

The Road Ahead

Sakhalin Energy Review 2002

Sakhalin Energy Review 2002

Reader feedback card

the road ahead



This Sakhalin Energy Review reflects the issues we think are of most interest to our stakeholders, but it can only provide a snapshot of our activities and progress to date. It would be helpful to us to

understand which issues most concern you and how we can make future reports and communications more relevant to you.

You can use this feedback card to tell me what you think or write to me directly at Sakhalin Energy or visit www.sakhalinenergy.com and send your comments via email.

I look forward to reading your views and suggestions.

Steve McVeigh
Chief Executive Officer



Contact details

Sakhalin Island (Head Office):

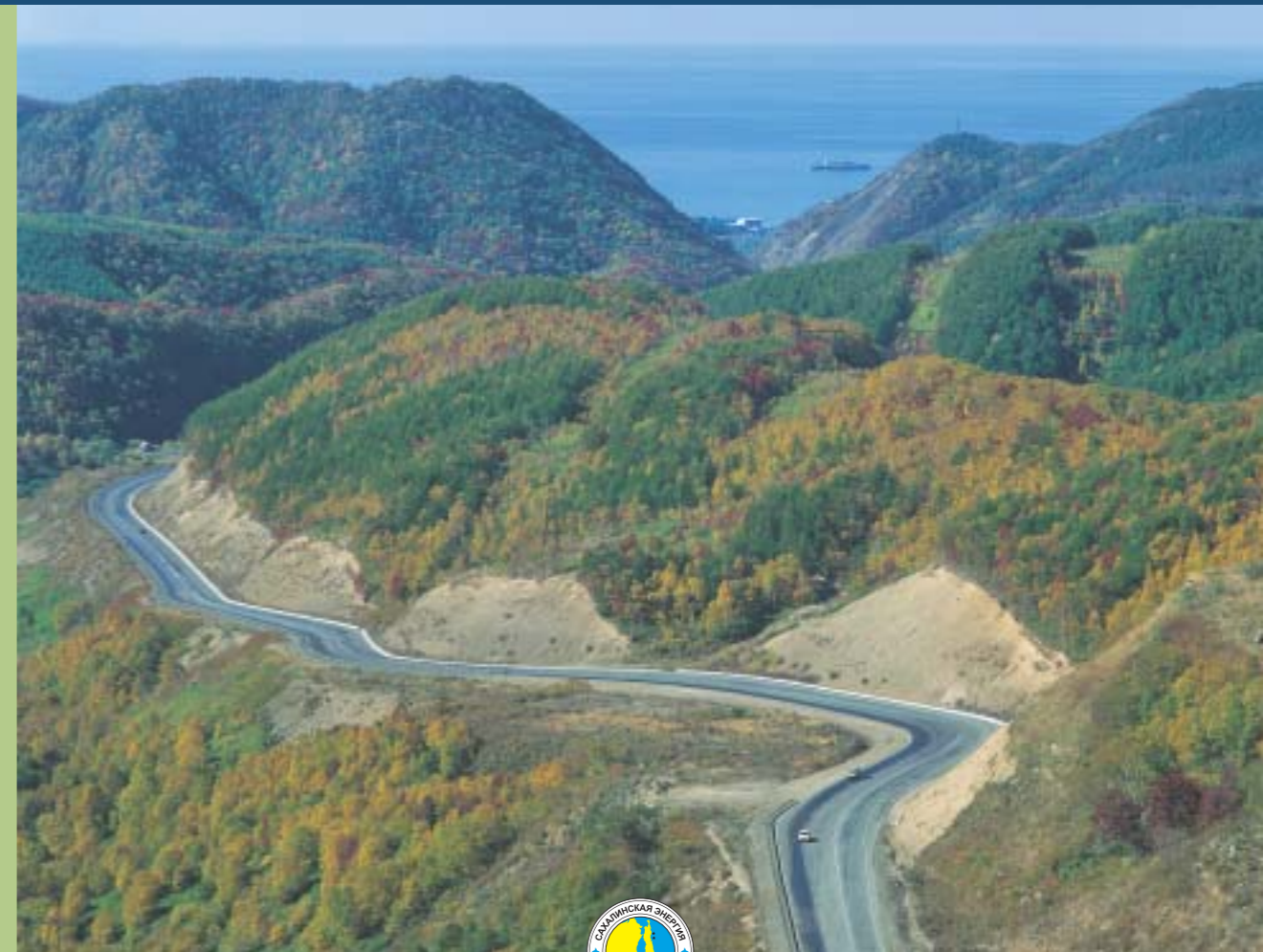
Sakhalin Energy Investment Company
35, Dzerzhinskogo Str.
Yuzhno-Sakhalinsk, 693020, Russia

Moscow branch:

Sakhalin Energy Investment Company
14 Malaya Pirogovskaya Str
Moscow 119435 Russia

Rijswijk branch:

Sakhalin Energy Investment Company
Visseringlaan 25, P.O Box 60
2280 AB Rijswijk, The Netherlands



The Road Ahead

Sakhalin Energy Review 2002





Sakhalin Energy Review 2002

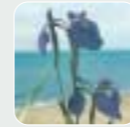
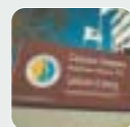
Contents

t h e r o a d a h e a d

Message from the Chief Executive Officer	1
Map of Sakhalin Island and Sakhalin II project locations	2-3
Where we have come from	4
Sakhalin Island: the challenges of development	5
What is a production sharing agreement & what does it mean for Russia?	6
Project benefits – beyond the financial	7
Phase I – Oil production	9
Molikpaq – fast facts	10
Phase I – the challenges	11
Infrastructure upgrade	12
Facing the challenges – road safety & construction camps	13
Phase II – the project	14
Phase II – Offshore development	14
Onshore processing facility	15
Onshore pipelines	16-17
Facing the challenges – Crossing rivers responsibly: preserving salmon spawning streams	18-19
Facing the challenges – Unexploded ordnance, war dead and archeological sites	20
LNG plant and oil export terminal	22
What is LNG and how is it produced	23
The markets: fuelling Asia's economy	24
Sustainable development into practice	25
Social overview	26
Facing the challenges – Maximising Russian employment	27-28
Environment overview	29
Facing the challenges – Oil spill response in a remote location	30
Facing the challenges – Co-existing with Gray Whales	31-32
Facing the challenges – Responsible waste management	33
Facing the challenges – Designing for seismic activity	34
Statement of general business principles	34
Glossary & contact details	36

Notes for readers:

All monetary values are expressed in United States dollars unless otherwise expressly stated.



S a k h a l i n E n e r g y R e v i e w 2 0 0 2

Glossary

t h e r o a d a h e a d

Associated gas – gas which at reservoir pressure is dissolved in the reservoir but is liberated upon production

Free gas – gas at reservoir conditions

FID – final investment decision

Licence blocks – the areas covered by the sub-soil licences for each of the Pitun-Astokhskoye and Lunskoye fields issued by the Government of the Russian Federation to Sakhalin Energy on 20 May 1996

LNG – liquefied natural gas

Russian Party – Federal and Oblast government representatives to the Production Sharing Agreement (PSA)

The company – Sakhalin Energy Investment Company

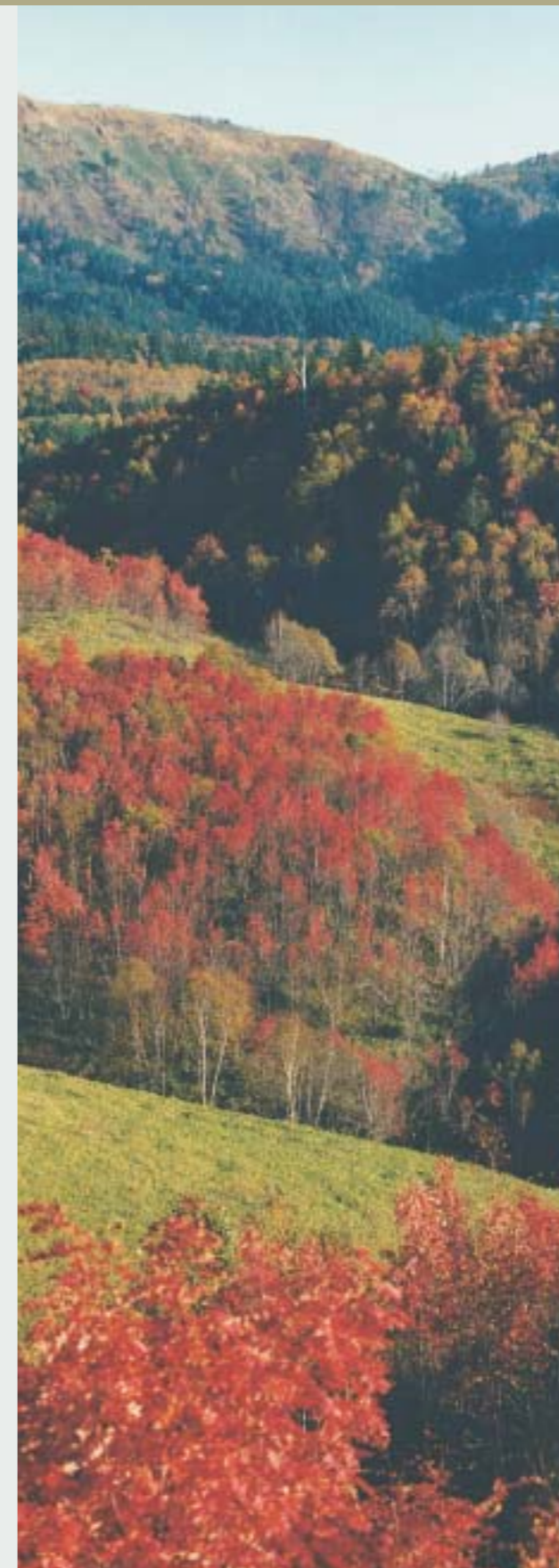
PSA – Production Sharing Agreement

Oblast – Sakhalin Regional Administration

OPF – Onshore Processing Facility

OET – Oil Export Terminal

Vityaz Complex – is the collective term used to refer to the Molikpaq platform, the single anchor leg mooring buoy and the floating storage and offloading unit



The Road Ahead

S a k h a l i n E n e r g y R e v i e w 2 0 0 2

What are the key issues in this Review that Sakhalin Energy should take action on?

What other issues should Sakhalin Energy report and/or take action on?

