



**SAKHALIN 1 PROJECT**  
**Environmental policy**  
**ENVIRONMENTAL MANAGEMENT**

**Exxon Neftegas Limited**

**2014**

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## 1. INTRODUCTION

### (Source: EMDC Implementation of OIMS)

ExxonMobil is committed to conducting business in a manner that is compatible with the environmental and economic needs of the communities in which we operate, and that protects the safety, security, and health of our employees, those involved with our operations, our customers, and the public. These policies are put into practice through a disciplined management framework called the Operations Integrity Management System (OIMS).

The Operations Integrity Management System is a standard structure used to reduce industrial safety, health, and environmental risks and avoid incidents at production facilities. The system covers all activities of the Sakhalin 1 Project (hereinafter "Project"), defines the project management methods, and is used in all activities of ENL. All ENL employees are involved in the system's use.

These commitments are documented in our Safety, Security, Health, Environmental, and Product Safety policies.

The purpose of this report is to provide information on the development of oil and gas fields in the framework of the Sakhalin 1 Project and the measures used to prevent or mitigate any environmental impacts of the project, as well as on environmental indicators for 2014.

Information will be provided to the public throughout the project implementation period. The Sakhalin 1 website ([www.sakhalin1.com](http://www.sakhalin1.com)) provides constantly updated information on the project, employment opportunities, contracting, public involvement, Health, Safety, and Environmental (HSE) issues, and Sakhalin 1 Project-related news.

## 2. SUMMARY OF THE FIELD DEVELOPMENT PROJECT

### (Source: S-1 Fact Sheet received from P&GA)

The Sakhalin 1 Project is one of the largest projects in Russia involving direct foreign investment and an excellent example of the application of advanced technology and project management skills for the development of hydrocarbon reserves in a harsh subarctic environment. During the years of its implementation, the Sakhalin 1 Project has demonstrated outstanding production performance, environmental protection, and safety and has brought many benefits to Russia and its people.

The Sakhalin 1 Project is being executed under a production sharing agreement (PSA) between parties representing the government (the Government of the Russian Federation and the Sakhalin Oblast Administration) and individual investors of the Sakhalin 1 Consortium.

Exxon Neftegas Limited (ENL) is a subsidiary of ExxonMobil Corporation and acts as the operator of the Sakhalin 1 Project on behalf of an international consortium, which includes: the government-owned Russian company Rosneft through its subsidiaries RN-Astra (8.5%) and Sakhalinmorneftegaz-Shelf (11.5%); the Japanese consortium SODECO (30%); the Indian State Oil Company ONGC Videsh Ltd. (20%); and ExxonMobil subsidiary Exxon Neftegas Limited (30%).

Three offshore fields – Chayvo, Odoptu, and Arkutun-Dagi – located on the northeastern shelf of Sakhalin Island in the Russian Far East are being developed under the Sakhalin 1 Project.

In 2001 the Consortium declared all these fields economically feasible, and on December 03, 2001, the project received approval for development of the fields from the Government of the Russian Federation. Sakhalin 1 has potential recoverable reserves of 2.3 billion barrels of oil and 17.1 trillion cubic feet of gas (or 307 million tons of oil and 485 billion cubic meters of gas).

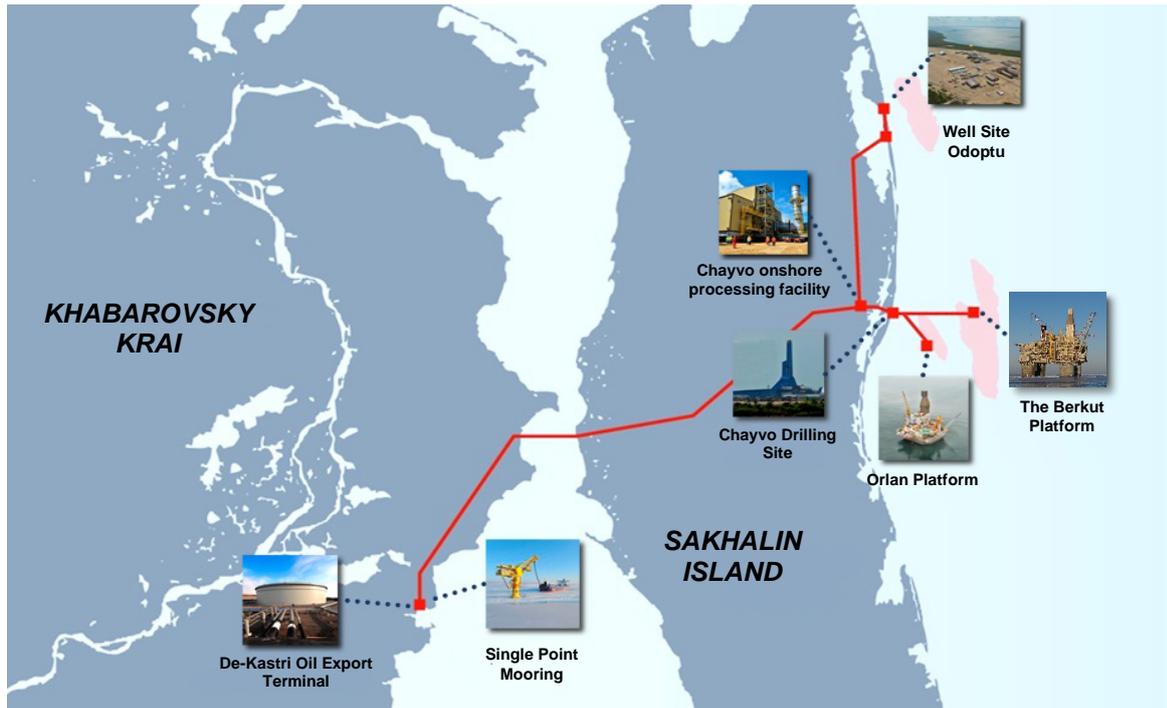
The project will be implemented in several phases to provide stable and balanced development of the project and balanced revenues for the Russian Federation.

The initial phase of the project included development of the Chayvo field, which began in October 2005 using a temporary processing facility. After commissioning of the oil export terminal in DeKastri in September 2006 and the Onshore Processing Facility (OPF) in October 2006, the commercial project infrastructure was established.

In September 2010 the Odoptu field started production as part of the existing project infrastructure, which marked the beginning of a new phase of the Sakhalin 1 Project.

In January 2015 hydrocarbon production from the Berkut platform of the Arkutun-Dagi field commenced.

Work to increase the volume of hydrocarbon production from the Chayvo field is on going at present.



According to plans, the Sakhalin 1 Project will continue hydrocarbon production until 2050. It is anticipated that over the life of the project, more than US\$89 billion in taxes, royalty payments and the state's share of oil and gas will be paid into the Russian State Treasury.

### **Chayvo Field: onshore Chayvo well site and Orlan offshore platform.**

The development of the Chayvo field is conducted both from onshore and offshore facilities.

In June 2003 ENL initiated a program for drilling extended reach (ERD) wells from shore under the seabed for a distance of over 12 kilometers. The northwestern part of the main Chayvo oil zone was penetrated by the Yastreb land rig, one of the most powerful land rigs in the industry. This rig is specifically designed for drilling wells from shore to offshore development targets for the Sakhalin 1 Project. The Yastreb has drilled a series of extremely long wells for the Sakhalin 1 Project.

Chayvo is also producing oil and gas from Orlan offshore platform. This concrete and steel structure is used for the development of the southwestern part of the main Chayvo development target. Installation of the Orlan platform was completed in July, 2005, and drilling commenced in December of the same year. Production from ERD wells is sent onshore for processing at the Chayvo OPF.

### **Odoptu Field Odoptu well site and First Phase Production facility.**

The Odoptu field is located approximately 70 km north of the Chayvo wellsite and 9 km from the northeastern coast of Sakhalin near the Piltun Bay. Drilling started in May 2009 after the Yastreb drilling rig was relocated from the Chayvo field and upgraded.

Oil and gas are delivered via pipeline to the existing Chayvo Onshore Processing Facility.

Upon completion of Odoptu operations, the Yastreb drilling rig was dismantled and moved back to the Chayvo wellsite.

### **Chayvo Onshore Processing Facility (Chayvo OPF)**

The Chayvo OPF is the core of the Sakhalin 1 infrastructure where the production from all the wells is gathered. This facility is designed to process stabilized oil, which is offloaded at the DeKastri terminal, and natural gas which is delivered to consumers in the Russian Far East or reinjected into the reservoir for pressure maintenance.

### **DeKastri Oil Export Terminal**

The Sakhalin 1 oil export system was put into operation in August 2006 after the 140 mi (226 km) 24" pipeline was completed to transport oil from the Chayvo OPF across Sakhalin island and the Tatar Strait to the DeKastri Oil Export Terminal in the Khabarovsk Krai. Tanker loading operations at the DeKastri Oil Export Terminal started in September 2006. To date, about 712 tankers have been loaded.

The DeKastri terminal provides storage and a Single Point Mooring (SPM) tanker loading facility that can accommodate year-round crude oil export to world markets. The crude is exported via a subsea loading line to the SPM, which is located 5.7 km east of the Klykov Peninsula in the Chikhachev Bay.

