



**SAKHALIN 1 PROJECT  
REPORT ON ENVIRONMENTAL PROTECTION ACTIVITIES**

**Exxon Neftegas Limited**

**2014**

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## 1. 2014 ENVIRONMENTAL PERFORMANCE

ENL pays special attention to environmental measures and tracks a variety of environmental performance measures and parameters on a daily, monthly, quarterly and annual basis. The section provides a summary of environmental performance for Sakhalin 1 Project.

### Waste Management **WWF Criterion 2.5**

Sakhalin 1 Project construction and production facilities in Sakhalin Oblast and Khabarovsk Krai generated 156 398 tons of drilling, industrial and domestic waste in 2014.

The volume of waste generated by production and consumption at Sakhalin 1 construction sites and production facilities in Sakhalin Oblast and Khabarovsk Krai includes:

- ◆ Drilling waste (slurry, drill cuttings)
- ◆ Domestic waste water of the Orlan offshore platform;
- ◆ Other industrial and domestic waste:

Domestic wastewater from the Orlan Platform and drilling waste were injected through special-purpose wells into deep horizons of the licensing blocks: Drilling waste (cuttings and waste mud) from the construction of wells in the Arkutun-Dagi field were injected into a well on the Berkut fixed offshore platform.

Part of the drilling waste was transferred to the licensed company Terra-Torf LLC for recycling and reuse.

Drilling waste and wastewater comprise 94.8% of the total waste generated in 2014. In 2014, 8 527 tons of industrial waste of Hazard Classes 1 - 5 of the total waste generated in 2014 and carried over from 2013 was neutralized, buried, and recycled, including:

#### Neutralization

Thermally neutralized in company's own incinerators – 5.5%, composed of:

- ◆ Oily waste;
- ◆ Industrial waste
- ◆ Domestic waste

The waste transferred for neutralization using specialized equipment of contractors and subcontractors was 0.93% of the waste.

#### Recycling / Reuse

- ◆ Waste reused in the main production and production support processes for the Project was 18.2% of the waste.
- ◆ Waste transferred to third parties for reuse / recycling was 48.6% of the waste generated.

### Burial

- ◆ 24.4% of Hazard Class 4 and 5 waste were disposed of at the specialized Solid Domestic Waste (SWD) landfills.
- ◆ 0.2% of Hazard Class 4-5 industrial and domestic waste was disposed of at the company's own site at DeKastri.
- ◆ Waste amounting to 0.075% of hazardous waste of Hazard Classes 2-3 was transferred for disposal to the specialized Serebristy landfill, Green City CJSC (Krasnoyarsk).
- ◆ Waste amounting to 1.6% of other process waste was injected into disposal formations in the license areas using special wells.

#### **Neutralization of other industrial and domestic waste of Hazard Classes 1-5 in 2014.**

Returned to the production process	18.2 %
Transferred for recycling and reuse	48.6%
Neutralized using company equipment	5.5%
Transferred for neutralization	0.93%
Injected into wells	1.6 %
Transferred for disposal in landfills	24.43%
Disposal at company landfill	0.17 %

### **Latest Waste Management Achievements**

#### **Minimization of Waste Generation**

As part of the strategy to reduce the amount of waste generated, in 2014 ENL implemented a number of initiatives aimed at the use of low-waste and resource-saving technologies and at reduction of waste generation at their sources.

In 2014, through the optimization of procurement strategies and processes, the chemicals necessary for processing crude to marketable oil were fully used without generating residue in the form of hazardous waste.

Replacement of light sources with LED lamps is ongoing at ENL facilities in order to reduce the volume of mercury-containing waste;

Measures to reduce the volume of domestic sewage generated were implemented at the DeKastri oil export terminal and the Odoptu NWS. The effect averaged 5-10%.

#### **Use of Best Available Technologies in the Field of Waste Management**

##### Waste Neutralization

Waste neutralization (including burning in incinerators) is a key method allowing for mitigation of hazardous properties of wastes and for land conservation by reducing the volume of buried waste.

A new incinerator was commissioned on the Berkut fixed offshore platform;

Overhaul of incinerators was commenced at the Chayvo OPF and Odoptu NWS and is scheduled for completion in 2015;

The Company's own specialized plant for neutralization of oil sludge and impacted soil was installed at the Chayvo OPF temporary waste storage site;

In order to reduce the volume of waste disposal, in December 2014 ENL signed a contract with specialized company EAGLE LLC for additional thermal neutralization of Hazard Class 4 and 5 wastes.

