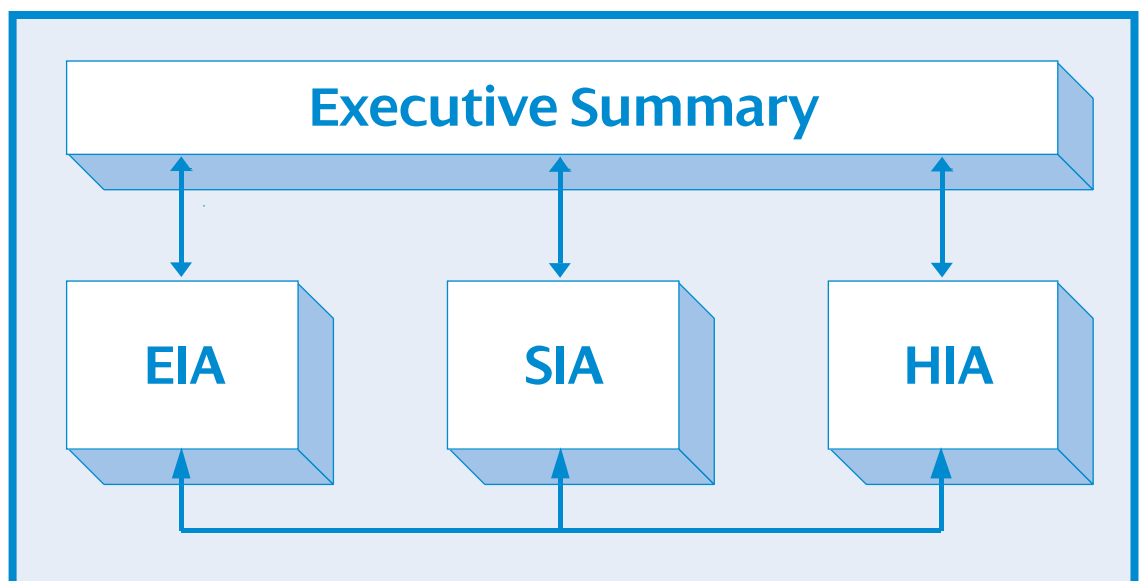
- Methodological recommendation for analysis of data required for decision making in the sphere of environmental and public health protection', and,
- RF Resolution: 'About the use of risk assessment methodology for the management of the quality of the environmental and public health in the Russian Federation.'

4.5 INTERFACE OF HIA WITH EIA AND SIA

4.5.1 Structure of ESHIA

The Environmental, Social and Health Impact Assessment (ESHIA) consists of this HIA, the Environmental Impact Assessment (EIA), the Social Impact Assessment (SIA), and an Executive Summary (ES). A schematic presentation of the structure of the ESHIA is shown below.

FIG. 4 STRUCTURE OF ESHIA



Potential impacts are discussed in the individual EIA, SIA and HIA reports. A number of issues cut across these volumes, for example, water and air pollution typically impacts on health as well as environmental conditions. Impacts on population health conditions may also have social implications; therefore where appropriate other volumes are cross-referenced.

The EIA includes the assessment of environmental impacts which effect humans, notably water quality and air emissions, noise and waste management for all project phases. These are discussed in the impact chapter for each asset and may have implications on health.

Chapter 4

Scope of HIA for SEIC phase 2 development

The SIA contains baseline socio-economic information relating to housing, household income, employment and changes in population, which have an impact on health.

The HIA team prepared a health survey questionnaire that was included in the data collection during the SIA and administered by the social assessment group (Appendix 7). The structure of the HIA is presented below.

TABLE 1: HIA STRUCTURE

PART	DESCRIPTION
EXECUTIVE SUMMARY	A concise summary of the health impacts of the proposed project.
INTRODUCTION	Provides the background and context to the proposed development, and the impact assessment objectives.
PROJECT DESCRIPTION	Describes the proposed project and its geographic and temporal context.
SCOPE OF HIA	Describes the approach for the HIA.
STAKEHOLDER CONSULTATION	Describes the stakeholders and the consultation activities.
DATA SOURCES AND BASELINE DATA	Explains the sources of the data and outlines the baseline information.
IMPACT ASSESSMENT	Identification and assessment of the positive and negative impacts likely to result from each phase of the proposed project: <ul style="list-style-type: none"> • Impacts associated with construction • Impacts associated with operation
MITIGATION AND MANAGEMENT PLAN	Description of the set of mitigation, monitoring, and institutional measures to be put in place during implementation and operation of the project to eliminate, offset or reduce adverse impacts to acceptable levels.
CONCLUSIONS	Presentation of conclusions from the impact assessment process.
REFERENCES AND APPENDICES	References, written materials, both published and unpublished, used in study preparation. Technical data that may relate to the assessment but is too detailed to be included in the main text.

4.6 HIA STUDY TEAM

The HIA was undertaken by SEIC in co-operation with key health stakeholders. Although this may raise concerns about impartiality, the benefit of this approach was to develop an effective working relationship with key stakeholders. The SEIC HIA team comprises Dr Paul Boelens, Corporate Health Advisor, Mr Mark DeBello, Health Services Co-ordinator and Dr Judy Balint, Project Health Adviser.

The success of an HIA depends on team effectiveness and appropriate stakeholder engagement. Participation by health practitioners living and working on the island in the HIA enhanced the focus on real health issues within the community and also helped in the development of practical mitigation and improvement measures.