A dedicated fleet of double-hulled Aframax-class tankers carrying up to 720,000 barrels (100,000 tons) of crude is used for the year-round export of crude oil from the DeKastri terminal to world markets.

### **Future Phases: Arkutun-Dagi**

The Arkutun-Dagi oil and gas field is located approximately 25 km off the northeastern coast of Sakhalin Island, east of the Chayvo field. Project execution plans include field development from the new Berkut offshore drilling and production platform, which was built and installed at the field in stages. The first Berkut oil was produced in January 2015.

Oil and gas are transported from the Arkutun-Dagi field to the existing Chayvo Offshore Processing Facility via a new flowline.

## **3. ENL's Environmental Protection Policy**

### **(Source: Arkutun-Dagi Environmental Management Plan (2010) Section 3.2)**

It is the policy of the Sakhalin 1 Project and its operator, Exxon Neftegas Limited (ENL), to conduct its business in a manner that is compatible with the balanced environmental and economic needs of the Sakhalin 1 Project communities. ENL is taking the environmental vulnerability of Sakhalin Island into consideration and believes that Sakhalin 1 resources can be developed on the basis of principles of environmental responsibility, meaning the prevention or mitigation of adverse impact through the use of carefully developed design solutions and measures to avoid or mitigate impact. ENL is committed to continuous efforts to improve environmental performance throughout its operations.

Accordingly, ENL's policy targets:

- ◆ Compliance with all applicable environmental protection laws and regulations of the Russian Federation and the application of principles of environmental responsibility in those cases where such laws and regulations do not exist;
- ◆ Encourage concern and respect for Sakhalin Island environment, emphasize every employee's responsibility in environmental performance and ensure appropriate operating practices and training;
- ◆ Work with the RF government and industry groups to foster timely development of effective environmental laws and regulations based on sound science and considering risks, costs, benefits, and effects on energy and product supply;
- ◆ Emphasize incident prevention through design and operating procedures;
- ◆ Respond quickly and effectively to incidents resulting from project operations, cooperating with industry organizations and authorized government agencies;

- ◆ Conduct and support research to improve understanding of the impact of the Sakhalin 1 Project on the environment, to improve methods of environmental protection, and to enhance its capability to make operations and products compatible with the environment.
- ◆ Fulfill obligations under the PSA and provide information on project activities and plans to Russian authorities pursuant to the rigorous formal review processes established by Russian legislation. These processes provide for a professional and objective review mechanism with comprehensive public consultation;
- ◆ Communicate with the local community on environmental matters and share ENL's experience with others to facilitate improvements in industry performance;
- ◆ Undertake appropriate reviews and evaluations of their operations to measure progress and to ensure compliance with this policy.

#### 4. ENVIRONMENTAL MANAGEMENT SYSTEM

**(Source: OIMS Framework Brochure 2010)**

##### WWF Criterion 1.1

ExxonMobil remains steadfast in its commitment to excellence in Safety, Security, Health and Environmental (SSH&E) performance, referred to collectively as Operations Integrity. Many of our operations and products present potential risks to people and to the environment. Recognizing these risks is inherent in our business, and we believe the best way to meet our commitment is through a capable, committed workforce, and practices designed to enable safe, secure and environmentally responsible operations. We accomplish this through clearly defined policies and practices, and with rigorously applied management systems designed to deliver results.

The Operations Integrity Management System (OIMS) is a cornerstone of our commitment to managing SSH&E risk and achieving excellence in performance. Industry-leading lost-time incident rates have been significantly reduced after implementation of OIMS. Risks to the environment have been reduced, with a substantial decline in marine spills and continuing reductions in emissions. We have been cited by Lloyd's Register Quality Assurance (LRQA) for "being among the leaders in the extent to which environmental management considerations have been integrated into our ongoing business practices."

All production units of ExxonMobil are obliged to follow the methods and rules necessary to meet the OIMS requirements.

To drive continuous improvement, the Framework is periodically updated.

The OIMS Framework includes 11 elements.

1. Leading role of the management
2. Risk assessment and management
3. Facilities Design and Construction
4. Information/Documentation
5. Personnel and Training
6. Operations and maintenance
7. Change management procedure
8. Services by Others
9. Incident Investigation and Analysis
10. Public awareness and emergency preparedness
11. Operations Integrity Assessment and Improvement:

Each element contains an underlying principle and a set of expectations. ExxonMobil management is responsible for such management systems in place that meet OIMS requirements. Elements 2 through 10 define the objectives and establish the expectations for performance. Element 11 provides for continuous feedback and the improvement of the OIMS systems.

Environmental management is part of the overall OIMS. The environmental management system has a clear organizational structure and aims at achieving the provisions specified in the environmental policy by implementing programs to protect the environment.

ExxonMobil has been certified by LRQA, confirming that the OIMS conforms to the ISO 14001 and OHSAS 18001 international quality standards.

### **Comprehensive assessment of Sakhalin 1 impact on the environment, socioeconomic conditions, and public health.**

#### **WWF Criterion 1. Item 6**

ENL conducted a comprehensive assessment of Sakhalin 1 impact on the environment, socioeconomic conditions, and public health

- ◆ at the investment planning stage in 2001;
- ◆ as part of preparation of the Sakhalin 1 Phase One TEO Construction for Chayvo and Odoptu field development in 2002-2004;
- ◆ as part of Odoptu First Stage production in 2007-2008;
- ◆ as part of preparation of the Arkutun-Dagi field development plan in 2008-2010;
- ◆ as part of Odoptu Stage 2 development and its supporting infrastructure in 2013 to present day.

The process of a comprehensive assessment of impact on the environment, socioeconomic conditions, and public health is based on a systemic approach and includes the following main elements:

- ◆ Analysis of the potential environmental impact of the proposed activity and evaluation of its significance at all stages of the project, from planning to implementation and abandonment;
- ◆ Consultations with parties concerned with the environmental, social, economic, and other aspects of the proposed activity with a view to find mutually acceptable solutions;
- ◆ Submission of materials of a comprehensive EIA for approval by the Authorized Governmental Bodies. The positive conclusions of State Environmental Experts Review have been received.
- ◆ The use of impact assessment results in the decision-making process relating to the proposed activity.

The development of measures to mitigate the adverse impact is one of the main components of the EIA process.

## **5. MEASURES FOR PREVENTION OF ENVIRONMENTAL IMPACT**

**(Source: Chayvo, Arkutun-Dagi Public Consultations Documents)**

In the development of measures to prevent the environmental impact and environmental protection programs, ENL uses the experience of other international oil and gas projects in regions with sensitive natural resources and places where indigenous peoples live. The applicable mitigation measures which had proven

effective in other regions of the world were selected and adapted to the specific conditions of the Sakhalin 1 Project implementation region in the context of legal regulation in the Russian Federation.

In the development of environmental protection measures by ENL, sources of impact are identified, their characteristics that affect environmental components are studied, and, if necessary, numerical modeling of the environmental impact spread is performed. Modeling was done for the most intense operation and the worst weather conditions.

Based on the results, measures are developed to ensure compliance with environmental and health standards of the Russian Federation.

## 5.1. Air Quality Protection

### Measures to Reduce the Impact on Air Quality

- ◆ use of modern vehicles, construction machinery, and equipment in proper operating condition;
- ◆ high-quality maintenance of vehicles, construction machinery, and equipment;
- ◆ optimizing traffic and the operation of process equipment;
- ◆ use of high-quality fuel (conforming to GOSTs);
- ◆ use of methods of integration of structures and improvement of the technological availability of structures and materials;
- ◆ equipping flare stacks with devices for soot-free combustion;
- ◆ sealing of process equipment;
- ◆ use of high-seal-class shutoff and control valves and connections;
- ◆ cleaning dust-containing emissions from the bulk handling pneumatic system
- ◆ use of incinerators with exhaust gas afterburners;
- ◆ onshore and offshore pipeline burial.

### **Program to reduce greenhouse gas emissions [WWF Criterion 1.4](#)**

Under the Program for Environmental Protection and Environmental Monitoring, in order to reduce greenhouse gas emissions ENL conducts the following types of operations for utilization of associated petroleum gas:

- ◆ reinjection of produced gas;
- ◆ providing gas for external customers (Khabarovsk Krai);
- ◆ use of produced gas for the company's production facilities of the company (boilers, gas generators).

From the beginning of ENL production activity in October 2005 through December 2014, the level of associated petroleum gas flaring and/or dispersion in the atmosphere has averaged 3.34% of the total volume of gas produced. While the figure was 5.6% in 2012, the gas flaring level has steadily declined to 4.5% in 2013 and 1.5% in 2014.

The decrease in the produced gas flaring ratio is due to the implementation of technical measures to improve the operability of the Odoptu-Chayvo OPF pipeline. Installing a station for gas compression and reinjection at Odoptu in 2014 has provided stability and decrease of the gas flaring ratio.

Additional gas compression and injection through the Odoptu Stage 2 projects will be added as oil production of the Odoptu field increases.