### Waste disposal

ENL's main objectives in landfill disposal are the efficient use of available capacities of waste disposal facilities and the use of environmentally friendly methods of waste disposal. This approach is reflected in the ENL waste management concept for the period until 2024, which was developed in 2014 and presented to the Ministry of Natural Resources of Sakhalin Oblast.

ENL injects drilling waste, produced water and household wastewater from the Orlan Platform into isolated zones of the subsoil license areas. This method is generally recognized as the most environmentally safe method of managing of drilling and oil production waste.

During the reporting year, ENL conducted an inventory of Sakhalin 1 waste disposal facilities, the results of which were presented to the Rosprirodnadzor departments for Sakhalin Oblast and the Far East Federal District.

### **Recycling and Reuse**

The main focus of waste management is on identification of the sources of waste generation and on separate collection of waste that can be reused in the main production or transferred for recycling as secondary raw materials. In 2014 most of the oily waste generated at Sakhalin 1 facilities was re-used or transferred to specialized recycling companies. In particular:

- ◆ Oily water was reused in the main production process;
- ◆ Sludge and substandard oil products were transferred to the specialized enterprise Terra-Torf LLC for recycling and reuse;
- ◆ Spent fuel and lubricants were transferred for reuse as fuel.

In 2014 ENL transferred 8 135 tons of drilling waste for recycling and reuse. All mud pits were completely cleared of drilling waste during the reporting year.

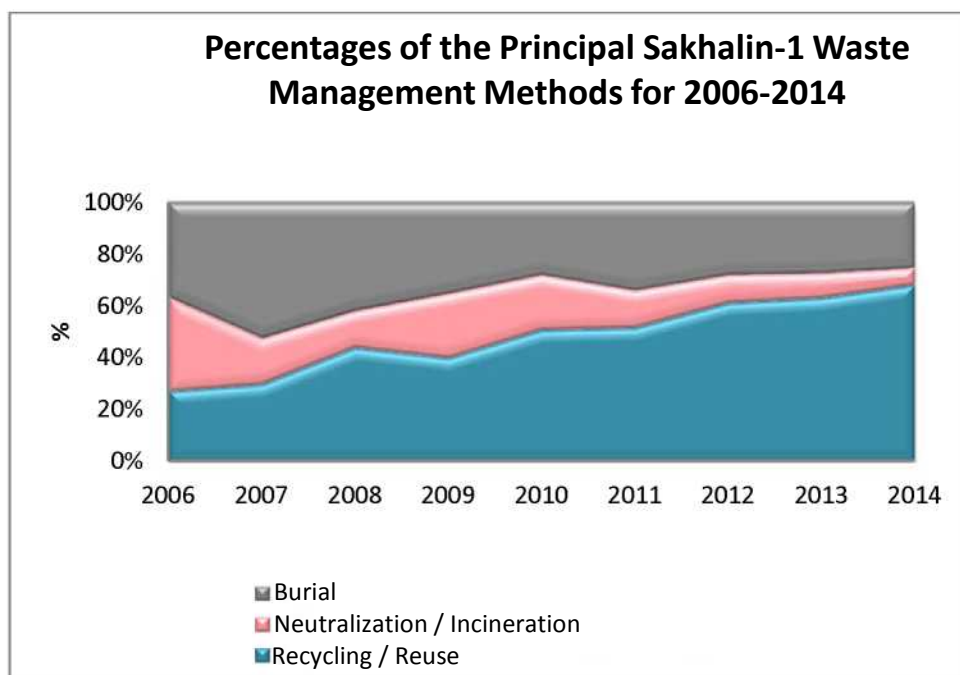
ENL is constantly expanding the list of organizations involved in recycling and reuse of waste and the list of recyclable wastes:

- ◆ In 2014 ENL began the transfer of DeKastri waste glass for recycling;
- ◆ Initiated the transfer of stabilized sludge from biological treatment facilities;
- ◆ Significantly reduced the amount of food waste for underground disposal, which was 0.6% during the reporting year. All ENL facilities (except for the Orlan and Berkut Platforms) work with

- local farms in arranging delivery of food waste generated at kitchen facilities to be used as cattle feed;
- ◆ The volume of cardboard and paper waste transferred for recycling increased in 2014. Due to the absence of paper recycling enterprises in Sakhalin Oblast, such waste is transported to Primorsky Krai. Special-purpose presses installed at Chayvo OPF, Odoptu WS and the Olympia Residential Complex are used to compact paper and cardboard in order to reduce transportation costs;
- ◆ In 2014, ENL has introduced selective polyethylene waste collection and return for recycling;
- ◆ In 2014, during construction and repair work at the Odoptu NWS and the Chayvo OPF, ENL arranged for separate collection of potentially usable construction waste. The resulting construction waste was transferred for reuse, leading to a decrease in the waste disposal volume by 5%;
- ◆ Transfer of waste wood, ferrous and non-ferrous metal, and plastic waste for recycling and reuse was maintained at a consistently high level.