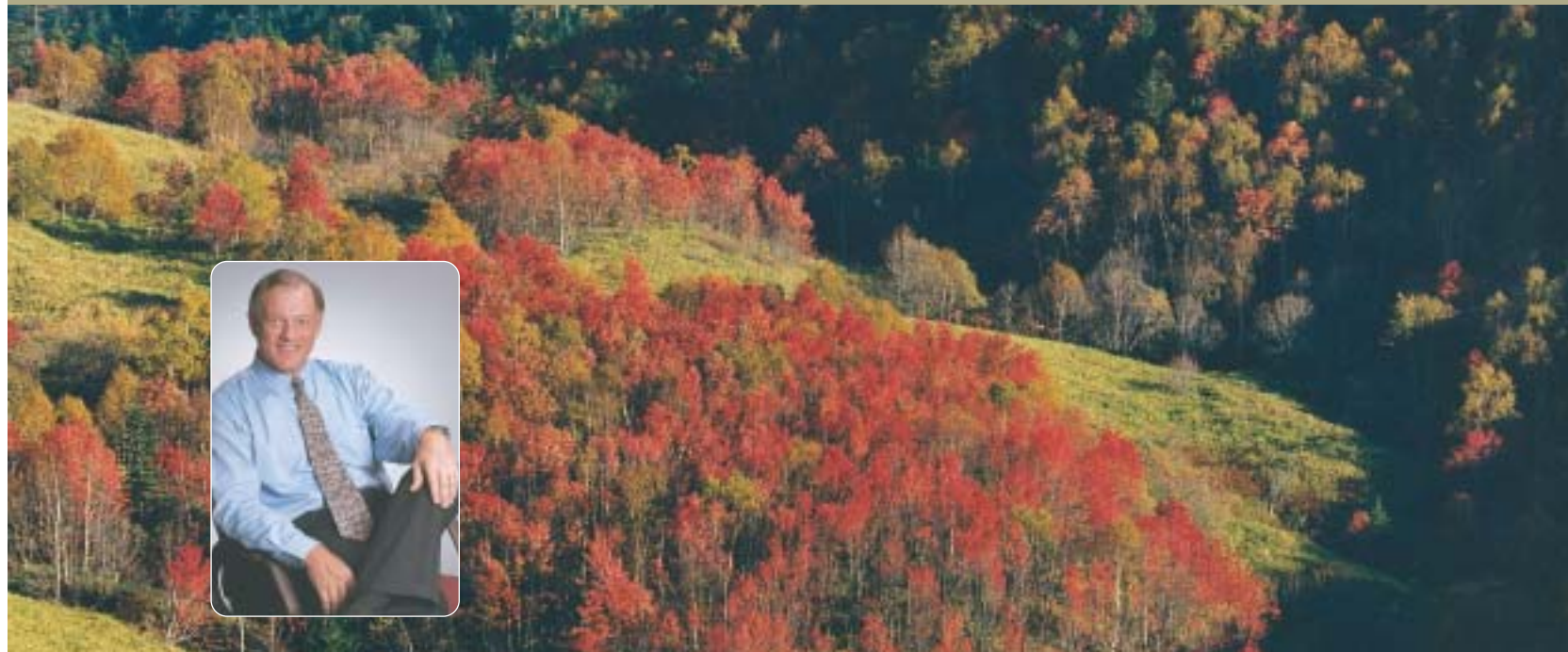
How can we improve the scope and format of this report?

Other comments and suggestions?

Your name and address (optional – if you want a reply)

Tick if you would like a reply

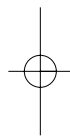
Tick if you would like your reply posted on www.sakhalinenergy.com



S a k h a l i n E n e r g y R e v i e w 2 0 0 2

Message from the Chief Executive Officer

t h e r o a d a h e a d



Welcome to the first Sakhalin Energy Review. It has been an exciting journey to where we are today and it will continue to be challenging as we work towards making Sakhalin Energy's plans a reality.

Phase I of the project involving seasonal oil production from the Piltun-Astokhskoye field and the Vityaz Complex has proved that we can produce oil safely and reliably offshore of Sakhalin Island. The ongoing pressure maintenance project implementation will increase production and continue the success of Phase I of the project.

We have completed the front-end design for Phase II during the last two years and expect to make a recommendation to the project's shareholders to take the final investment decision (FID). Much of the preliminary groundwork to allow the project to kick start quickly following FID is already underway. This includes the evaluation of all

engineering procurement, construction contractor tenders and the implementation of Island infrastructure upgrades.

The success of the Sakhalin II project will open a new strategic offshore energy province in Russia's Far East. The project has many competitive advantages as a liquefied natural gas (LNG) supply source for the growing markets in the Asia Pacific region, including proximity to market and abundant reserves of oil and gas.

The project will bring many benefits and opportunities to Russia. It will be the largest single foreign direct investment in Russia and will advance Russia to a position of global energy supplier. The Russian Federation government and Sakhalin Oblast are supportive of the project and have been working hard with us to make this a reality.

We are committed to delivering a world-class project that is designed

and operated to high environmental and safety standards, that maximises the socio-economic benefits and minimises any impacts on the environment. We believe we have demonstrated this during the development and operation of Phase I, and we will build on that in Phase II.

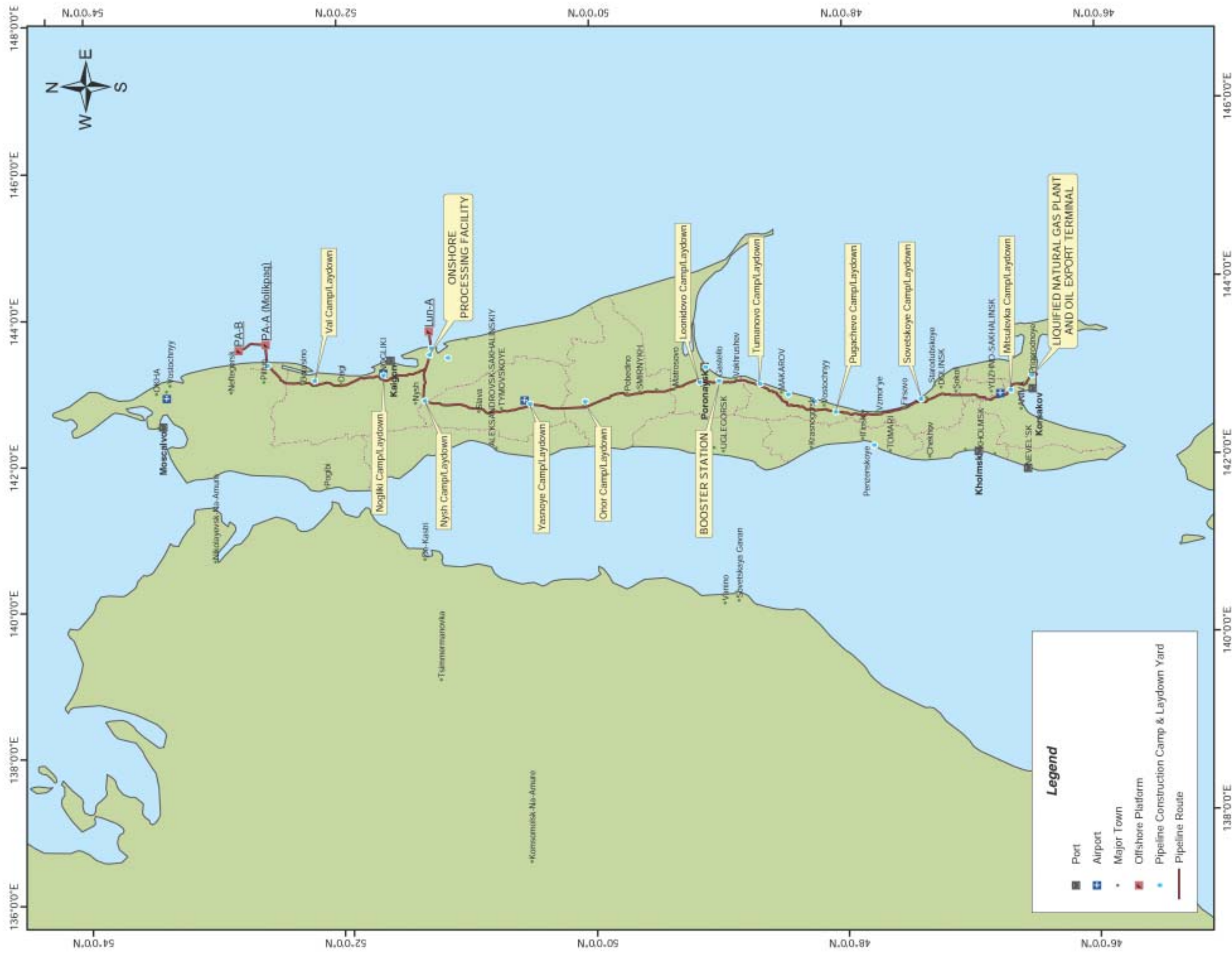
This is the first report published which reviews the entire range of activities of the Sakhalin Energy Investment Company. It represents a significant expansion of our public reporting of the activities of our company. We would like to hear what you think about the report but, more importantly, we want to hear from you on what you think about Sakhalin Energy and how we are conducting our business. We have provided a feedback form at the end of this Review for your use.

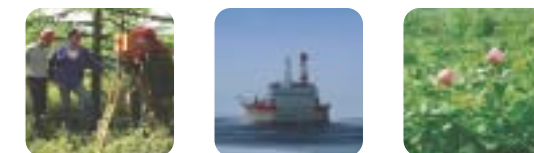
Steve McVeigh



Sakhalin II Project Overview

the road ahead





Sakhalin Energy Review 2002

Sakhalin Island: the challenges of development

the road ahead



Sakhalin Energy Review 2002

Where we have come from

the road ahead

Since the collapse of the Soviet Union at the end of 1991, the Russian Federation has been rebuilding its economy and society. The transition to democracy and a market-oriented economy has been a complex one that is still evolving. The legal and regulatory framework continues to be difficult for companies developing large-scale projects in Russia. The development of our project is set against this background.

In May 1991, the USSR government invited international oil companies to tender for the right to conduct a feasibility study for the development of the Piltun-Astokhskoye and Lunskeye licence blocks. The agreement, signed by Marathon, McDermott and Mitsui, was eventually concluded with the new Russian

Federation government.

This programme became known as the Sakhalin II project.

The study was completed at the end of 1992. It was during that year that Shell and Mitsubishi joined the development consortium. The study was approved by the Russian Federation in 1993, and the following year the consortium formed Sakhalin Energy. Sakhalin Energy went on to sign the first ever Production Sharing Agreement (PSA) with the Russian Federation.

In 2000 Shell concluded an asset swap with Marathon, as well as assuming the position of majority shareholder and project operator.

Russia's political, economic, legal and social systems have all been transformed since reforms began. Economic growth has resumed after the slump of the early 1990s, and the financial crisis of 1998. Legislation has been developed, including production sharing legislation in 1995, and corporate governance is improving.

Russia remains a challenging place to do business. It can take a great deal of time and resources to conduct business transactions that would be more straightforward in other parts of the world. For example, more than one thousand official permits and licences were required to develop the Phase I project alone.

All these challenges and more face the company in the region where the company operates. With the downturn of the Soviet integrated economy, Sakhalin Island's infrastructure, power, water and health-care systems have deteriorated and come under threat from the lack of investment in infrastructure services. The decline in demand for local raw materials and goods has led to higher unemployment and an increase in poverty. Some goods and services available on Sakhalin Island have become, in some instances, prohibitively expensive for local people.

Against this backdrop, the company is developing one of the largest integrated oil and gas projects in the world. The project faces some very specific challenges.

These include the remoteness of Sakhalin Island, severe weather conditions, the poor perception of oil and gas industrial activities, as a result of the environmental legacy issues surrounding previous onshore oil development, lack of local infrastructure, and the threat of earthquakes on the island.

Despite this, the company has high expectations that the project will deliver not only in terms of returns to the Sakhalin Oblast, the Russian Federation, shareholders and lenders, but also in terms of direct benefits to the community in which we live and work on Sakhalin Island.

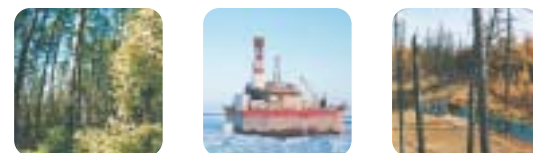
Over more than 40 years, the company will spend between \$20 and \$30 billion on a project that will generate billions more in value to the Russian Federation. The company will

conduct its business responsibly and efficiently in order to maximise project benefits to shareholders, the Russian Federation and the broader community.

The company, being the first major investor, needs to manage the aspirations of the local community on what the company can deliver in benefits. The company is managing this through information and consultation.

The company will combine business effectiveness with efforts to stimulate wider, long-term economic and social benefits. The company is committed to delivering a robust project that contributes to the redevelopment and the future sustainable development of Russia and the Sakhalin region.