## 5.2. Protection of Surface Water

The key technical and organizational measures to prevent impact on water bodies are:

- ◆ use of wastewater treatment facilities on marine vessels that comply with the International Convention for the Prevention of Pollution from Ships (MARPOL).
- ◆ use on the platform of wastewater treatment facilities that comply with established norms for impact on the marine environment;
- ◆ installing a pipeline under the seabed of Chayvo Bay using horizontal directional drilling;
- ◆ optimizing the offshore pipeline route with the goal of reducing its length and reducing the impact on the marine environment;
- ◆ minimum use of additives in water used for hydraulic testing of the onshore pipeline section and regulatory compliance for all discharges when water additives are used in pressure tests of onshore and offshore sections of the pipeline;
- ◆ injection of the main volume of drilling waste and wastewater from platforms where possible into a disposal well;
- ◆ construction of culverts to preserve natural runoff;
- ◆ measures to reduce the flow of suspended matter into water bodies during earth moving;
- ◆ maximum use of the existing infrastructure;
- ◆ choice of technology options for stream crossing construction based on hydrological and hydrochemical characteristics of the sites and water resources.

An analysis of design solutions and environmental protection measures leads to the conclusion that during normal operation the impact on water resources (surface water bodies and the marine environment) for construction operations as well as the operation of planned facilities complies with established Russian environmental protection requirements and international water protection standards.

## 5.3. Protection against physical factors

Physical impact factors include noise and vibration in the air and water environment, electromagnetic and ionizing radiation from equipment and technical devices, and equipment lighting and thermal impacts.

The main measures to mitigate impact are:

### Light Impact

- blackout screens are installed to only allow light propagation in the desired direction;
- aiming all general, safety, emergency, security and other light fixtures correctly;
- switch off idle lighting equipment and, if possible, work during daylight hours.

### Noise and vibration

- use of acoustic construction methods to provide vibration and acoustic insulation;
- installation of mufflers on the exhaust and suction pipes of gas turbine engines and gas-pumping units, and screening of noisy units or groups of units.

### Electro-magnetic radiation

- placement of sources of electromagnetic radiation, with the direction and power of radiation selected according to the requirements of the laws of the RF;
- the use of modern technology with low levels of radiation to ensure compliance with health and industrial safety regulations;
- strict enforcement of equipment operating rules.

#### Ionizing radiation

- compliance with instructions for operation and storage of ionizing radiation sources;
- training of personnel in the safe use of equipment;
- compliance with industrial safety rules and all applicable requirements of the laws of the RF pertaining to sources of ionizing radiation.

### **5.4. Protection of the Geological Environment**

Measures to protect the geological environment are ENL technical solutions and measures ensuring the safety of facilities in the event of earthquakes or other hazardous geological events, such as permafrost conditions change, soil decompaction and preventing the development of new geological processes that are hazardous both for the facilities themselves and for the environment: shore erosion, scouring, rising groundwater and bog formation, wind erosion of soils, etc.

The following measures prevent the development of new geohazards:

- ◆ platform jacket protection structure to prevent erosion of sediments around the platform;
- ◆ protection of the sea coast by the creation of coastal protective structures;
- ◆ decreasing the area where the topography is altered and the soil cover is disturbed during construction;
- ◆ preserving/restoring natural groundwater flow and surface runoff to prevent rising groundwater and bog formation;
- ◆ reclamation of areas disturbed during construction.

During drilling and operation of wells, measures are taken to ensure protection of subsurface resources and efficient use of mineral resources, as required by RF regulations. This is done by means of advanced drilling technologies which permit the maximum possible utilization of the field's natural hydrocarbon reserves.

Drilling waste is disposed of in deep isolated horizons through the special well of 2,5-3 km depth.

After production ceases in each well, a set of plugging and abandonment operations is carried out to ensure that they are reliably isolated and subsurface resources are conserved.

### **5.5. Soil protection and land reclamation**

#### [WWF Criterion 1.2, Item 2](#)

Measures for the protection of soils during construction and operation are common to all Sakhalin 1 facilities and involve, first and foremost, the following preventive measures:

- ◆ stabilization of soils on construction sites;

- ◆ anti-erosion measures (i.e., the preservation of existing vegetation, anchoring slopes, and controlling surface runoff, where possible);
- ◆ thorough waterproofing of all settling tanks (storage and separator tanks, etc.);
- ◆ injection of drilling waste into deep aquifers;
- ◆ installation of drainage systems, monitoring of groundwater, and measures to prevent underflooding and marsh formation;
- ◆ environmental monitoring of all operations during the construction and operation phases;
- ◆ mechanical and biological remediation of lands disturbed during construction;
- ◆ in accordance with the ENL policy, prohibition of the collection of vegetation and other intrusive activity in the project area.

In addition to general preventive measures, the measures to protect the soil during construction and operation include:

- ◆ use of methods of integration of structures and improvement of the technological availability of structures and materials;
- ◆ trenching using advanced international experience under such conditions;
- ◆ use of concrete to hold pipelines in place and prevent them from floating in soggy areas;
- ◆ use of water treatment systems, oil and gas separators, and other water treatment facilities;
- ◆ bunding of the most environmentally hazardous facilities;
- ◆ use of incinerators equipped with special filter devices.

Remediation of land disturbed during construction is conducted in two phases:

It is performed after the final stage of construction activities is completed (removal of construction wastes; demolition and removal of all temporary structures, installations and construction materials from the site; backfilling of pipeline trenches with a windrow required to ensure a plane surface after soil compactions; uniform distribution of organic soils over the surface) and consists of grading to create natural slopes of the surface.

The biological phase consists of re-vegetation and restoration of the topsoil fertility. The usual planting of vegetation is performed at most sites, and accelerated planting of vegetation and hydroseeding are performed in areas where it is necessary to slow down erosion processes, such as on slopes and in streams.

## **5.6. Protection of vegetation and forests**

### **WWF Criterion 1.2, Item 5**

The main sources of impact on vegetation in the construction phase are: vehicles and construction equipment, waste generated during construction, temporary and permanent structures, and local leaks during the construction.

The Project provides for the following measures to prevent or reduce the adverse impact on vegetation:

- ◆ maximum use of the existing infrastructure;
- ◆ erosion prevention measures;
- ◆ removal of fallen trees and other flammable materials and compliance with fire regulations prescribed by the laws of the RF;
- ◆ prohibition of moving trees and slash out to the forest edge;
- ◆ compliance with forest management regulations and requirements in accordance with the laws of the RF;

- ◆ laying the onshore part of the pipeline system in existing utility corridors for other pipeline systems;
- ◆ restoration of original contours of the site and drainage routes disturbed during construction;
- ◆ prohibition of the collection of plants and other intrusive activity in the project area for ENL and contractor employees;
- ◆ environmental monitoring and monitoring of reclaimed land.

ENL environmental protection measures result in limiting the impact of the land allotment area without disturbing the vegetation of surrounding areas, followed by re-vegetation of the disturbed land.

### **5.7. Protection of terrestrial wildlife**

[WWF Criterion 1.2, Item 3](#)

[WWF Criterion 1.6](#)

A system of measures is used to reduce the potential impact on wildlife; the system includes:

- ◆ construction planning takes into account the periods of maximum vulnerability of individual species and groups of animals;
- ◆ planning the sites of construction areas and temporary camps that avoid the distribution of critical habitats, including places where migrants congregate in certain seasons, breeding grounds and the primary feeding areas of rare species;
- ◆ prohibiting construction equipment from operating outside the boundaries of assigned areas;
- ◆ control vehicle traffic to maintain the distances necessary to avoid disturbing nesting and rare colonial bird species and congregations of molting and migrating birds.
- ◆ restrict the unauthorized public access to and use of previously hard-to-access natural areas;
- ◆ prohibit Project personnel from hunting, gathering of eggs of nesting birds, destroying the nests of rare bird species, and visiting environmentally vulnerable areas during critical periods;
- ◆ familiarize workers with the instructions on how to behave in the event of an encounter with wild animals when servicing and monitoring overland sections of the pipeline.
- ◆ Implement an action plan for the rescue and rehabilitation of animals contaminated as a result of an oil spill.

Exxon Neftegas Limited's performance of a program of measures to protect Steller's sea eagle is an example of effective positive action for the population of this protected species.



Steller's Sea Eagle, North Sakhalin population.

### **Program for monitoring Steller's sea eagles and other rare birds.**

**(Source: Received from Yuzhno Regulatory group)**

Since 1995 ENL has conducted a comprehensive program for monitoring the Steller's sea eagle population of as one of the most distinctive endemic species of the Russian Far East and the indicator species for the status of shore ecosystems within the scope of the Sakhalin 1 Project on northern Sakhalin. The main focus of monitoring is on the study of key population characteristics of the species, and determine its stability under changing environmental conditions. These characteristics include demographic parameters such as population growth rate, population size, and sex and age structure of the population, as well as changes in the occupancy of nesting sites. In addition, the impact of predation by bears and the impact on the population of certain types of human economic and recreational activities were investigated.