Sakhalin Energy Review 2002

What is a production sharing agreement & what does it mean for Russia

the road ahead



The Sakhalin II production sharing agreement (PSA) was concluded in 1994 between the Russian Federation government and Sakhalin Energy. Not only was it the first agreement of its kind to be signed in Russia, but it is also the first operating PSA in Russia.

Sakhalin II has two license areas: Piltun Astokhskoye, primarily an oil field with associated gas, and Lunskoye, predominantly a gas field with associated condensate. Both were discovered in the 1980s. Together the fields contain in-place reserves of approximately 600 million tonnes (4.6 billion barrels) of crude oil and over 700 billion cubic metres (24 trillion cubic feet) of natural gas.

To put this in context, the fields are equivalent to about one year of Russia's current crude oil exports to Europe at 2.5 million barrels a day and represents nearly five years of Russia's current total gas exports to Europe. Alternatively, there is enough gas to meet worldwide LNG demand for four years.

This resource base will supply about 9.6 million tonnes of LNG for at least 25 years. The success of the Sakhalin II project will open the Russian Far East to the growing Asia Pacific market – creating a new strategic source of oil and gas in the region. The bulk of LNG from the Sakhalin II project will be supplied to the growing Asian market, in particular, Japan, Korea, China and Taiwan.

How the PSA works

A PSA is a commercial contract between the investor and the state which allows the investor to undertake large-scale, long-term and high-risk investments. The purpose of the PSA is to define the terms and conditions for the exploration and development of resources by replacing existing tax and license regimes with a contract based arrangement that exists for the life of the contract. The PSA system is used in many countries world-wide to develop oil and gas resources.

Under the PSA, the Russian Federation government retains its rights and ownership of the oil and gas resources. The company invests all the capital needed to develop the fields and pays bonuses to the Russian Federation government at key milestones during project development.

We pay a royalty of six percent of the oil and gas produced to the Russian Federation government throughout the lifetime of the project. The balance of revenues, less operating expenses from production sales in the early years, is used to repay the company's capital investment. The remaining production, after payback of investments, is shared between the Russian Federation, the Sakhalin Oblast and the company.

The Russian Federation government receives an increasing proportion of revenues from production as the project progresses. If profitability exceeds certain specified levels then the Russian Federation government receives an increasingly bigger share of the extra revenues, which can be as high as 70 percent.

In addition, we pay tax on any profit the company makes.



Sakhalin Energy Review 2002

Project benefits – beyond the financial

the road ahead

Direct investment:

The approximately \$10 billion development of Sakhalin II will be the largest single direct foreign investment in Russia to date. Total value to Russia including royalties and taxes, is estimated to be \$49 billion in money of the day.¹

Direct foreign investment in Russia delivers many indirect benefits, including growing international confidence in Russia as a place for foreign investment, growth in the goods and services industries, and other multiplier benefits.

Direct benefits to Russia to date include:

- \$55.6 million in royalties
- \$100 million contributed to the Sakhalin Development Fund, which went to the Sakhalin Oblast consolidated revenue fund
- \$45 million in bonuses paid to the Russian Party
- \$10 million of income tax paid by our employees
- \$1 million in community programmes

Russian content:

Under the PSA Russian content is defined as man-hours and volume or quantity of materials. The company is committed under the terms of the PSA to maximise Russian content in the project to 70 percent over the life of the project. Participation is subject to competitiveness in cost, quality and timing.

The transfer of skills and know-how, particularly through Russian and foreign joint ventures, should enable Russian industry to compete more effectively in international markets for contracts with future oil and gas developments within the Russian Federation.

The company has a policy to promote such joint ventures between non-Russian and Russian companies. The objective of these joint ventures is to maximise Russian content and the transfer of technology and knowledge.

The company has also carried out an extensive vendor assessment programme. This is a practice where assessors visit both Russian and foreign companies to assess their ability to fulfil the requirements of supplying equipment and services to the project. Companies are advised how they can meet the necessary standards and technical requirements to become qualified bidders for contracts.

Since the project started, over 80 percent of the man-hours and almost 70 percent of the volumes of material have qualified for Russian content. Eighty percent of contracts have been competitively bid and by the third quarter of 2002, the cumulative value of contracts awarded by our company to Russian businesses was over \$800 million. These include contracts for 3D seismic work, vessel support services and the construction of houses and offices. All major engineering

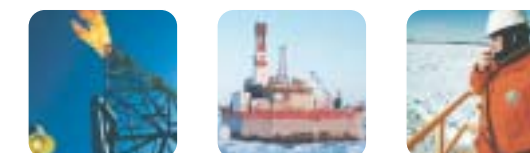
procurement and construction contracts to build the LNG plant have Russian partners.

Procurement procedures have been agreed with the Russian Party and a joint committee comprising of company and Russian Party representatives work together to increase Russian content in the project subject to cost, quality and timing.

A competitive bid process was implemented following an extensive briefing process for Russian companies. Seminars were conducted over a number of months and included information on major bid lists, planned contracting and procurement activities and the vendor registration and assessment procedure. Additionally, this information was published on the company website.

In developing oil and gas fields in any country there will always be some contracts which have to go to foreign companies. Often the processes are highly specialised or use new technology which is not currently available in Russia. In these cases all projects around the world would use that supplier. The company is fully committed to fulfilling the Russian content terms of our PSA. We expect to achieve 70 percent Russian content over the lifetime of the project. (See *Facing the challenges: maximising Russian employment*)

¹ Based on \$20/barrel oil price



Sakhalin Energy Review 2002

Phase I – Oil production

the road ahead

The Piltun Astokhskoye field has been producing oil during the ice-free seasons since 1999.

The field was discovered in 1986 and underwent an extensive exploration programme that included a seismic survey programme followed by 17 test wells and 14 development wells. It has recoverable oil reserves of more than 110 million tonnes.

At its peak it produces 90,000 barrels of oil per day (14,286 cubic metres/day). By the end of 2002 more than 38 million barrels of oil had been produced and exported from the Vityaz complex.

For Russia, Phase I was a project of firsts. It was the first offshore oil and gas development in Russia, the first project to come into operation under a production sharing agreement (PSA) and the first project to be partly project financed under a PSA.

There were many challenges – commercial, environmental and social – in developing Phase I. It required over 1000 separate approvals and licences. The environment is harsh and unforgiving; production is limited to about 180 days per year because the complex is locked in ice, ruling out year-round production.

Production is carried out at the Vityaz production complex, which is built around the Molikpaq platform. The

Molikpaq was previously based in the Beaufort Sea as an ice class drilling rig, before being converted by the company for use as a production and drilling platform. The structure was specifically built to operate in severe ice conditions and the platform had already proved itself in such conditions. Using an existing structure also allowed production to come on-stream quicker.

The platform concrete base was first extended with a steel 'skirt' to allow for the deeper water depths in the Sea of Okhotsk, then submerged to rest on the seabed. Some 278,000 cubic metres of sand was then used to fill the concrete sub-structure to anchor it permanently to the seabed. This was a massive task in its own right, involving huge trucks to spread the sand inside the structure – the last of these trucks still lies "locked" inside the platform's base.

The modification work was one of the first major project contracts undertaken by Russian industry for the project – in this case by the Amur Shipyards.

Oil is transported by sub-sea pipeline from the Molikpaq to a single anchor leg mooring buoy (SALM) and a floating storage and offloading (FSO) unit where it is transferred to shuttle tankers for sale to the company's customers.



Currently winter is a time of maintenance and construction work. Oil production has to be shut down, because the frozen sea means the FSO has to leave the complex for winter. The SALM also has to be protected from the ice. A novel method is used

for this. Rather than take the SALM away it is lowered to the seabed and spends the winter laid horizontally in a protective cradle.

The Phase II full field development will enable production to continue year

round and output in this phase is expected to peak at around 170,000 barrels per day (27,000 cubic metres/day). The gas produced will be used for platform fuel, injection and or export.

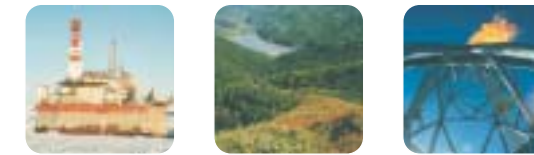
Molikpaq – fast facts

MOLIKPAQ – “BIG WAVE”

Molikpaq means “big wave” in the language of the Inuit people of northern Canada and is the central feature of the Vityaz Phase I production complex. The platform was first used in Arctic Waters offshore of Canada. In 1998 the platform was towed from the Beaufort Sea across the Pacific to South Korea and then to Russia. It was adapted and upgraded for the project - this meant fitting a purpose made steel “spacer” to the bottom of the platform so it could be used in deeper waters offshore of Sakhalin Island.

Molikpaq – the facts

- Located 16 kilometres offshore from north-east Sakhalin Island
- The platform is 120 metres wide and weighs 37, 523 tonnes
- 132 people live and work on the platform at any one time
- The platform is ballasted down by 278,000 cubic metres of sand
- Average seasonal production in 2001 was over 75,000 barrels per day (11,905 cubic metres/day)
- In winter, temperatures (with wind chill) can drop to -70°C



Sakhalin Energy Review 2002

Phase I – the challenges

the road ahead

Phase I was the first offshore project to be developed in Russia. It faced many logistical and regulatory hurdles before it could become a reality. It was a true frontier development. In the beginning there were no office buildings and the project was spread through four small offices in central Yuzhno-Sakhalinsk. Stationary was scarce as were translators and all technical equipment such as faxes and photocopiers. To begin with the project was hampered by lack of local support contractors who could supply goods and services to the offshore development, as this type of offshore construction, drilling and development operation had not been undertaken in Russia before.

The project was developed to be completely self-sufficient, as there

were no coast guards or emergency response suitable for this type of development. The company contracted its own oil spill response vessels that were permanently located at the Vityaz complex during the oil production season (and still are today). Much of the construction work to set the platform such as dredging, ballasting and topside work was conducted during the winter months in order to have the platform ready for the ice-free production period of 1999. The climate for operations was harsh with winter temperatures dropping to -40°C. To date it is the only platform located in such sea-ice conditions.

Phase I was the first offshore development in Russia and as such a regulatory framework specific to

offshore development did not exist. As such Russian regulations for onshore development or vessels were adapted and applied to the project. Many separate approvals were required for Phase I to begin operations. In many cases the permit issue number was “001” and was the first of its kind.

Since this time legislation on project specific requirements and permits has been developed by the Russian Federation government. These are in line with international best practice for offshore development, particularly in the areas of environmental protection and oil spill response.





Sakhalin Energy Review 2002

Infrastructure upgrade

the road ahead

Much of the infrastructure on Sakhalin Island has deteriorated in the years since the Soviet Union declined. For the company to successfully undertake the Sakhalin II project, about \$250 million dollars will be invested in infrastructure improvements before, and during, the Phase II construction period.

The company has been working closely with the Sakhalin Administration (the "Administration") to ensure that the work is carefully planned and takes account of community needs.

The upgrades include road, bridge and culvert upgrades and replacement. Forty-four bridges and about 155 kilometres of public roads will be upgraded during the project and similar stretches of new roads will be built to replace roads that will no longer be accessible because of project construction. The company has also been working with the Administration to undertake a number

of improvements outside of the project scope but which will improve conditions on the Island.

Kholmsk fishing port will be upgraded during this time to enable it to meet the increase in marine offloading of equipment, pipeline materials and supplies for the project.