During the program period, considerable factual material that comprehensively characterizes the state of the Steller's sea eagle population has been collected. Bioengineering work is done regularly to maintain the eagle population. The work has included: construction of artificial nests, construction of artificial perches, and fitting nesting trees with protective covers to prevent the destruction of nests by brown bears. Observations show that the birds readily use artificial perches for hunting and rest. Artificial nests serve primarily as places for overnight stops, handling of prey, and in some cases chick incubation and breeding.

In addition to monitoring of the Steller's sea eagle, ENL monitors other bird species listed in the Red Book of the Russian Federation and the Red Book of Sakhalin Oblast, as well as migratory, nomadic and colonial nesting species in the course of operation of Sakhalin 1 facilities. Studies on the state of populations of rare and endangered species and assessment of the types and level of impact of facilities on breeding and migrating birds are conducted in control areas in the immediate vicinity of major production facilities.

Monitoring results show that these species' nesting and feeding grounds were not disturbed significantly during construction, which is why the spatial configuration of their colonies was preserved in the operation phase and they continued to nest and feed in the same places where they did before construction began.

### **5.8. Protection of aquatic biota and commercial biological resources**

During the construction and operation of onshore oil production facilities, the impact on water bodies and commercial bioresources is a result of the construction of water body crossings, earthmoving, and pressure testing of pipelines.

Offshore operations include preparation of the seabed for the installation of the platform, excavation and filling of trenches for laying pipelines, noise exposure during the movement of construction, transportation, and supply vessels, and discharge of water based mud (WBM) and cuttings on the seabed during the installation of surface casings and drilling of shallow well sections. These impacts increase turbidity, and the work may have mechanical impacts on aquatic organisms as a result of intake of seawater for utility and process water.

The Project is carried out on the basis of the principle of minimizing the impact on aquatic biota, commercial biological resources, and their habitat. ENL implements the following main environmental protection measures:

- ◆ enforcing the strict observance of land allocation boundaries, particularly in water crossing areas and near bodies of water;
- ◆ performing vehicle maintenance at least 100 meters from watercourses;
- ◆ using a water filtration system after pressure testing of pipelines;
- ◆ using modern equipment that reduces water turbidity during excavation and filling of the pipeline trench;
- ◆ water intakes equipped with fish protection systems
- ◆ implementing ship sewage discharge according to MARPOL standards and RF statutes.
- ◆ regularly checks of construction conditions.

ENL also assesses the damage to fishery resources during project activities and performs compensatory measures for the artificial reproduction of Pacific salmon and chum salmon in Sakhalin Oblast and Khabarovsk Krai.

### **5.9. Protection of marine mammals**

The main impacts on marine mammals in the construction and operation phases are associated with the physical presence of facilities and vessels, noise generated by industrial equipment, vessels, and aircraft, and discharges of sewage and wastewater treated to comply with the standards. ENL has developed a system of measures to protect marine mammals and their habitat with the goal of preserving migration routes, feeding areas, and breeding areas and preventing the deaths of animals.

The system of measures for the protection of marine mammals has been tested successfully and improved steadily in the course of the Sakhalin 1 Project. It includes the following basic elements:

- ◆ special observation of the project area during all periods of noisy and potentially disturbing work;

- ◆ in the event of unacceptable levels of noise impact on animals, the source of the noise is determined, and the noise level is reduced where possible;
- ◆ temporary shutdown of unused equipment;
- ◆ use of wastewater treatment units on marine vessels that meet the requirements of the Russian Federation Maritime Registry and have been certified by the proper authorities;
- ◆ all fuel, chemical and waste handling activities are carried out in a manner designed to minimize or eliminate chronic inputs and incidents. The offshore platforms and support vessels have the necessary equipment and materials to prevent small spills.

Discharges of household sewage from ships and the platform treated to comply with standards have a negligible impact on marine mammals.

Some level of noise is generated by construction and operations in the Sakhalin 1 area regardless of the mitigation measures.

On the whole, the project doesn't have a perceptible impact on marine mammals, and the environmental protection measures reduce any residual impacts to slight.

### **Marine Mammal Monitoring Program**

**(Source: ITAR-TASS Interview E.Mkolaevskaya about WGW (Feb 2015))**

The research conducted on northeastern Sakhalin in conjunction with the Program for Monitoring the Okhotsk-Korean Population of Gray Whales for Exxon Neftegas Limited (ENL), the Sakhalin 1 operator, and Sakhalin Energy Investment Company (SEIC) began in 1995 and its results have significantly added to the existing scientific body of knowledge on marine mammals in the study area.

ENL organizes annual integrated field studies of gray whales on the northeast shelf of Sakhalin Island jointly with SEIC. The work involves scientists from the Institute of Marine Biology and the RAS Institute of Pacific Oceanology, as well as experts from Sakhalin State University. The Monitoring Program is one of the longest multi-disciplinary research programs that focuses on a specific area and marine mammal species.

#### Program Objectives

- expansion of the body of scientific knowledge of gray whales and their environment, as well as the factors that influence the population and its habitat;
- assessment of the population (e.g., the population size, increase, etc.) and habitats.

Information received under the Program is used by ENL for the following purposes: minimizing the harmful effects of industrial operations on the whales and their habitats, and defining and implementation of measures to reduce risks to gray whales and their habitat during industrial operations.

Work is conducted in several directions, and includes the following key areas of research: photographic identification of gray whales, study of their distribution, identification of individual whales and assessment of their condition, study of benthos, and acoustic monitoring to assess the food supply and to define the acoustic environment. Sometimes there are additional studies such as satellite tagging.

The satellite tagging program in 2010-2011 achieved unprecedented results which led scientists to review other available data across the Pacific Basin on the migration routes of the gray whale.

The issue of extinction of the population has been eliminated. There has been a steady increase in the number of gray whales that feed near the northeast coast of Sakhalin Island.

In order to reduce or eliminate impact on gray whales, the company has developed and annually updates a Marine Mammal Protection Plan which has proven its effectiveness. Commitment to following the Plan is not limited to ENL but also applies to all the contractors of the Sakhalin 1 Project.

Thanks to the Plan, there has not been a single documented case of injury to marine mammals in all the years of ENL operations.

### **5.10. Preservation of protected natural areas and environmentally sensitive areas**

#### **WWF Criterion 1.2, Item 7**

ENL fully recognizes the importance of unique, irreplaceable, and ecologically, scientifically, culturally, and aesthetically valuable natural complexes and natural monuments in Sakhalin Oblast and Khabarovsk Krai. In order to prevent adverse effects on protected areas, Sakhalin 1 facilities are located outside these areas.

Specially protected nature territories of the Sakhalin Oblast include 2 national natural reserves, 1 natural park, 15 national nature sanctuaries, 45 natural monuments.

The specially protected natural areas near the work area include:

- ◆ The Nogliki regional State Nature Sanctuary (the northwest boundary of the sanctuary is about 0.2 km from the onshore pipeline from the Chayvo OPF to Nevelskoy Strait)
- ◆ Vagis Mountain Range regional natural monument (the southern boundary of the monument is 1.4 km from the onshore pipeline from the Chayvo OPF to Nevelskoy Strait)
- ◆ Wrangel Islands regional natural monument (4.1 km from Odoptu WS1 and 3.25 km from Odoptu WS2)
- ◆ Lyarva Island regional natural monument (32 km from the Orlan platform and 36 km from the Chayvo WS)

Protected areas of Khabarovsk Krai include six national natural reserves, eight national nature sanctuaries, 226 natural monuments, and 20 natural resource refuges. Protected areas within the Khabarovsk Krai which are located proximate to the project facilities (Map 9.3) include:

- ◆ Ustrichny Island local natural monument (the distance from the DeKastri oil export terminal is 7.5 km)
- ◆ Somon Lagoon local natural monument (the distance from the DeKastri oil export terminal is 7.5 km)

The natural habitats and the condition of flora and fauna of these areas are not impacted by Sakhalin 1 facilities.

### **5.11. Protection of archeological and cultural monuments**

Within the impact zone of Sakhalin 1 facilities are archeological, ethnographic, and historical sites which include ancient settlements, camps, and burial grounds of various periods and cultures.

Potential sources of impact on archaeological sites during the construction phase include earthmoving and other construction equipment. During construction, there are threats of direct impact on previously identified as well as unknown and newly discovered, archaeological sites.

The study and excavation of the archeological landmarks located directly within the boundaries of the construction sites are carried out by ENL before the beginning of construction operations.

To ensure the preservation of archeological monuments, both those that were already known and ones that could be discovered, ENL carries out archeological monitoring in all phases of construction, which helps to increase the amount of information about the history and culture of indigenous minorities of Sakhalin.

In addition, ENL provides the following measures for the protection of archaeological and cultural sites:

- ◆ perform surveys of proposed construction sites to identify the presence of archaeological sites;
- ◆ optimizing the location of construction sites in order to bypass valuable archaeological sites;
- ◆ organization of training for construction personnel on how to handle archaeological artifacts;
- ◆ daily interaction between the construction managers and persons responsible for archaeological monitoring;
- ◆ allocation of resources and determination of the procedures for emergency excavation of sites, if archaeological material is discovered during the construction process.

## **5.12. Socio-Economic Impact**

Implementation of the Sakhalin 1 Project is a stimulus to economic activity and has a beneficial effect on the economy and population of Sakhalin Oblast and Khabarovsk Krai, as well as on the economy of the Russian Federation as a whole.