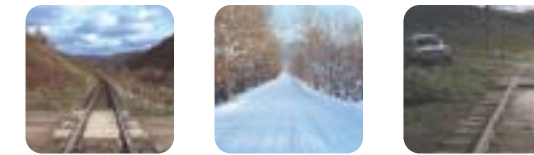
The airport at Nogliki will be upgraded to allow year-round, all weather air access to the more remote northern areas of the Island. The authorities are working on upgrading Yuzhno-Sakhalinsk airport which will also see an increase in passengers and cargo during the coming years.

There is currently one main railway that runs north along the spine of Sakhalin Island. Due to the current state of the roads, it provides the bulk of freight and passenger access to the middle and upper reaches of the Island.

During the construction of the project,

a substantial amount of equipment, construction materials and supplies will be moved using the railway system. To ensure that the system can cope, we will work with the authorities to upgrade the railway connections between the north and south. The company will be adding nine new rail sidings with two passing loops. At the peak of construction, it is expected that 90 railcars will carry people and equipment on a daily basis. Further upgrades and refurbishment will be carried out by Sakhalin Railways, all of which will result in an improved rail service for the Island.

Some of this work is being done in conjunction with the Exxon Neftegas, the Sakhalin I PSA project operator.



Sakhalin Energy Review 2002

Facing the challenges Road safety and construction camps

the road ahead

Upgrading the infrastructure of the island in readiness for the start-up of Phase II construction is very challenging. Many of the communities where the work is being conducted will see a temporary, but significant increase in traffic. Managing the impact of this increased traffic and road safety will be a key concern in the coming months and years.

The company has put in place a number of measures to combat the increased risk from construction related traffic. These include extensive driver training, assisting contractors in managing road safety through journey management plans, and ensuring that those who work for our company abide by the laws and regulations which govern driving on the roads, such as obeying speed limits when passing through towns. The company will support the authorities efforts to safeguard road safety.

Much of the construction work will take place in remote areas, far from the major population centres. In these areas construction worker camps will be built. For the company and its contractors these will be the first camps of their kind on Sakhalin Island. Local communities will experience an influx of people in the area. At the peak of construction there could be up to 15,000 workers. The effects

could be both positive and negative.

Consultation that the company has already undertaken suggests that communities will most likely want to trade and supply goods and services to the camps, this may boost the economies of these communities for a short time while construction is taking place in the area. The purchase of such services will be managed to avoid a boom-bust economy that may impact the fabric of those communities. *(See Social overview)*

The company has been working with our construction contractors to develop camp policies which take into account the good and bad impacts that construction camps can have on local communities.

These measures have been detailed in Sakhalin Energy's Project Camp Management Philosophy. They include camp closing times; sign in and out procedures, limited access to alcohol and random drug and alcohol testing. A code of conduct as well as a "no fishing, no hunting, no gathering" and "no gate hire" policy will be enforced. Camps will be closed to all visitors other than legitimate business visitors.

Community Liaison Officers (CLOs) will work closely with the communities who may be impacted – directly or

indirectly – to manage the relationship between the camp and the community and to ensure that any grievances are dealt with in a consistent, effective and timely manner.

There will be over ten company CLOs located throughout the island; with many of the major construction camps and sites having a dedicated Camp CLO. One of their primary responsibilities will be to ensure that the communities understand the project and to act as an easily accessible focal point for communities to meet and discuss both opportunities and concerns. The major contractors may also have CLOs who will work closely with the company CLOs.



Phase II – the project

the road ahead

Phase II is an integrated oil and gas development which will include building one of the largest single gas liquefaction trains in the world today.

Natural gas and crude oil produced offshore will be piped to the southern end of Sakhalin Island. Here, the natural gas will be converted into liquefied natural gas (LNG) and subsequently exported to markets in the Asia Pacific region and beyond. The LNG plant and oil and LNG export terminals will be built on Aniva Bay which has no or mild ice conditions in the winter. Close proximity to markets in the Asia Pacific region is one of the project's biggest advantages over its LNG competitors. This advantage can only be capitalised on if facilities can produce and export all year round.

Offshore development

Phase II involves the further development of the Piltun-Astokhsokoye field with one more platform on the more northern Piltun feature of the field, called Piltun Astokh B (PA-B). This is in addition to the Molikpaq platform (Piltun-Astokh A or PA-A) which is already installed and operational on the Astokhsokoye feature of the reservoir.

PA-B will be a manned integrated oil and gas platform with drilling facilities. Its oil capacity will be 70,000 barrels per day (11,000 cubic metres/day).

The Molikpaq platform, which

currently only produces in the ice-free season, will be connected to the new pipeline infrastructure allowing year-round production. The remaining components of the Phase II Vityaz complex – the FSO, the existing subsea pipeline and SALM – will be decommissioned.

Treated oil and gas will be taken from the Piltun-Astokhsokoye field directly to shore via offshore pipelines and then by onshore pipelines to the onshore processing facility (OPF). At the OPF the oil and gas from Piltun-Astokhsokoye field will be further pressurised to allow for transportation to the south of the Island. Separate oil and gas pipelines will then transport the oil and gas to the LNG plant and oil export terminal (OET) in the south of Sakhalin at Prigorodnoye on Aniva Bay.

The Lunsokoye field is predominantly a gas field, with some small oil rims in parts of the reservoir. During production the field will produce gas, condensate and if feasible oil.

The platform will have drilling facilities, accommodation and a minimum of processing facilities. The main gas processing will be done at the onshore processing facility located near Lunsokoye beach. On the platform, produced free water will be separated and re-injected into subsurface reservoirs and the gas and condensate will be transported to shore via two 30 inch pipelines.

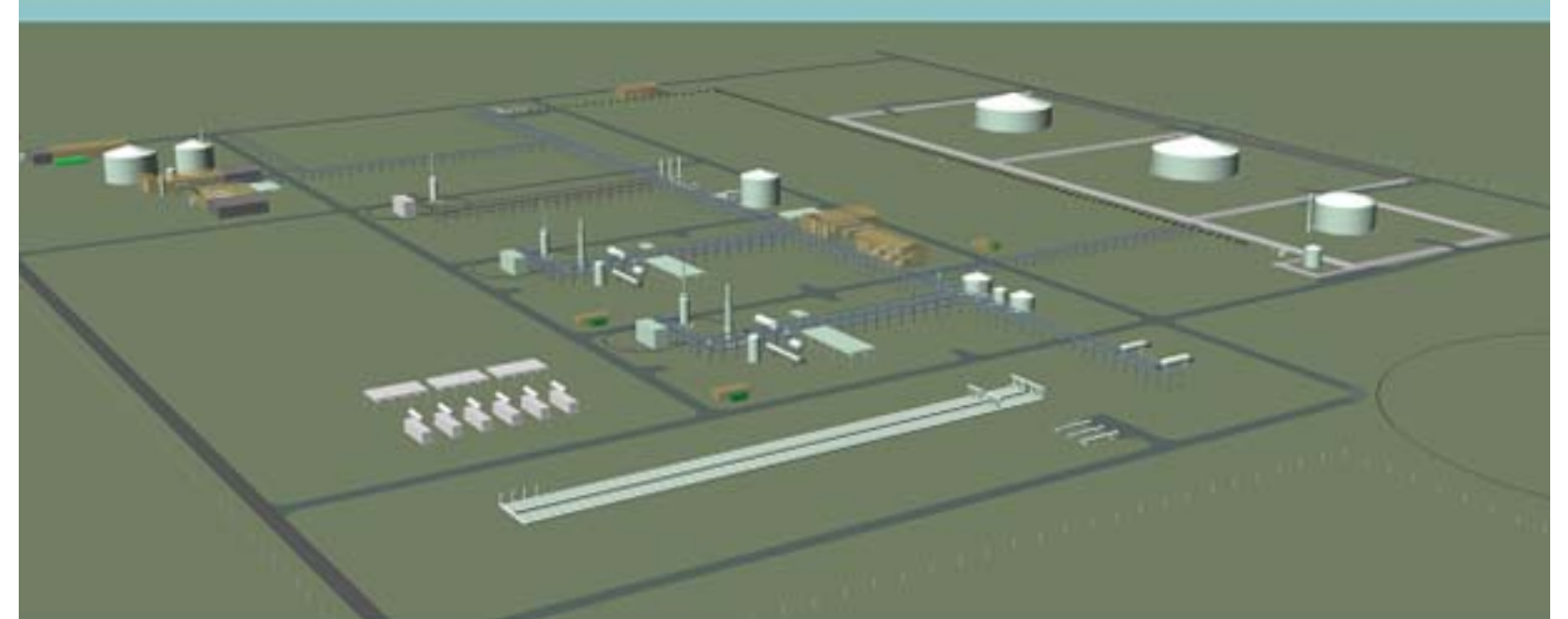
Glycol will be pumped from the OPF to the platform and will be injected into the gas stream to prevent the formation of hydrates in the subsea pipelines to the onshore processing facility (OPF). There the glycol will be collected, cleaned and recycled back to the Lunsokoye platform.

The platform has no main electric power generation. Instead, electric power is taken via an offshore cable from the OPF. The platform will have the capacity to produce all the gas required particularly for the two LNG trains currently planned, but can produce more if needed by adding additional wells and facilities.

The Lunsokoye platform will have the capacity to produce 51 million cubic metres of gas per day (1,800 million standard cubic feet/day) and approximately 50,000 barrels of condensate per day (8,000 cubic metres/day).

Both of the new platform substructures will be concrete gravity base structures built in Russia, and will be able to withstand the winter ice conditions of the Sea of Okhotsk.

These will be the first such offshore structures to be built in Russia and represent another example of technology transfer and participation of Russian industry on a major scale for the Sakhalin II project.



Onshore processing facility

the road ahead

The onshore processing facility (OPF) is where the gas and condensate from the Lunsokoye field will be received via pipeline from the Lunsokoye offshore platform. Once the gas and condensate is received it will be separated and further processed so that it can be transported by pipeline to the liquefied natural gas plant (LNG) and oil export terminal (OET). The gas will be dehydrated and processed to remove liquid hydrocarbons for pipeline transmission. The condensate will be stabilised before transportation to the OET via the crude oil export pipeline.

As well as providing the first phase of the process for both the gas and oil the OPF also provides power to the

Lunsokoye platform. An average of 19 megawatts of power will be supplied daily to the platform from a 100 megawatt power station to be built on the plant site.

The plant will include dual-purpose storage tanks for oil and condensate. It is also the start of the oil pipeline pump and pipeline gas compressor stations to boost the pressure of the gas and oil/condensate for pipeline flow to reach the LNG plant and the OET.

The plant will be developed in two stages to mirror the development and planned ramp up of gas sales. At full capacity the plant will be capable of processing 1,800 million standard

cubic feet of gas per day (51 million cubic metres/day) and about 60,000 barrels of condensate/oil per day (9,500 cubic metres/day).

When completed, the OPF will be completely self-sufficient with all required utilities such as electrical power generation, water, fuel gas, instrument air and all the necessary plant support facilities such as roads and buildings. It will even feature its own fire station and helicopter landing pad.



S a k h a l i n E n e r g y R e v i e w 2 0 0 2

Onshore pipelines

t h e r o a d a h e a d

From the onshore processing facility (OPF) the oil and gas will be transported by two pipelines more than 600 kilometres to the oil export terminal (OET) and LNG plant at Prigorodnoye near the southern port of Korsakov. The oil pipeline will be 610mm (24") in diameter and the gas pipeline will be 1200mm (48") in diameter.

The line pipe will be delivered to Sakhalin Island through the Kholmsk fishing and commercial ports from staging areas on mainland Russia. All equipment will be processed and clear customs on the mainland. The pipe will then be delivered to around ten laydown and storage areas by rail and truck. Here it will be stored prior to being used at the pipeline construction sites.