This positive impact is long-term (dozens of years), exceeding the duration of the Project itself because of the positive residual effects of revival of industry and the economy.

Implementation of the project began on schedule and rapidly reached the planned level of oil production of 250,000 barrels per day (33,000 tons per day).

More than 15 Gm<sup>3</sup> of natural gas has been delivered to the Russian Far East customers.

The positive impact of the project is due primarily to payments and revenue for federal, regional, and local government under the PSA.

The PSA also states the intention to use Russian equipment and services in all cases where the cost, quality, availability, and delivery times do not impair the economic performance of the project. This relates to all stages of the project: Design, fabrication, construction, installation, and operation (including drilling operations) Opportunities for Russian participation are provided in several areas, including equipment, construction materials, labor for civil construction and for construction sites, pipeline construction, start-up operations as well as improvements to local infrastructure.

At the beginning of the project, the parties to the PSA (federal agencies and representatives of Sakhalin Oblast and ENL as the project operator) organized the Joint Committee on Russian Content for the Sakhalin 1 Project. The main objective of the Joint Committee is to assist in maximizing the involvement of Russian subcontractors and Russian suppliers of goods and services in the Project. The Joint Committee operates as a special working group to establish initiatives for Russian Content and conducts quarterly reviews of plans for ENL contract activity.

The Joint Committee works to keep potential Russian contractors and suppliers informed and develop a database of Russian contractors and suppliers. In particular, it conducts workshops for contractors and suppliers based on Sakhalin, where it informs them of current needs for the Sakhalin 1 Project, the terms of tender procedures, contract terms, etc.

Socioeconomic benefits associated with the project also include the creation of a significant labor market; reduction of the population loss from the areas of construction and operation of facilities; and increases in worker income and purchasing activity due to the purchase of equipment, materials, and services to meet the needs for construction and operation.

The Project provides a number of measures aimed at strengthening the combined positive effects of its implementation:

- ◆ construction and rotation worker camps are built in accordance with international standards, giving due regard to applicable Russian regulatory requirements, which include installation of water supply and water treatment systems, wastewater treatment plants for sewage and drainage, removal of solid waste, etc.
- ◆ application of the policy of preferred hiring of qualified local people to work at specific construction and operating sites. This applies especially to inhabitants of settlements located near the project and along the strip of land allocated for pipelines and access roads
- ◆ providing training to local workers employed for the construction and operation of Project facilities;
- ◆ incentives for contractors that advertise employment in regional and district media and select and hire employees from the local community.

Implementation of the Sakhalin 1 Project is conducive not only to raising the standard of living but also to the development of transportation infrastructure and improvement of the level and quality of educational, medical, and cultural services.

The Consortium has invested more than 120 million USD in the modernization of Sakhalin infrastructure, which is an unquestionable benefit for the local population. The objects of such modernization are hospitals and clinics, roads, bridges, ports, airports, and heat and water supply facilities. Examples include the Nogliki airport and federal and municipal roads and bridges.

As part of a number of projects, including educational, health care, youth, art, and social ones, social institutions have received charitable contributions totaling more than 3.5 million USD (85 million rubles). Examples are the Oblast Children's Hospital, the Women's Clinic of Yuzhno-Sakhalinsk, the Oblast Cancer Center, the Yuzhno-Sakhalinsk Chamber Orchestra, summer camps for children of indigenous peoples in the Okha and Nogliki districts, and development of the Oil and Gas Engineering Institute and its facilities.

ENL and members of the Consortium promptly respond to the public's needs and render assistance in the event of emergency situations such as the earthquake in Nevelsk in 2007.

### 5.13. Waste management

Proper waste management is a priority of the ENL Sakhalin 1 Project. There are various waste types (Hazard Class 1-5) anticipated to be generated from the construction, drilling, and operation activities within the Sakhalin 1 Project. The waste management strategy is comprised of:

- ◆ classification and identification of wastes;
- ◆ separate initial collection of wastes at waste generation locations, waste accumulation and/or storage at specialized sites;
- ◆ additional waste treatment if required (pressing, segregation);
- ◆ waste transportation from own production facilities to treatment, neutralization, and disposal facilities;
- ◆ recycling and reuse;
- ◆ waste neutralization using own incinerators or at specialized enterprises;
- ◆ final waste disposal to landfills or injection wells;
- ◆ tracking and reporting.

ENL constantly strives to use the services of licensed contractors:

- ◆ manage and operate Sakhalin 1 Project waste management facilities; and/or
- ◆ provide acceptable alternatives to Sakhalin 1 Project waste management facilities.

First and foremost, all Sakhalin 1 facilities and operations seek opportunities to minimize the amount of waste generated according to the following hierarchy:

- ◆ preventing or reducing the amount of waste generated on site;
- ◆ environmentally safe reuse or reclamation of the wastes;
- ◆ environmentally safe processing of the wastes;
- ◆ environmentally safe burial of wastes.

Additional waste management technologies are evaluated on an ongoing basis from the data during detailed engineering design and with data from facility operations. For example, other waste management strategies may include pretreatment of hydrocarbon-contaminated wastes and increased utilization of deep well injection for disposal of other suitable waste types, such as hydrocarbon liquids and solids, and treated wastewater.

To move waste from the facilities where it is generated and stored to the processing and disposal facilities, a Transportation Program was designed according to changing road conditions and the seasonal impact on the road surface, as well as to provide adequate safety for human beings and the environment. All the plans and decisions concerning waste transportation, are coordinated by ENL and its appointed Contractor.

Wastes that cannot be recycled or reused and/or are not being stored require further treatment and final disposal. The Project provides for the disposal of drilling mud, cuttings, and formation water by injection into wells. To dispose of spent drilling mud and cuttings, specialized injection wells were drilled to a depth of 2,5-3 km. In some scenarios separate wells were drilled for injection of formation water and wastewater. Target intervals for injection are selected with account of availability of a strong isolating horizon in order to eliminate potential impact of injection on ground waters.

The thermal disposal method is used to reduce waste hazardous characteristics and reduce the amount of waste requiring final disposal. Campsite incinerators and fixed-hearth incinerator facilities are options available to treat construction and operation wastes arising from the Sakhalin 1 Project. All project sites are equipped with the thermal waste treatment facilities.

All waste generated in course of implementation of Sakhalin-1 Project and subject to further recycling, treatment, neutralization or disposal to landfills are accumulated separately by types and class of hazard at own sites dedicated to temporary waste storage, in containers/packages appropriate from the point of view of waste type and class of hazards as per the health and environmental requirements.



Temporary storage of waste in plastic containers

Temporary waste storage site

Steel barrels used as temporary storage containers

Separate collection of spent abrasive disks

Separate collection of used electrodes

Separate collection of empty spray cans

All wastes to be generated and managed within the Sakhalin 1 Project are tracked as they move from point of generation through to disposal. This tracking system is captured by a database developed specifically for Sakhalin 1 Project conditions. The tracking data forms the basis of regulatory reporting, and ongoing analysis of data ensures that Project waste strategy objectives are met, and public health, safety, and the environment protected.

## 6. RISK ANALYSIS AND PREVENTION OF EMERGENCIES

The ENL strategy is based on the concept that all field development activities should be implemented in such a way as to minimize the risks to the environment and human health and safety. With respect to this strategy, all types of activities should be analyzed for the purpose of reducing the risks of potential hazards.

A risk assessment has been conducted on the Sakhalin Project to assess potential safety, health, environmental, and property impacts. The risk scenarios for Terminal Operations included overfilling the storage tanks, an earthquake, leaks from the pipe work or equipment, an oil fire, and a leak while filling the tanker.

The risk scenarios for Pipeline Operations included a leak due to 3rd party damage, a leak due to corrosion, a leak due to a seismic event, a leak due to soil conditions (freeze/thaw, mud slides), a leak due to material / construction defects, a leak due to human error during operations, an oil fire, and damage by a 3rd party in the areas of Tatar Strait, Nevelskoy Strait, offshore, and onshore.

As a result of the risk assessment performed for operations on platforms, at well sites and the OPF, leaks from pipelines, and the terminal in DeKastri, it was concluded that the risks for all scenarios by production facility can be prevented to ensure safety for the human beings and the environment.

The risk analysis procedure is conducted in the following sequential steps:

- ◆ determination of potential causes to release a hazard;
- ◆ development of credible scenarios that lead to undesirable events;
- ◆ listing preventative safeguards that may prevent the event from occurring;
- ◆ listing the mitigating measures that may limit the extent of damage associated with the incident;
- ◆ describing the consequences of the event in terms of the potential for harm to people and the environment;
- ◆ analysis of scenario realization frequencies from historical data;
- ◆ development of solutions to reduce risk through the use of a risk matrix;
- ◆ documenting any additional remedial measures or actions that may be considered to further reduce the risk associated with the scenario.

The necessary systems of safety measures and equipment meeting the requirements of applicable safety standards are provided for all identified hazards.

Development of the necessary incident prevention measures and calculation of the manpower and equipment needed for timely response are provided by drafting such documents as the Industrial Safety Declaration, the Emergency Response Plan, and the Oil Spill Response Plan.