The pipelines will be trenched and laid underground using as many as five separate crews. Each spread will cover up to 200 kilometres of route and will work concurrently. Terrain and seasonal conditions will determine the timing of activities. However, work will be undertaken all year round apart from the spring thaw when roads become impassable. The majority of construction in swamp areas will be conducted during the winter, as will the construction of crossings of many rivers and streams (*See Facing the challenges- crossing rivers responsibly: preserving*

salmon spawning streams). Work in mountainous terrain will be carried out during the summer months when the weather is more hospitable and access is possible.

At the end of construction the pipeline right of way (ROW) will be cleaned up and restored. This will include the restoration of drainage patterns, re-seeding, terracing to prevent erosion, stabilisation and environmental compliance. In places where the ROW has opened up previously remote areas which may be environmentally sensitive, access will be restricted in an appropriate manner, including the removal of construction access roads to ensure ongoing secondary exploitation and damage is minimised or prevented.

The pipeline will cross over 1,100 rivers, streams, watercourses and swamps as well as several seismic faults, roads and railways. In addition, the pipeline traverses mountain ranges, including the Makarov Range, of up to 400 metres above sea level.

These conditions and the specific weather and environmental aspects of Sakhalin Island presented several design challenges for the pipelines. These included ensuring that the pipelines remain stable in the event of floods, washouts and retains integrity during and after seismic events. The pipelines also need to be able to cope

with environmental conditions such as ice and freezing temperatures during construction, road and rail traffic loads.

The oil and gas will be pressured for flow through the pipelines with the help of gas compressor and oil pumping stations. Although pumps and compressors will initially be installed at the beginning of the pipelines (on the platforms and at the onshore processing facility) remaining stations will be added if required or as production increases. The additional stations will be located at points along the pipeline route, their location being optimised to minimise the amount of

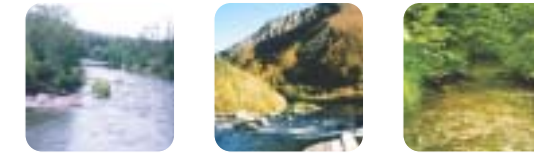
power required to move the oil and gas to its final destination.

A comprehensive plan has been developed in conjunction with the local authorities and in consultation with the communities on Sakhalin Island to ensure that the pipeline has the smallest impact possible. Where possible, the pipeline route follows the existing roads and railway (service corridor) between the onshore landing points and the LNG plant.

The pipeline has been adjusted in certain areas where the company has received feedback from the community on the pipeline route.

The pipeline was also re-routed where possible to minimise the risk of failure by active seismic faults.

(*See Facing the challenges: designing for earthquakes*).



Sakhalin Energy Review 2002

Facing the challenges

Crossing rivers responsibly: preserving salmon spawning streams

the road ahead

Sakhalin's rivers are important in their own right as places of environmental sensitivity and significance. But they are also important to Sakhalin's people, industry and services. Many of the rivers and streams on Sakhalin Island have salmon spawning in their upper reaches.

The company has conducted three years of extensive environmental baseline data collection and survey work along the pipeline route to assess the potential impact of pipeline crossings on the environment and, in particular, on the salmon streams.

This includes the classification of all waterways for salmon spawning, significance to salmon resources, the width, physical and hydrological characteristics of the waterway. In addition, this research has considered construction timing to avoid major salmon runs and migration.

This work has been conducted in conjunction with SakhNiro, the fishery regulatory agency at the regional (Sakhrybvod) and Federal (Tsuren) level. The company has included the assessment of the environmental impact to fish resources and calculating expected fish damages and compensation.

Under Russian legislation the impact of construction on fisheries is compensated via an established

system of natural resource compensation payments. The value of the resource is established using set methods, reviewed and approved by Russian authorities and paid into a government fund. By law, the compensation paid must be used to improve the fishing industry, such as hatcheries. The compensation is paid whether or not there is any actual damage.

It is anticipated that the impacts of individual crossings will be insignificant, local in nature and short term. The cumulative impact of over 1000 crossings is expected to be larger, but again short-term, with construction impact being temporary, and confined to the period during construction and immediately afterwards. Our mitigation measures are designed to effectively minimise this cumulative impact.

Mitigation measures:

In addition to the compensation payable under law, the company will be working to mitigate the impact of construction on rivers and streams. There are several methods commonly used in construction of river crossings including:

- The dry ditch method, where stream flow is temporarily halted or diverted around the work area and the work area is made water-free
- The wet trench method where the excavation, installation and back-filling is completed without

impeding the stream flow

- Overhead pipe crossing where the pipe is installed over the river or stream like a bridge
- Horizontal directional drilling (HDD) where a bore hole is drilled under the riverbed and the pipe pulled through the bore

Overhead spanning is not preferred for safety and operational reasons.

HDD can be considered for large rivers but the equipment, construction and drilling processing associated with HDD crossings means there will be other environmental impacts.

The type of crossing chosen for each river or stream considers all the characteristics of the river or stream including its importance to the fishing industry. The HDD and wet trench methods have been evaluated as being the most suitable methods to be used on Sakhalin Island. A total of eight rivers will be crossed using HDD. The remainder will use the wet ditch method, however, the use of the dry ditch will be discussed during the detailed design phase.

Works will be carried out at the rivers and streams identified as being of importance to salmon spawning during the winter. This is outside the salmon spawning season when there are no salmon present, and when the water is completely frozen, thereby greatly reducing the impact.



S a k h a l i n E n e r g y R e v i e w 2 0 0 2

Facing the challenges Unexploded ordnance, war dead and archeological sites

t h e r o a d a h e a d

Sakhalin Island's history means that when preparing the pipeline right of way and the sites for LNG plant, oil export terminal (OET), onshore processing facility (OPF) and the infrastructure upgrades for construction, the land had to be surveyed not just for archeological sites, but also for unexploded ordnance left over from previous military action between Russia and Japan.

The desk studies carried out, with the experience of the Authorities, indicated the high probability of finding war dead from the 1945 conflict and as such a separate project was carried out to cover this. These needed to be dealt with in a sensitive manner, consistent with Russian law and Japanese customs.

The company has therefore developed policies for archeological sites, unexploded ordnance and war dead.

The archeology policy aims to meet regulatory and international requirements to deal with sites found. The finding of archeological sites could happen over the next three to four years and lead to construction delays. There is a limited pool of expertise in the Russian Far East to deal with such matters, so management strategies have been

developed to ensure that the impact of such findings on project schedule is minimised. This includes employing a small core team of Russian archeologists and establishing local capacity for the protection and analysis of artifacts. This team will provide an important interface between Authorities and the company to ensure such sites are properly managed and preserved wherever possible.

The clearing of the right of way and project sites of unexploded ordnance (UXO) will be completed in a timely manner to ensure the project schedule is not delayed. This work is currently being conducted to accepted international and Russian standards.

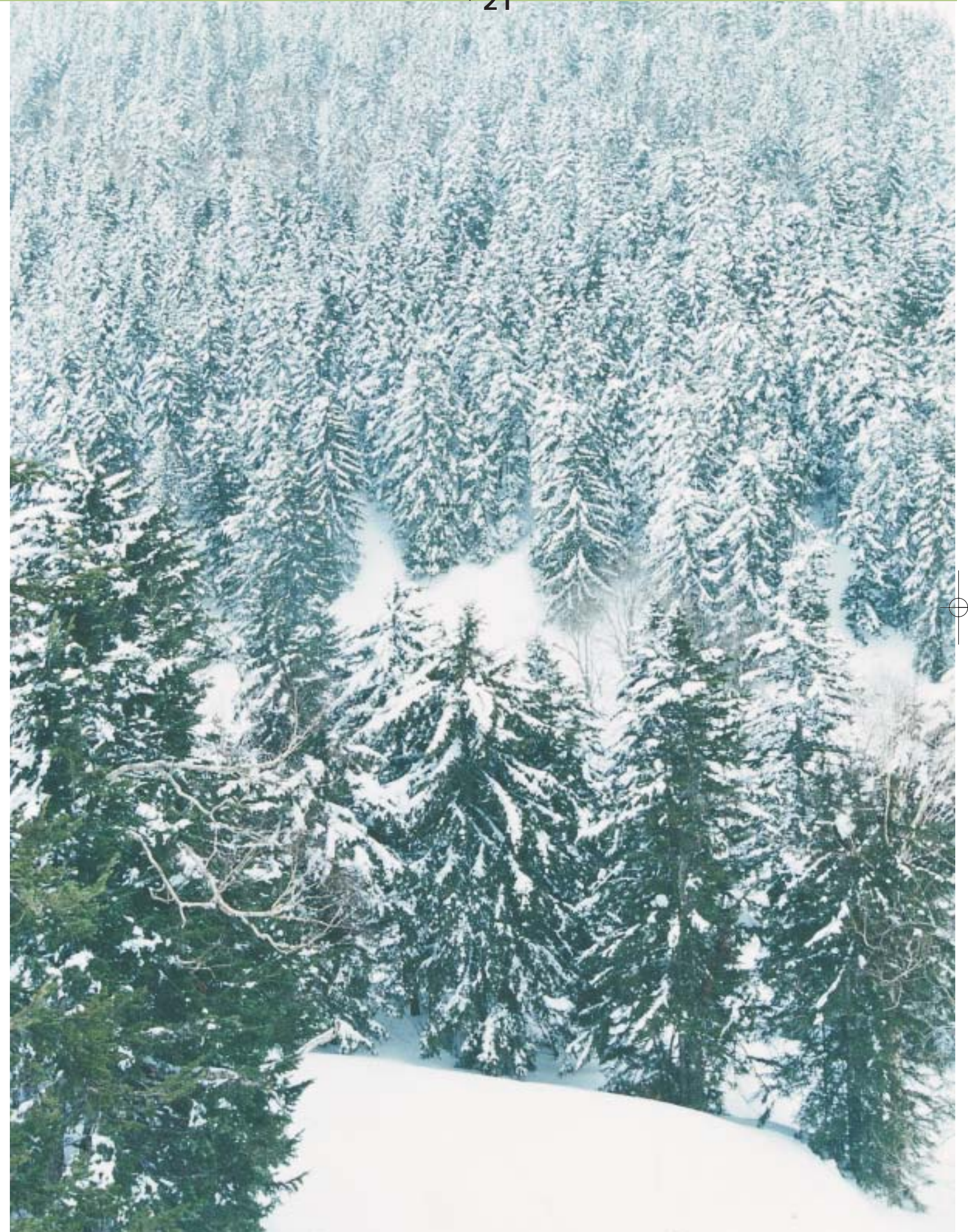
The company expected to encounter war dead, in specific areas, and during its work detecting and clearing both UXO and general project site clearance work.

Under Russian law the government is responsible for the recovery and re-burial of war dead. Lack of available government funds has meant that we have been working closely with the military commissariat to ensure the sensitive handling of war dead.

The company has solicited the support of the military Commissariat to ensure war dead are correctly handled by the relevant Authorities according to Russian law. The company provides the necessary funds to undertake the search for war dead. These funds contribute towards the appropriate identification, notifications and burial with military honours of Russian war dead. Japanese war dead are cremated according to Shinto religious law and their ashes returned to Japan.

When human remains are discovered during the UXO clearance, work is stopped. The Commissariat then takes the appropriate action to deal with the remains. Following the removal of the remains, the UXO work is recommenced.

During construction it is still possible that further UXO, war dead and archeological sites may be discovered despite the company's efforts to date. Such finds will be treated using the procedures outlined above.





Sakhalin Energy Review 2002

LNG plant and oil export terminal

the road ahead

An oil export terminal and liquefied natural gas processing plant will be built on a 200 hectare site at Prigorodnoye on Aniva Bay 15 kilometres east of Korsakov. Aniva Bay remains largely ice-free throughout the year making it an ideal export location for the project.

The Sakhalin LNG project will be the first LNG plant to be built in Russia.

The LNG processing plant will have an annual production capacity of 9.6 million tonnes. Each of the two trains will have an annual capacity of 4.8 million tonnes. These will be amongst the largest single trains built worldwide to date. There is sufficient room on the site to build more trains later if required.

The processing trains will use a dual mixed refrigerant process. Shell double

mixed refrigerant liquefaction process uses coil wound type cryogenic heat exchangers for both the pre-cooling and main cooling cycle. The cold climate on Sakhalin Island makes it ideal for utilising this air-cooling process.

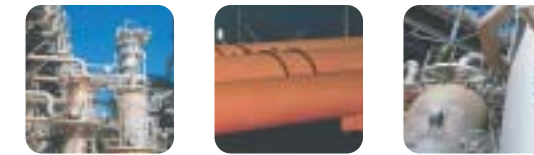
The LNG plant will have two 100,000 cubic metre storage tanks and LNG will be exported via an 850-metre jetty in Aniva Bay. The jetty will have two loading arms, with ship loading expected to take between six and sixteen hours depending on the size of the cargo.

The oil export terminal (OET) will be located 500 metres east from the LNG plant on the same site at Aniva Bay. The facility will provide oil storage in floating roof tanks with a capacity to store two million barrels (95,500 cubic metres).

This is equivalent to about ten days throughput from the onshore oil pipeline. A leak detection system will be installed in each tank foundation to prevent land contamination.

Crude oil will be exported via a subsea pipeline to a tanker loading unit (TLU) which is located offshore in Aniva Bay, about five-kilometres out into the bay. Up to 50,000 barrels of oil can be loaded per hour (8,000 cubic metres/hour). The TLU will have a surge relief system installed to protect the tanker loading unit from overpressure and leaks in the event of a sudden shutdown.

The LNG plant and OET will be self-sufficient having their own power, water, fire fighting, oil spill response and waste water treatment services.



Sakhalin Energy Review 2002

What is LNG and how is it produced

the road ahead

Natural gas is a fuel that is in demand the world over, as it is a cleaner, more environmentally friendly energy source than other fossil fuels such as coal and fuel oil. In order for natural gas to be transported economically, other than by pipeline which limits the customer base, it needs to be converted into liquefied natural gas.

What is LNG?

LNG is liquefied natural gas. When natural gas is cooled to -160°C it reduces in volume by 600 times and becomes a liquid. This makes it possible to transport large quantities to customers by tanker ship in many different locations.

Environmental friendly

LNG (natural gas) is one of the most

environmentally friendly fuels available for power generation today. Compared with other fossil fuels it produces less greenhouse gases per MJ of energy produced. The diagram shows the greenhouse gas emissions compared with other fossil fuels. The LNG liquefaction from gas has an energy efficiency of about 93 percent.

Safety and proven technology

LNG technology has proven to be very safe. Japan, the world's largest LNG consumer, has been taking deliveries and converting LNG back to vapour gas for power generation since the 1970s without a single significant accident. The Society of International Gas Tankers and Terminal Operators reports that over 50,000 journeys

have been successfully completed without loss of life or a single vessel or port facility being put out of operation.

Shell – the technical adviser to the project – has been building and operating LNG plants around the world since the 1970s. All the project's shareholders have a proven track record in building and operating successful large-scale LNG plants around the world.

EMISSION COEFFICIENTS AT THE COMBUSTION OF FOSSIL FUELS

Fossil fuel	Lower calorific value (MJ/kg or Nm ³)	Emission coefficient (g _{CO₂} /MJ)
Steam coal	22.9 - 29.3	106.4
Anthracite and household coal	21 - 34	94.6
Heavy fuel oil	40 - 41	78
Light fuel oil	41 - 42.8	74.2
Natural gas	36.6 - 37.8	56.8





Sakhalin Energy Review 2002

The markets: fuelling Asia's economy

the road ahead

Sakhalin gas is a strategically important hydrocarbon resource that is located close to the growing markets of the Asia-Pacific region. Sakhalin has a natural advantage in developing liquefied natural gas (LNG) as it is close to the markets of Japan, Korea, Taiwan and China, which between them account for almost two thirds of current world LNG demand.

The company selected LNG as the best, fastest and most practical option to deliver gas to Asia because it enables customers to use existing import facilities, and at the same time allows the company to rapidly build up sales volumes across several different customers in different countries.

Customers require a long-term reliable source of LNG and reliability of supply can be achieved only by export via a port with no or mild ice conditions. That is why Sakhalin Energy chose to build an 800 kilometre oil and gas pipeline to an LNG plant export facilities at Prigorodnoye in the south of Sakhalin Island.

The onshore oil and gas transportation system that will link the offshore fields to the LNG plant and oil and gas facilities will provide continuous exports of LNG all year round.

The majority of the natural gas

produced from Sakhalin II will be exported for sale as LNG.

Under the PSA the Russian federal and state authorities are entitled to a certain amount of natural gas. With the pipeline running down the spine of the Island the opportunity exists to "gasify" the island in the future. This will provide Sakhalin and its people with the chance to replace its current dependence on coal, oil and wood as energy sources with cleaner, more efficient natural gas.

The pipeline system being developed by the company can also be expanded as an export corridor for other future offshore Sakhalin projects to transport their oil and gas to international markets.

The major benefit of Sakhalin II is that it is right on the doorstep of the Asia-Pacific market. The company is poised to meet the challenge of providing essential, clean and reliable energy supplies for those economies, opening up new markets for Russia's natural resources.

The Russian Federation has achieved a reputation second to none as a reliable supplier of natural gas to Europe. The successful development of the Sakhalin II project will see that success repeated in the entire Asia-Pacific region.

Sakhalin LNG has a number of competitive advantages including:

- World class abundant reserves located on the doorstep of the largest LNG market in the world
- The track record of our shareholders in developing world-class LNG projects
- Strong political support both in Russia and in our target gas markets
- Source of diversification of supply for gas customers
- Geographic proximity to Asian markets
- Winter production bias meets winter customer demand needs

Sakhalin Energy believes it can make use of the advantages outlined above to deliver LNG with competitive terms and conditions to fuel the market for future growth and expansion, and to assist in further sustainable economic development and energy security in the Asia-Pacific region.



Sakhalin Energy Review 2002

Sustainable development into practice

the road ahead

The company has developed a sustainable development (SD) policy. It reflects the realities of doing business in Russia and focuses on what is realistic and achievable for our company in its contribution to SD. It will be implemented over the project's lifetime through embedding the SD principles into business plans and processes.

We developed the policy based on the widely used definition of sustainable development of "ensuring that the needs of the present generation are met without compromising the ability of future generations to meet their own needs".

The company also adheres to the following seven objectives of sustainable development:

- Minimise impact on the environment
- Use resources efficiently
- Maximise profitability
- Maximise benefits to the community
- Respect and safeguard people
- Engage and work with stakeholders
- Deliver value to customers

The key policy commitments are:

- Sakhalin Energy will carry out its business responsibly and efficiently so as to deliver a robust project that

will maximise benefits to the Russian Federation, the Sakhalin community and shareholders

- Sakhalin Energy will contribute to the present and future needs of society on Sakhalin Island while keeping a balance between economic development, environmental protection and social responsibility
- Sakhalin Energy will work with stakeholders to identify ways to contribute to the wider, long-term economic, environmental and social benefits in the Sakhalin region.

Throughout this Review we have discussed some of the key environmental and social concerns that have been raised during our consultation efforts to date. We are not able to cover all issues in this document but have addressed some of those most often mentioned. We have talked about these frankly and of our plans to mitigate these issues and impacts.

We would welcome your feedback on these issues.





Social overview

the road ahead

The company has undertaken a detailed series of impact assessments for the project. The potential positive and negative social impacts are described in detail in the social impact assessment work.

The company plans to continue consulting with the wide group of people and organisations who are interested in our project about our plans to mitigate the social impacts of the project and how we can maximise the benefits. (See *Facing the challenges: maximising Russian employment*)

Monitoring our impact on the community will be the primary responsibility of the social monitoring group. This group of dedicated experts will look at how effective the mitigation measures we have developed are in addressing the impacts of the project and addressing the concerns of local communities. As part of this a monitoring programme has been developed to look at such things as camp management (See *Facing the challenges: road safety & construction camps*), food and housing prices, community safety and the level of complaints that the company is receiving.

This group will be assisted at the community level by the Community Liaison Organisation which will be operational in the early part of 2003.

The key activity of this organisation is to provide a link between the community and the company as well as our contractors. The community liaison officers will be based at towns and company camp sites across the entire island. (See *Sakhalin II project overview map*)

The CLOs are all Russian nationals who have been recruited and trained by the company. The skills' training includes meeting facilitation and design, mediation and negotiation, intercultural communications and conflict resolution. The CLOs will be responsible for implementing the company's grievance procedure, which addresses community concerns in a transparent, efficient and consistent manner.

The company will continue to invest and develop a range of social investment programmes throughout Sakhalin Island. The company's current programme is focused on youth related activities, indigenous peoples and special interest groups. These programmes include an annual correspondence school in mathematics and physics, helping to provide books to the Sakhalin Regional Children's library, support for the annual programme of the Department of Culture, support of several orphanages, indigenous and environmental programmes. Some of our programmes are described in detail below.

Nivkh Dif newspaper:

Since 1999 the company has supported the monthly edition of the "Nivkh Dif" - a newspaper in the language of the Nivkh indigenous people. We equipped the newspaper office with a facsimile machine, email connection and, in conjunction with the regional authorities, a computer was provided, with the company offering computer support services. In addition, the company covers the cost of printing and distribution. The company has also sponsored a multi-year programme of Holland's Groningen University, University of St. Petersburg and Sakhalin Museum of Local History to preserve indigenous languages and verbal heritage.

Green Island School

Annual support is provided to the Regional Department of Education's extra-curricular activity centre's environmental education programme. There are two sessions a year - spring and autumn. Students have theoretical and practical classes that focus on ecological aspects of Sakhalin's flora and fauna. At the end of the programme students are required to submit a thesis on nature protection issues. The programme includes a ten day summer camp and excursions to various sites, including to working fish hatcheries and other environmental locations.



Facing the challenges Maximising Russian employment

the road ahead

The company is committed to maximising the employment of Russian nationals at all levels of the company. Significant training and employment opportunities will be available to those who join the company.

Through the programme to maximise, to the extent possible, Russian industry utilisation, further indirect employment opportunities will be available to Russian nationals, making the project benefits more tangible to a greater number of people in the community.

The number of people employed by the project will vary during its life-cycle. We recognise that many people have both direct and indirect expectations of the project. Indirectly, the project will affect the lives of many people as the project starts.

Temporary employment - Construction Phase 2002 - 2008

During this period there will be a large number of temporary, short-term construction jobs that will last from a matter of weeks to a few years. Research carried out together with the Administration indicates that there are about 6,000 skilled construction workers living on Sakhalin Island - many of whom are currently employed.

The expectation will be that the company will provide employment. However, many people who will be employed during this period will not be hired directly by the company but by our contractors and their subcontractors. Policies are in place to ensure the company and our contractors maximise the use of Sakhalin Island and Russian labour for the project with minimum disturbance to the local employment market. This will be monitored by the Social Monitoring Group and the Community Liaison Organisation as well as others within the company.

To meet this challenge we have introduced Russian content conditions into our contract awards. The successful contractor is required to submit to the company a comprehensive recruitment and employment plan which addresses how the contractor will implement the company's commitment to advertising and recruiting Russian nationals for

positions, in particular, people from Sakhalin Island. The contractors will be responsible for hiring people directly.