### **Precautions to Prevent Emergencies**

The risk of incidents is reduced and damage is minimized by general and specific safety measures (Table 1 and Table 2):

**Table 1. General measures to minimize incident events:**

Description of actions
Development and control of fulfilling detailed process regulations
Training and examination of personnel knowledge
Regular technical maintenance of equipment
Anticorrosive protection of equipment
Regular inspections and checkups of safety assurance systems
The quality of construction and assembly work shall be inspected.

Description of actions
Operations shall be subject to continuous industrial and environmental monitoring.

**Table 2. Special measures for minimization of emergencies situations:**

Description of actions
Separation and isolation of technological processes and equipment (safety, cutoff valves, etc.);
Early hazard identification systems (gas analyzers, etc.);
Automatic leakage control system;
Equipment Emergency Shut-down Systems
Construction of secondary safety barriers (levees, trays, drains, waterproofing geomembranes)
Passive and active fire protection systems

Technology and work management take into account the high seismicity of the production facility locations and exposure to other geological hazards (underflooding, gulying, marsh formation, etc.), specifically by the development of measures to prevent the manifestation and effects of these processes.

Appropriate measures have been taken to protect the facilities and monitor personnel on each site from the time of mobilization for construction at the sites and throughout the equipment operation period.

Fire protection activities at the facility are a part of general strategy aimed at incident-free operation of technological equipment.

The basic principles of fire safety used in developing fire-protection measures are: Compliance with RF regulatory requirements governing fire safety in the design, construction and operation of a facility;

- ◆ Use of modern fire prevention and fire protection systems and administrative and technical fire protection procedures
- ◆ In accordance with RF regulations, the fire safety of Sakhalin 1 facilities is ensured by:
  - ✓ fire prevention system;
  - ✓ firefighting systems;
  - ✓ a system of organizational and technical measures.

The fire-prevention system calls for:

- ◆ the use of new technologies and process equipment ensuring the highest degree of fire safety;
- ◆ use of slow-burning and incombustible materials;
- ◆ reduction of the fire load
- ◆ measures to prevent the formation of a combustible environment and the origination of ignition sources therein;
- ◆ maximum process mechanization and automation;
- ◆ the use of devices to protect equipment from damage and incidents, including incidents during repairs, and other measures.

The fire prevention system is deployed in the form of specific technical solutions: In the master plan, the production part of the plan, power supply, ventilation, etc.

Administrative and technical measures include:

- ◆ organization of fire safety of facilities and cooperation of fire safety services with territorial subdivisions of the State Fire Fighting Service;
- ◆ determination of fire hazard levels of substances, materials and technological processes;
- ◆ providing fire safety training for employees;
- ◆ development of facility-specific regulations, instructions and other documents for handling inflammable substances and materials;
- ◆ development of measures for personnel actions in the event of a fire, and the organization of evacuation of personnel;
- ◆ implementing technical solutions to provide for successful fire extinguishing;
- ◆ specifying the procedure for storing substances and materials which cannot be extinguished with the same agents;
- ◆ using devices for automatic and automated protection of the facility's production equipment from unauthorized and mistaken actions of personnel that may cause fires or explosions;
- ◆ schedules for testing and maintaining active fire-protection subsystems, etc.

### **Spill prevention and response**

**(Source: OSRP Corporate Plan, General overview)**

Emergency risk analysis conducted in the course of the Sakhalin 1 implementation showed that incidents involving oil and product spills could cause the greatest damage to the environment.

The Sakhalin 1 Oil Spill Response and Prevention Plan (OSRP Plan) for existing facilities has been approved by the Ministry of Civil Defense and Emergencies and other regional and federal authorities.

The plan covers all oil product spills that may occur at ENL oil production and export facilities for the Sakhalin 1 Project located on the Sakhalin Island shelf, on Sakhalin Island, and in the Tatar Strait, as well as in some Khabarovsk Krai mainland areas, including:

- ◆ the Sea of Okhotsk;
- ◆ coastal zones, including Chayvo Bay and Piltun Bay on the northeast coast of Sakhalin Island;
- ◆ land areas along the routes of main and field pipelines in northern Sakhalin Island;
- ◆ the Tatar Strait and Nevelskoy Strait, including the west coast of Sakhalin Island and the coastal areas of Khabarovsk Krai.

The purpose of the Plan is planning of oil spill prevention and response actions. The planning is intended to ensure timely and effective action to mitigate the effects of spills, maintain constant readiness of manpower and resources for emergency response, ensure safety and protection of human beings and the environment, and minimize potential damage to the environment and production facilities and losses in the event of an oil spill.

The plan includes methods, rules, guidelines, and supporting information allowing ENL to:

- ◆ proceed with timely and effective oil and oil product spill response in accordance with the laws of the RF using the manpower and resources of the company, contractors, and government agencies;
- ◆ develop a procedure for initial emergency response to the most likely scenario of oil spill Level 1;
- ◆ together with the RF Ministry of Civil Defense, Emergency and Natural Disaster Response, organize and coordinate the overall operation of oil spill response of Levels 2 and 3.

In accordance with the recommendation of the International Petroleum Industry Environmental Conservation Association (IPIECA) and the International Maritime Organization (IMO), the OSRP plan strategy during execution of the Sakhalin 1 Project is determined by the tiered approach to oil spill response (IPIECA 2000a). The three-tier approach is the standard in international practice for characterization of oil spills and deciding on appropriate response actions. A tiered OSR approach takes into account not only the size of an oil spill, but also its potential threat to human and environmental resources, the level of control the responders can gain over the situation, the speed of response implementation, and the availability of required OSR resources.

A tiered approach creates the conditions for the most efficient and aggressive combination of degrees of readiness to respond to a spill and carry out OSR operations. It promotes rapid and streamlined expansion of an OSR operation by involving initially the on-site resources and equipment, then local resources and equipment, involvement of regional assets, and then up to the capabilities at the federal and even international level. The tiered approach is not restricted in terms of limited and sequential step- by- step escalation of resources and equipment; rather it can be expanded as needed to any level that is economically and environmentally justified.

Response strategies for major spills are executed in cooperation with Federal, Regional, and Local authorities at the time of the response.

The Oil Spill Response Plan provides for the use of ENL resources to ensure seamless management of processes of containment and response to spills of oil and oil products, including the following:

- ◆ alerting and mobilization of ENL Emergency Response Team at the facility, as well as specialized response contractors, support staff, and equipment;
- ◆ isolation of the spill source by operating personnel at the facility using process control systems, and ensuring of workplace industrial safety;
- ◆ implementation of measures aimed at containing and cleaning up oil spills and their aftereffects;
- ◆ waste collection and disposal;
- ◆ restoration (reclamation of territories).

Proper planning of OSR measures, identification of available manpower and resources, and adequately trained personnel ensure the availability of sufficient human resources and response equipment for the most likely spills of all possible categories. Regardless of whether a spill is classified as a tier 1, 2, or 3 emergency situation, the actions of the ENL response group will facilitate containment of any spill within the timeframe prescribed by RF oversight authorities.

Containment and response to oil spills that occur at ENL facilities will be handled by specialized groups with which ENL has existing agreements using available equipment to respond to oil spills at ENL facilities. If necessary, additional forces may be enlisted from specialized outside contractors for oil spill response and cleaning contractors, along with internal ENL oil spill response teams from other facilities unaffected by the emergency.

The general ENL conceptual approach to oil and oil product spills provides for compliance with following principles:

- ◆ prevention of oil spills during normal day-to-day business processes and operations is a priority strategy of the Sakhalin 1 Project;

- ◆ responsibly and promptly involve the mainstream and specialized internal resources and its contractors for effective response to oil spills and, if necessary, mobilize non-specialized and specialized resources and contractors from other production facilities;
- ◆ immediate notification of RF state agencies of incidents and incidents at the facility;
- ◆ immediate mobilization of specialized contractors for the oil spill response at the facility and from other ENL facilities;
- ◆ protection of Areas of Special Value is given priority when responding to a spill.
- ◆ use of the most appropriate technologies and tools (skimmer vessels, booms, mobile containers, absorbents, dispersants, incinerators, and other equipment) in coordination with the relevant agencies of the Russian Federation;
- ◆ The command and control system for oil spill response is organized in accordance with the laws of the Russian Federation;
- ◆ opportunities to improve oil spill response are studied constantly in collaboration with government and industry organizations to improve regional response forces and resources.

## **Wildlife Rescue and Rehabilitation**

### **WWF Criterion 1.7**

The primary strategy for wildlife protection is controlling the spread of spilled oil to prevent or reduce contamination of potentially affected species and habitats. Removal of oiled debris and contaminated food sources also protects wildlife.

The trained and experienced personnel only may capture, transport, and rehabilitate oiled wildlife. In addition to the local and area veterinarians who have trained with the ENL Wildlife Rehab kits and would provide the initial wildlife response capability, ExxonMobil can establish contracts with two internationally-recognized oiled wildlife rescue and rehabilitation organizations: the International Bird Rescue Research Center and Tri-State Bird Rescue & Research, Inc. If necessary, specialists that hold Russian visas from these two organizations can be sent to Sakhalin Island within a matter of days.

If necessary, ENL may enlist the following Russian experts for rescue and rehabilitation of wild animals during oil spill response operations:

- ◆ Lomonosov Moscow State University

in Sakhalin Oblast:

- ◆ Ecoshelf LLC
- ◆ Environmental Company of Sakhalin.
- ◆ Veterinary service at Nogliki
- ◆ Veterinary Department of Sakhalin Oblast Ministry of Agriculture
- ◆ Veterinary Service of Yuzhno-Sakhalinsk;
- ◆ Fauna Information Research Center, 2013.
- ◆ Natural Sciences Institute (IEN) Sakhalin State University

In Khabarovsk Krai:

- ◆ Institute of Water and Environmental Problems, Far East Division, Russian Academy of Sciences, Khabarovsk
- ◆ Veterinary Department of Ministry of Agriculture in Khabarovsk Krai
- ◆ Bastak State Nature Preserve

After being notified, contractors and trained local specialists will mobilize special equipment and trained personnel to the spill area and begin wildlife rescue and rehabilitation operations.

- ◆ Reconnaissance survey, capture, and transportation of animals contaminated with oil;
- ◆ Stabilization and rehabilitation of animals contaminated with oil;
- ◆ Release of wild animals followed by tagging, monitoring, and tracking of the results of rehabilitation.

### **ENL readiness for emergency prevention and response**

ENL readiness for emergency prevention and response is ensured by the following:

- ◆ creating a three-tier operations command system for oil spill response which includes the use of company's own manpower and resources, as well as response professionals from contractors acting as a coordinated group for emergency response at the facility;
- ◆ availability of manpower and resources for prevention and containment of emergencies at Sakhalin 1 production facilities;
- ◆ creation of a personnel education and training program dealing with emergencies, including study of the features of production facilities and areas of applicability of the Plans and special equipment and procedures for its use, as well as development of tactics for dealing with emergencies at a single complex;
- ◆ response capability is provided by ENL with assistance, as required, from other Sakhalin, Russian Far East, and international resources;
- ◆ protection of ENL facilities against adverse natural and man-made impacts;
- ◆ compliance with industrial, environmental, and fire safety requirements during field exploration, development construction, production and during storage of oil and oil products;
- ◆ buildup of reserve of material and financial resources for Emergency Situation response;
- ◆ compulsory liability insurance, consistent with requirements of the Sakhalin 1 Production Sharing Agreement, against damage from operations of hazardous industrial facilities.

Monitoring of the implementation of measures for emergency prevention, containment, and response is conducted by the relevant executive agencies of the Russian Federation with supervisory authority in the course of scheduled and unscheduled inspections in accordance with Russian regulations, as well as in the process of conducting drills and training on emergency containment and response.

### **ENL Financial Risk Policy**

#### **WWF Criterion 1.9**

The obligations of the Sakhalin 1 Consortium in regard to compensation for damages are defined in Article 25 of the Production Sharing Agreement, which states that "the Consortium is responsible for actual damage or injury directly caused by the development of fields for which the Consortium is responsible under the applicable laws of the Russian Federation."

The Consortium provides and maintains kinds and amounts of insurance commensurate with reasonable risk management. Types of insurance may include, but are not limited to, insurance against loss of assets, loss of use of assets, loss of investment value, control of well and re-drilling expenses, environmental impact and seepage costs and liability, general third-party liability, and such other insurance as is consistent with good Oil and Gas Industry practice.

### **7. REQUIREMENTS FOR ORGANIZATION OF CONTRACT WORK**

**(Source: Arkutun-Dagi Environmental Management Plan)**

#### **WWF Criterion 1.8**

**Contractor's Responsibilities.**

In accordance with the contracting procedure approved by ENL, which is included in tender document packages, contractors are required to develop an Environmental Protection Plan. The Plan should include solutions / programs for waste management and engagement of the relevant services, environmental, socioeconomic, and sanitation monitoring, prevention of water impact, oil spill response, measures to comply with legal and regulatory requirements, assessment of impacts on environmental, socioeconomic, and sanitary conditions, and measures for their mitigation and elimination and should provide for training and appropriate reporting. These programs are reviewed and approved by ENL before starting work.

Each contractor is required to identify and obtain all necessary permits, notifications, authorizations, approvals, licenses, and agreements with applicable stakeholders that are required to progress work and as agreed in the contractor's Regulatory Compliance Plan. The Plan is also submitted for careful review before the start of work and is approved by ENL.

In accordance with the terms of the contract, the Contractor must create a division responsible for compliance with environmental regulations, including the requirements of the Environmental Protection Plan covering the Contractor's scope of work.

Contractors should require that their subcontractors meet similar requirements, and in internal inspections each contractor must include data on the compliance of its subcontractors with environmental protection requirements in its reports.

Contractors are responsible for the proper training of their workers and the workers of subcontractors, as well as their awareness of current environmental and other legal/regulatory requirements and obligations and the environmental requirements for the Project.

Contractors should periodically evaluate and adjust their Regulatory Compliance Plans and programs for management and monitoring of environmental and socioeconomic activities to ensure efficiency and to promote steady improvement.

Contractors are responsible for all legal/regulatory, environmental, socioeconomic, and sanitary aspects of their work, including work performed by their subcontractors.

Contractors should ensure that their subcontractors have implemented Regulatory Compliance Plans and Environmental Protection Plans (including plans for waste management, spill prevention and response, social and economic activities, training, and monitoring), as well as the relevant procedures which are compliant with Contractor-approved Regulatory Compliance Plans and Procedures and the Environmental Protection Plan.

**Interaction between the ENL Project Environmental Protection Team and Contractor**

To ensure the appropriate level of organization of environmental protection activities and compliance indicators in the Environmental Protection Plan for the Project, it is necessary to ensure an effective process for exchanging information between the Project Team and contractors.

The ENL Environmental Protection Team performs the following functions:

- ◆ oversee/monitor Contractor's management of the environmental aspects of its work activities on a regular, on-going basis;
- ◆ coordinate the interaction between the Contractor Team responsible for the execution of the Environmental Protection Plan and third parties with a relationship to the Project (the representatives of state agencies, private organizations, etc.).

Interaction of ENL personnel with specific state authorities does not relieve the Contractor of full responsibility for the implementation of its own regulatory compliance procedures and compliance with the relevant approval conditions.

The interaction between the ENL Environmental Protection Team and the Contractor Team responsible for the implementation of the Environmental Protection Plan includes the following:

- ◆ ensuring Contractor is properly executing the Environmental Protection Plan;
- ◆ consultations regarding proposed change events as part of the Change Management Process;
- ◆ submittal of proposed changes to the Environmental Protection Plan by the Contractor to the ENL Project Team for approval;
- ◆ mandatory immediate communication with the ENL Project Team concerning failure to comply with environmental requirements;
- ◆ mandatory immediate communication with the ENL Project Team concerning spills of hazardous substances;
- ◆ mandatory transfer of information by the Contractor to the ENL Project Team on environmental monitoring, audits, and inspections conducted at the work sites;
- ◆ weekly and monthly reporting by Contractor regarding environmental performance and statistical data.

The ENL Environmental Protection Team conducts periodic checks of Contractor work sites (including ships).

In the event of an environmental emergency, the Contractor shall forward a notice to the ENL Project Team immediately and take appropriate measures to respond to the emergency and eliminate its consequences.

## **8. SYSTEM OF INDUSTRIAL ENVIRONMENTAL CONTROL AND ENVIRONMENTAL MONITORING**

**(Source: Sakhalin 1 Project. In-Process Environmental Control and Environmental Monitoring Program (Plan))**

ENL performs industrial environmental control at the Sakhalin 1 Project facilities and environmental monitoring in the areas of their environmental impact in accordance with the Sakhalin 1 Project Environmental Monitoring and Industrial Environmental Sanitary Control (EM & IESC) Program, approved by Glavgosexpertiza of Russia. The EM & IESCP is an informational and measuring system which is implemented using technical, software, information and organizational means providing complete, on-line, reliable and comparable information about the environment.

Environmental monitoring practices during oil spill incidents are detailed in the Corporate Plan for prevention and response to oil and oil products spills for Exxon Neftegas Limited production facilities under the Sakhalin 1 Project, approved by the letter of Ministry of Emergencies of Russia (Letter No. 22-2-495 of April 10, 2012).

### **ENL strategy for environmental monitoring and in-process control**

In compliance with current environmental protection laws, standards and regulations of the Russian Federation, and with due consideration of the applicable international conventions on environmental protection signed by the Russian Federation, and guided by agency regulatory documents, ENL has performed and continues to perform environmental studies and industrial environmental control during construction and operation of Sakhalin 1 production facilities.

Environmental studies, an environmental impact assessment, and industrial environmental control are integral components of environmental management.