The company will be participating in this process through the Community Liaison Officer (CLO) organisation. CLOs will work closely with contractors to facilitate the identification and recruitment of suitable individuals through providing information regarding forthcoming positions, working with local employment authorities and within the communities themselves.

Long term employment - Operations phase 2006 to decommissioning

There are currently about 600 people employed by the company. About 600-850 new jobs will be created by the time the project begins full operations in 2006. It is estimated that by 2008 50-70 percent of these positions will be filled by Russian

CURRENT ESTIMATED EMPLOYMENT FIGURES: CONSTRUCTION PHASE

Onshore Construction	Start	End	Average Range	Peak
LNG/OET	2002	2006/2008	2,000-3,000	6,000
OPF	2002	2006/2008	250-450	700
Booster Station	2003	2008	150-200	200
Pipeline	2003	2005	4,000-5,000	6,000
Total			6,400-8,650	13,000



Sakhalin Energy Review 2002

Facing the challenges Maximising Russian employment

the road ahead

CURRENT ESTIMATED EMPLOYMENT FIGURES – OPERATIONS PHASE

Operations	Existing	New (SE & Contract)	Total
LNG/OET	0	200-300	200-300
OPF	0	50	50
Offshore platforms	100	200-250	300-350
Pipeline	0	50-100	50-100
SE Office	500	100-150	600-650
Total	600	600-850	1,200-1,450

nationals. This number will continue to increase as specialised technical and managerial expertise is gained.

The company is currently implementing a graduate recruitment programme across Russian universities in addition to the experienced hire programmes already underway today. There are also plans to establish a training centre which will develop school leavers into a steady supply of skilled apprentices who can take up opportunities in the company's operations.

Indirect employment – local business opportunities

Projects of this size generate numerous local business opportunities and create indirect benefits including employment. Studies have shown in other energy producing areas, such as the North Sea, that oil and gas development stimulates wider growth of the economy in sectors that are not necessarily related to each other or

the oil and gas industry. As more jobs are created, as more money is invested, as more taxes are paid, new businesses and services open up. It is estimated that each job in the oil and gas industry helps to create several jobs in other industries, particularly in the services sector such as construction, transport, public catering and communications. Increasing employment leads to learning new skills, and the skilled workforce attracts new manufacturing businesses. It is known that higher employment entails more funds allocated to the purchase of cars, furniture, household appliances, clothing, food and other consumer goods. All this stimulates the local economy, multiplying several times over the benefit of the initial expenditure, contributing to a healthy local economy with good long-term employment prospects.



Sakhalin Energy Review 2002

Environment overview

the road ahead

Over the past 30 years there has been a fundamental shift in the approach of industry and government to the environment. Governments have become more aware of the need for environmental legislation and practices, and companies of the need to manage the impact of their operations on the environment better. At the same time public awareness regarding environmental issues is higher than ever before and people's expectations of the way companies manage their impact on the environment has changed.

In many countries the legacy of environmental practices from the past can still be felt today. This colours the perception of the how people view industry and its performance on mitigating its impact on the environment.

In recent years, the Russian Federation government has adopted a set of environmental standards and regulations that are amongst the most stringent in the world. The framework to monitor and regulate compliance with these standards is still evolving.

The company's experience shows that the Russian authorities check everything we do with care and a healthy degree of investigation. In some areas – such as offshore

operations and LNG plants which are new to Russia – we seek to discuss solutions to potential problems. But we do this from a perspective of applying international best practice. It is against this background that the company is managing the environmental impacts of the Sakhalin II project.

Our company's strategy, while working at all times within the parameters of the Russian legislative system, is to adopt a rigorous application of a number of recognised and approved health, safety and environment (HSE) management methods. This is known collectively as the "Hazard and Effect Management Process". It involves identifying hazardous aspects of activities, then assessing the sensitivity of the local environment to them before modelling and predicting the likely effects. The next stage in the process is the management of the likely or potential effects in order to eliminate them or, where this is not feasible, to minimise adverse effects and to maximise positive effects.

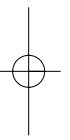
Much of this work also involves introducing such practices into our contractor companies. This will be implemented by including clear HSE guidelines into major contracts. Contractors will be required to prepare a HSE management plan to be approved by the company which

includes training and supervision obligations and which preserves the company's right to audit compliance and levy penalties for non-compliance.

The company works at all times towards meeting or exceeding Russian and international HSE management standards in the execution of the project and in implementing systems to allow this in its operations phase.

While a project the size of Sakhalin II will have an impact on the environment, all efforts will be made to minimise any environmental impacts while working to maximise the economic and social benefits.

On the following pages we discuss some of the environmental impacts which have emerged during consultation as having a high level of concern in the community about how we are managing and mitigating these potential environmental impacts.





Sakhalin Energy Review 2002

Facing the challenges Oil spill response in a remote location

the road ahead

The Sakhalin offshore area of development and operation is both new and isolated, with little existing infrastructure to support an oil spill response (OSR) capability. Potential oil spills are one of the key environmental concerns associated with the Sakhalin II project.

As part of its commitment to sustainable development, the company takes the issue of oil spills seriously, and has instituted measures to ensure that the likelihood and impact of oil spills are kept to a minimum. Over the past two years to date a total of approximately 50 millilitres has been spilt by our Phase I Vityaz complex operations. The essence of company's approach to oil spill prevention, preparedness and response is outlined below:

1. Prevention:

The prevention of any spills in the first instance through the robust design of production facilities and continuous monitoring for oil spills, adhering to high international standards and best practice.

2. Preparedness:

The company's preparedness in OSR is regularly tested – in 2002, five oil spill response exercises were undertaken for the Vityaz offshore platform, which engaged local volunteers in the training programmes.

3. Efficient Response Strategy:

In the event of a spill, the company has an efficient and effective OSR strategy, with a clear and tested chain of command and appropriate resources on hand to tackle a spill. Under Phase I operations, there is an OSR vessel on standby at all times, which is supported by additional craft and equipment located on the coast near Nogliki. The company employs a full-time dedicated team of ten OSR specialists, who are based on the Island. During Phase II, the company will deploy permanent OSR equipment and resources at each asset, and at strategic locations along the pipeline route. In environmentally sensitive locations along the coast, drop-off points have been identified for the air-transport of specialized equipment to ensure a rapid response is achieved.

4. Net Environmental Benefit Analysis.

Our OSR strategy embraces the principles of Net Environmental Benefit Analysis to ensure that the impact of any oil spill on the natural and human environment is kept to a minimum. This strategy has been informed through detailed modeling of potential oil spill scenarios, the development of habitat sensitivity maps, diverse response options and tools that are tailored to the sensitivity of the environment, and the strategic location of response equipment

to ensure an efficient and effective response.

5. Tiered Approach:

The company's response to an oil spill will vary depending upon the size of the spill, and will be structured according to a tiered approach (Tiers 1 to 3), which enables a flexible build up of resources at regional, national, and international levels, as required. The level of response is very much dependent upon the size of the spill, its behaviour and dynamics, and the prevailing climatic and hydro-meteorological conditions. A tiered approach has been adopted to facilitate the rapid and orderly expansion of emergency response by each project facility, with the support of substantial international resources if required.

In compliance with Russian federal laws and resolutions and Sakhalin Oblast decrees, and guided by international best practice and lessons learned from the implementation of Phase I, the company has developed OSR Plans for each of the Phase I and II assets. In addition, the company has also prepared a Corporate OSR Masterplan, which provides a strategic overview of the policies and principles that guide our OSR approach. The Russian Federation authorities are currently reviewing the Phase II plans as part of the TEO-C approval process.



Sakhalin Energy Review 2002

Facing the challenges Co-existing with Gray Whales

the road ahead

The north-east coast of Sakhalin Island is sensitive and diverse and home to a number of species including the critically endangered Western Gray Whale. The offshore area is the summer feeding grounds of the Western Gray Whale. These feeding areas are within thirty kilometres of our company's offshore oil and gas project.

The Western Gray Whale was, until the 1970s, thought to be extinct, but since then there have been regular sightings in the shallow waters off the north eastern shore of Sakhalin Island in the Sea of Okhotsk.

Much of what is now known about this species is a result of the programme of systematic and detailed research undertaken by Russian and international experts for our company and Exxon Neftegas. There are thought to be between 100-110 whales off the north-east coast of Sakhalin, however, the extent of the population is not known as the entire Pacific coast has not been systematically surveyed.

Concern remains with non-governmental organisations and others regarding the impact of the company's operations on the Gray Whale. To date the ongoing monitoring and study programme has shown that no whale has been harmed since the company commenced operations in the area, and the whales have continued to return annually.

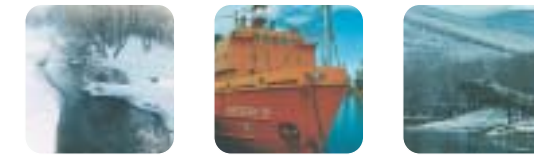
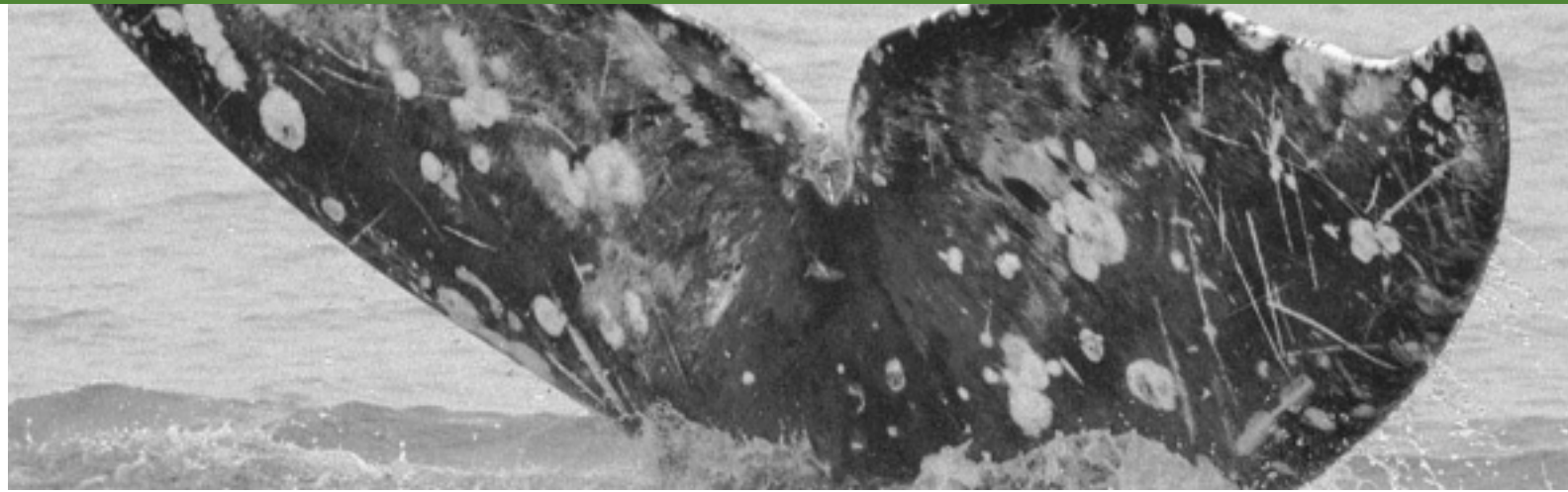
There are questions and concerns about the "skinny whale" phenomenon. Some of the whales which have summered off Sakhalin have appeared to be emaciated. However, skinny whales have been recorded in the more numerous Eastern Gray Whale population off the coast of California. Scientists do not at present understand why whales appear skinny. Current thinking is that it may be caused by some climatic or ocean-wide changes. The appearance of skinny whales in both populations suggests that the phenomenon is not linked to the company's operations.