The essence of the in-process environmental control and environmental monitoring concept is as follows:

- ◆ environmental surveys, including determination of baseline environmental indices, will be performed during the pre-construction phase;
- ◆ a detailed environmental impact assessment is performed using the results of environmental studies by ENL at the project site and the results of environmental monitoring and industrial control at active Sakhalin 1 facilities; the intensity, duration and spatial dimensions of zones of potential impact on elements of the environment are determined for different phases of project implementation;
- ◆ based on the results of the impact assessment, an Environmental Monitoring and In-Process Control Program for the construction and operation phases is developed;
- ◆ programs for study of individual elements of the environment and study and protection of vulnerable species are developed and implemented;
- ◆ compliance of production operations with the environmental laws and implementation of environmental protection measures are monitored, and records of natural resources use are kept;
- ◆ the environmental monitoring and industrial control program include monitoring of the actual environmental impact of industrial activities;
- ◆ the monitoring results are used for operational management in planning production activities.

### **Goals and Objectives of Environmental Monitoring and Industrial Environmental Control**

The goals of environmental monitoring and industrial control are to:

- ◆ ensure compliance with environmental standards and implement measures for environmental protection and sustainable use and renewal of natural resources;
- ◆ compliance with environmental requirements prescribed by the laws of the Russian Federation;
- ◆ ensure implementation of the Company's environmental protection policy;
- ◆ ensuring that the environmental information is comprehensive, provided on time, and reliable.

The principal objectives of environmental monitoring and industrial control are to:

- ◆ monitor implementation of environmental protection measures, instructions, and recommendations of specially authorized government agencies in the field of environmental protection;
- ◆ enforce the prescribed standards and rules for handling hazardous wastes and materials;
- ◆ monitor sustainable utilization of natural resources and keep records of their use;
- ◆ monitor the state of elements of the environment in the facility impact zone;

- ◆ observe hazardous natural processes that affect project facilities and predict the development of monitored indices of these processes;
- ◆ maintain the facility's environmental documentation;
- ◆ submit the information specified by the Company's environmental management system in a timely manner;
- ◆ submit in a timely manner the information envisaged by the state and other reporting requirements to the RF regulatory authorities.

**Stages of environmental monitoring**

Environmental monitoring of the Sakhalin 1 Project facilities is done in three stages:

- Baseline monitoring (pre-construction);
- Local environmental monitoring and industrial environmental control at the construction stage (construction monitoring);
- Local environmental monitoring and industrial environmental control at the stage of operation (operational monitoring).

Pre-construction monitoring involves an appraisal of the status of environmental components in the projected zones of project facilities prior to the start of construction work. The data thus obtained are subsequently used as inputs for the evaluation of the environmental impact of Sakhalin 1 Project facilities in the course of their construction and operation.

The construction monitoring stage involves industrial control of environmental impact and environmental status monitoring during construction of the facilities.

Operational monitoring begins as the facilities go on stream. The stage of operational monitoring involves industrial environmental monitoring of the impact on the environment and environmental status monitoring during operation of the facilities.

**Management of in-process environmental control and environmental monitoring.**

The environmental monitoring and industrial environmental and sanitary control system is divided into the following functional subsystems:

- ◆ Data measurement;
- ◆ Data transmission;
- ◆ Data management.

The environmental observations combine two systems: monitoring the sources of environmental impact and monitoring the condition of the environment. The system for monitoring the sources of environmental impact records emissions, discharges, levels of physical impact, and the volumes and movement of production and consumption waste. Monitoring of the condition of the environment includes measurement of parameters of the air, surface water bodies and groundwater, the geological environment, soil cover, vegetation, aquatic biota and terrestrial wildlife.

ENL performs the following field studies:

<p><u>Atmospheric emission monitoring</u>                  Sampling of atmospheric emissions                  Measurement of Gas-air Mixture Parameters                  Measuring Pollutant Concentrations</p>
<p><u>Atmospheric air and work area air:</u>                  Sampling to Determine Pollutant Content                  Measuring Pollutant Concentrations</p>

<u>Monitoring of wastewater discharge, surface and groundwater quality:</u> Water sampling to Determine Pollutant Concentrations
<u>Physical impact factor monitoring:</u> Noise Measurement Electromagnetic Field Measurement Vibration Measurements
<u>Monitoring of geological processes:</u> Observations of Exogenous Geological Processes
<u>Soil conditions control:</u> Soil Sampling
<u>Monitoring of vegetation status</u> Field Material Collection Organization of permanent test site network Work at base sites
<u>Control of wildlife conditions</u> Faunal Monitoring Programs

Properly accredited and certified Russian laboratories are enlisted for laboratory work.

All laboratory studies are conducted in accordance with existing Russian methods included in the State List of Quantitative Chemical Analysis Methods and the Federal List of Methods for Carrying out Measurements Allowed for Use in Performing Environmental Impact Monitoring, and RF Ministry of Health methods.

Environmental monitoring program makes it possible to control the environment quality during the implementation of the Project. Using the monitoring findings, ENL and its contractors take adequate and timely measures to mitigate the environmental impacts. The information acquired in the environmental monitoring process is duly conveyed to Russian governmental authorities.

## 9. PUBLIC AWARENESS OF PROJECT PROGRESS

### WWF Criterion 3.3

The public are kept informed throughout the Sakhalin 1 Project period.

**Table 4: Data transmission equipment;**

<b>Form</b>	<b>Where</b>	<b>When</b>	<b>Objective</b>
Mass media (newspapers, television, radio)	The entire island and the relevant part of the Russian mainland	On a regular basis	Provide specific information on the project, give notice of meetings and open door days, and determine public opinion
Visual Aids	Open door days, seminars and conferences, special libraries	On a regular basis	Provision of information

Form	Where	When	Objective
Posters, brochures, flyers, reports,	Open door days, seminars and conferences, special libraries, and additional dissemination of information by request	On a regular basis	Provision of information
Video, photographs, maps, charts	Meetings, seminars, open door days	On a regular basis	Provision of information
Direct communication	Yuzhno-Sakhalinsk; whole island	On a regular basis	Provision of information
Website:	On an international scale	On a regular basis	Provision of information

ENL conducts public consultations on EIA materials and promotes public participation in the process of assessing the environmental impact of the project, providing the opportunity to express opinions on the key issues related to this process.

Public consultations are conducted in three phases:

- In the first phase interested parties have the opportunity to read and make comments and suggestions on the draft Scope of Work for environmental impact assessment and Explanatory Notes for the proposed field development project. Notices are published in newspapers at federal and oblast levels, such as *Sakhalinskiy neftyanik* (Okha), *Znamya truda* (Nogliki), *Gubernskiye vedomosti* (Yuzhno-Sakhalinsk), and *Rossiyskaya gazeta*. The draft Scope of Work for environmental impact assessment and the Explanatory Notes are available for review at local libraries.
- In the second stage members of the public can familiarize themselves with the preliminary EIA materials presented in this document and express their opinion on EIA during public discussions and also using a telephone hotline and other means of two-way communications. Comments and suggestions from members of the public are taken into account during development of the EIA materials to be submitted to the state environmental and state expert reviews as part of the set of documents for the Field Development Project.
- The third stage of public discussions begins when the final version of the EIA is completed, which takes into account the public's comments and suggestions.

**Table 5: Public Consultation Communication Methods**

Form	Where held	Objective
Interview / focus groups	Yuzhno-Sakhalinsk, Kholmsk, Nogliki, Okha, Bogorodskoe	Environmental protection policies;
	Yuzhno-Sakhalinsk, Kholmsk, Nogliki, Val, Okha	Study of environmental protection issues and updating of EIA
Public Opinion Survey	Yuzhno-Sakhalinsk, Kholmsk, Korsakov, Aleksandrovs-	Determination of baseline data

Form	Where held	Objective
	Sakhkalinski, Nogliki, Okha and Dolinsk	
	Yuzhno-Sakhalinsk, Kholmsk, Okha, Val, Nogliki, DeKastri	Determination and comparison of baseline data
Public opinion exit poll	Yuzhno-Sakhalinsk, Kholmsk, Val, Nogliki, Okha, DeKastri,	Collection of additional information
	Yuzhno-Sakhalinsk, Kholmsk, Val, Nogliki, Okha, DeKastri,	Collection of additional information
Stakeholder workshops	Yuzhno-Sakhalinsk, Kholmsk	Exchange of information and determination of public opinion
	YUZHNO-SAKHALINSK	Exchange of information and determination of public opinion
Open Door Sessions	Yuzhno-Sakhalinsk, Kholmsk, Val, Nogliki, Okha, DeKastri,	Exchange of information and determination of public opinion
Books with the documentation and comments in public (city, town) libraries	Yuzhno-Sakhalinsk, Kholmsk, Korsakov, Val, Nogliki, Okha, DeKastri, Nikolaevsk-na-Amure	Exchange of information and determination of public opinion

ENL promotes ongoing meetings with a wide range of parties affected by the project. Meetings with regional and local authorities are an important component of the system for project management and addressing the regulatory issues. Representatives of regional and local government bodies are involved in determining the issues to be discussed with the public at open door days, seminars, and other events.

ENL recognizes the importance of public participation in the discussion of issues related to the project. ENL employees participate in numerous community events and intend to continue this interaction with the public on Sakhalin Island and in Khabarovsk Krai and to arrange presentations and events for schools, environmental groups, local government, business groups, and community organizations.