The health of the Western Gray Whales and the efforts to protect them is further complicated by the fact that the location of their wintering grounds – where they mate and calve – is unknown. It is thought that they may migrate to the South China Sea, but this has not been confirmed by reliable data. Until more is known, it is impossible to say what other pressures the whales may be coming under which will affect their survival once they leave the coastal waters of Sakhalin.

The company has introduced a protection and mitigation programme – the Western Gray Whale Protection Programme – based on advice from international whale experts, the findings of existing surveys and research it has undertaken. We have consulted widely on the measures contained in this document and see it very much as a living document.

SUMMARY OF PROTECTION AND MITIGATION MEASURES

- **General avoidance of marine mammals** - training employees and contractors to raise overall awareness of the sensitive marine environment;
- **Separation of vessels from marine mammals** - establishing specific communication and distance requirements for vessels when marine mammals are sighted;
- **Special altitudes and flight paths to minimise disturbance** - establishing special helicopter flight paths to avoid flying directly over the whale feeding areas, and minimum altitude specifications for company aircraft so as to generally minimize disturbance to whales and other wildlife;
- **Control of any offshore discharges** - such as drilling mud and cuttings;
- **Oil spill response preparedness** - maintaining a 24-hour oil spill response vessel on standby at the production site during the production (i.e. ice free) season to enable rapid response should an oil spill occur;
- **Noise control during seismic and pile driving** - establishing environmental protection plans before starting activities such as seismic, dredging and pipeline construction.



Sakhalin Energy Review 2002

Facing the challenges Responsible waste management

t h e r o a d a h e a d

We are currently developing a plan which looks at Phase I and II of the project and the potential impacts of our operations, in both the construction and operations phases. This will be reviewed by the Russian authorities, as well as being presented in public consultation and dialogue sessions with a variety of stakeholders, both on Sakhalin Island and internationally.

The focus of the protection and mitigation measures going forward is to continue the monitoring and studies already underway. An important part of the future programme includes building capacity of Russian research institutes.

Discussions are ongoing regarding a satellite tagging programme which would be used to gain information about migration routes and wintering areas. Current tags are judged as unsuitable for Gray Whales due to their size. It is hoped that further research and development will allow this work to be undertaken in the near future.

To date the company has spent over \$1.9 million on research programmes. ENL has also funded studies, bringing the combined industry research to approximately \$5 million.

A new research programme is currently being developed which will involve the All Russian Institute for Fishing, Oceanography and Scientific Research (VNIRO) and other national and international experts on whales and marine species. A key focus of the

programme will be to build Russian expertise. Some of this training is already underway. In early 2002 a team of Russian scientists visited the United States to receive training in photo identification operations.

Summary of current and planned research

Aerial surveys – Will document within-season shifts in the distribution of the Gray Whales and provide information on alternative feeding grounds. Continued monitoring of the distribution of Gray Whales throughout the feeding season is necessary to help assess natural baseline conditions and, in the future, the extent of potential impacts of development in the region.

Vessel based surveys – Will document within-season shifts in the distribution of Gray Whales within and among the feeding areas, as well as provide information on alternate feeding areas.

Acoustic study – Will help to determine the levels of noise in the feeding habitat of the Gray Whales, transmission loss, and the responses of the whales to different sources and levels of man-made noise. This study, in conjunction with the aerial and vessel based surveys, food source studies and the behavioural study will help to determine and monitor baseline ambient noise, transmission loss, the effects of industrial noise on the behaviour, distribution and movements of the Western Gray Whales.

Behavioural studies - Will examine behaviour of whales in the coastal feeding sites to look at potential disturbance reactions of Gray Whales during baseline conditions, and in future in proximity to petroleum development and other activities occurring off the northeast coast of Sakhalin Island.

Food source study – Will help to understand the relationship between the distribution and abundance of food source and the spatio-temporal distribution of the Gray Whales along the northeast coast of Sakhalin Island. In addition, a baseline understanding of food source may help to determine if natural or human caused changes may be causing the "skinny" whale phenomenon. Without baseline understanding of food source dynamics in space and time, it will continue to be difficult to determine if shifts in the distribution of whales are caused by natural or anthropogenic factors.

Photo identification study – The multi-year photo identification and re-identification survey helps to establish the size, structure and health of the Gray Whale population. With the discovery of a new offshore Gray Whale feeding area, photo identification is critical to help to understand the movement of whales between Piltun Bay and the southern feeding areas.

Much work has been undertaken to date on the most effective way to dispose of waste over the lifetime of the project. This work has included identifying the volume of waste to be generated by the construction and operations of the Phase II project, integration with Phase I waste disposal and appropriate hazardous waste disposal.

The majority of waste will be generated during the construction of Phase II. This waste is largely non-hazardous construction rubble as well as domestic waste from the workforce. In comparison to the total amount of waste generated on the Island the Project waste will form only a small percentage.

To monitor and track waste the company has introduced a waste

tracking system. This document system looks at generation, classification, transport, storage, treatment and disposal. The underlying principle of the uniform tracking and records system will be "care and custody". The system will be comparable with international best practice and conform to Russian legislative requirements.

A co-operative approach with the local Administration will be taken to upgrade existing landfills for non-hazardous waste. The basic upgrade is intended to improve the current environmental performance of these facilities so that local Administrations have a sustainable base from which to expand capacity and service future waste disposal needs of the broader community. The facilities selected under this approach will need to meet

company requirements for environmental integrity, provision of appropriate land allocation, operational permits and the long-term transfer of legal liability and responsibility to local operators.

The project will provide a purpose built hazardous waste storage and disposal site, if possible this will be done in conjunction with other oil and gas development operators.

As part of the company's integrated approach to waste management the engineering, procurement and construction contractors will also be required to submit information on waste disposal as part of their HSE management plans.





Facing the challenges Designing for seismic activity

the road ahead

Sakhalin Island is located in a region of high seismic activity. In 1995 the entire city of Neftegorsk, the centre of the onshore oil industry, was destroyed by an earthquake. Over 2000 people lost their lives and environmental damage was caused by the earthquake's impact on the onshore oil industry.

The possibility of a large magnitude earthquake during the project's lifetime presented design and construction challenges for all aspects of the project. The onshore pipeline, for example, crosses 24 fault lines, seven of which are deemed active.

It has been designed to withstand both the seismic activity of the region and the winter soil freezing. At fault crossings, the pipeline will be covered to a depth of one metre, enclosed in polystyrene board insulation and the pipeline thickness will be increased.

The platforms and offshore structures are all designed to meet the ISO

International Code. This code of seismic criteria and design procedures applicable for offshore structures is considered the most appropriate for the oil and gas industry. All the offshore structures are designed to withstand a "Ductility Level Earthquake" which is the highest design category. This is a rare and intensive earthquake with a very low probability of occurring during the lifetime of the offshore structures.

All the onshore facilities have been designed to withstand earthquakes predicted to occur once in every 500-1,000 years. In addition, selected critical structures, like the LNG plant are designed for safe shutdown in the event of an earthquake predicted to occur only once every 10,000 years.

In addition, the company is participating in an upgrade of the seismic monitoring network jointly with the Russian Academy of Science (RAS) and ExxonMobil Neftgas. This will enable scientists to more fully

understand the natural seismicity of the area. The company will install and maintain three monitoring stations in the Lunskeye area. ENL will install and maintain three stations in the Odoptu area. These new stations will be combined with the existing RAS stations to form a very comprehensive network. Currently, site surveys are being performed and design criteria established for the monitoring stations. The new stations will begin to be operational starting in the summer of 2003.



Statement of general business principles

the road ahead

Our business principles - managing our business

Our General Business Principles govern how we conduct our business. Our core values are honesty, integrity and respect for people. These principles apply to all transactions, large or small, and describe the behaviour expected of every Sakhalin Energy employee in the conduct of its business.

Our objective:

Sakhalin Energy's mission is to commercially develop, operate and market the hydrocarbon resources and associated infrastructure, governed by the Sakhalin II licences, for the sustainable benefit of the Russian Party, the wider community and shareholders.

Our responsibilities:

SEIC has identified six key areas of responsibility:

- Shareholders – protect shareholders' investment and provide an acceptable return;
- Russian Party – respect the company's obligations under the PSA to the Russian government;
- Customers – win and maintain customers by developing and providing products and services that offer value and which are supported by the requisite technological, environmental and commercial expertise;

- Employees – provide opportunities for personal growth and development with job satisfaction in a safe, challenging, diverse and team-based environment; reward performance with competitive compensation and benefits;
- To those who we do business with – seek mutually beneficial relationships with contractors and suppliers and promote the use of these business principles in doing so;
- Society – conduct our business as a responsible corporate member of society, to observe the laws of the Russian Federation and the other countries in which Sakhalin Energy operates, to express support for human rights in line with the legitimate role of business and to give proper regard to health, safety and the environment consistent with Sakhalin Energy's commitment to contribute to sustainable development.

These six areas of responsibility are inseparable.

Economic Principles

Profitability is essential to discharging these responsibilities and staying in business. It is a measure both of efficiency and of the value that customers place on Sakhalin Energy's products and services. It is essential to the allocation of the necessary corporate resources and to support the continuing investment required to

develop and fully exploit Sakhalin Energy's business opportunities. Without profits and a strong financial foundation it would not be possible to fulfil the responsibilities outlined above.

Criteria for investment decisions are not exclusively economic in nature, but also take into account social and environmental considerations and security of the investment.

Business Integrity

Sakhalin Energy insists on honesty, integrity and fairness in all aspects of its business and expects the same relationships with all whom it does business. The direct or indirect offer, payment, soliciting and acceptance of bribes in any form are unacceptable practices. Employees must avoid conflicts of interest between their private financial activities and their part in the conduct of company business. All business transactions on behalf of Sakhalin Energy must be reflected accurately and fairly in the accounts of the company in accordance with established procedures and will be subject to audit.

Political activities:

Of companies:

Sakhalin Energy acts in a socially responsible manner within the laws of the Russian Federation and the other countries in which it does



business in pursuit of legitimate commercial objectives. Sakhalin Energy does not make payments to political parties, organisations or their representatives or take any part in party politics. However, when dealing with governments, Sakhalin Energy has the right and the responsibility to make its position known on any matter which affects itself, its employees, its customers, or its shareholders. Sakhalin Energy also has the right to make its position known on matters affecting the community, where it has a contribution to make.

Of employees:
Where individuals wish to engage in activities in the community, including standing for election to public office, they will be given the opportunity to do so where this is appropriate in the light of local circumstances.

Health, Safety & Environment
Consistent with its commitment to

contribute to sustainable development, Sakhalin Energy has a systematic approach to health, safety and environmental management in order to achieve continuous performance improvement. To this end, Sakhalin Energy manages these matters as any other critical business activity, sets targets for improvement, and measures, appraises and reports performance.

Community
The most important contribution Sakhalin Energy can make to the social and material progress of the Sakhalin Oblast and the Russian Federation is in performing its basic activities as effectively as possible. In addition, Sakhalin Energy takes a constructive interest in societal matters which may not be directly related to the business. Sakhalin Energy will provide assistance to the communities in which it operates through donations and sponsorship programmes that contribute to

health, education and culture within the community.

Competition
Sakhalin Energy supports free enterprise. It seeks to compete fairly and ethically and within the framework of applicable competition laws; it will not prevent others from competing freely with it.

Communication
Sakhalin Energy recognises that in view of the importance of the activities in which it is engaged and their impact on the local economy and individuals, open communication is essential. To this end, Sakhalin Energy has comprehensive corporate information programmes and provides full relevant information about its activities to legitimately interested parties, subject to any overriding considerations of business confidentiality and cost.