In 2014, the level of recycling and reuse of industrial and domestic waste generated at the Company's facilities amounted to 67%. This was made possible due to high industrial standards, early and complete waste segregation and waste management processes preventing waste burial and/or secondary contamination of potentially recyclable waste.

The graph shows the percentage ratios of the main methods of treatment of industrial and domestic waste for Sakhalin 1 Project for the period from 2006 to 2014 inclusive.



## **Waste Management Facilities monitoring**

In accordance with the requirements of Russian environmental protection legislation and regulatory documents, ENL performs environmental monitoring at sites where waste management facilities are located.

Monitoring is performed under the “Program of environmental monitoring and industrial environmental monitoring at the operations stage” approved by the State Environmental Expert Review.

Monitoring covers the soil condition, air emissions from the incinerators, groundwater quality in the area of the landfill and temporary waste storage sites.

The characteristics of injected drilling waste and production water, as well as the technical parameters of the injection process are monitored in accordance with the requirements of authorized subsoil management agencies.

The results of monitoring at the waste disposal sites in 2014 showed that the controlled parameters generally comply with environmental quality standards.

## **2014 Water Use, Consumption and Wastewater Discharge**

### [WWF Criterion 2.3](#)

### [WWF Criterion 2.4](#)

ENL does not dispose of contaminated wastewater in surface water bodies. Contaminated industrial and domestic wastewater is injected into special wells.

In 2014, during construction and operation within the scope of the Sakhalin 1 Project, ENL based its water management on five Decisions and three Agreements for the right to use surface water bodies, as well as four licenses for subsoil use for the production of subsurface water.

Water consumption totaled 8 956 thousand m<sup>3</sup>. Water discharge totaled 8 566 thousand m<sup>3</sup>.

### **Orlan offshore platform**

Seawater intake in 2014 amounted to 4 669 thd.m<sup>3</sup> - 42.8% of the prescribed limit for seawater intake, which is 10 908 thd.m<sup>3</sup>/year.

#### Water disposal:

- Standard clean water from the equipment cooling system was returned into the sea in the amount of 4 562 thd.m<sup>3</sup>;
- Standard clean water from the desalination system was returned into the sea in the amount of 99 thd. m<sup>3</sup>;
- Domestic wastewater and wastewater from industrial zones, as well as rain/storm runoff from the decks, is pumped into the disposal well.

The total volume of wastewater of all categories injected into the well in 2014 was 31 thd. m<sup>3</sup>.

### **Chayvo Onshore Processing Facility (OPF) and Chayvo Wellsite (CWS).**

Water disposal from the Chayvo\_OPF and the Chayvo WS totaled 161 thd. m<sup>3</sup>

#### Water disposal:

-A total of 88 thd. m<sup>3</sup> of domestic wastewater was discharged to leach fields following treatment at the Chayvo OPF wastewater biological treatment facilities;

- Industrial wastewater was injected into the disposal wells to accommodate formation water and other process waste in the amount of 24 thd. m<sup>3</sup>;

- Water used in the preparation of drilling fluids was injected into a special-purpose well.

### **DeKastri Oil Export Terminal, Export Oil Pipeline and SPM located in Ulchsky District of Khabarovsk Krai**

A total of 28 thd. m<sup>3</sup> of fresh groundwater was consumed in accordance with a subsoil use license.

Water disposal: Domestic wastewater in the amount of 15 thd. m<sup>3</sup> after treatment at biological treatment plants was transferred to the Housing and Utilities System of the DeKastri Rural Settlement.

### **Odoptu-2 North Wellsite.**

In 2014 water supply was provided from two existing source water wells located outside the Odoptu NWS.

During construction and operation, the overall load on underground water supply sources did not exceed the allowed production volume. No depletion sources occurred.

Domestic wastewater was transferred to water treatment facilities. The construction and drilling camps have domestic sewage from which the wastewater was also sent to biological treatment facilities.

Water consumption at the Odoptu NWS, including the multipurpose building and drilling camp, totalled 105 thd. m<sup>3</sup>.

Domestic sewage water in the amount of 82 thd. m<sup>3</sup> was treated and discharged to the leach fields.

### **Berkut Fixed Offshore Platform**

The Berkut fixed offshore platforms is located on the northeast shelf of Sakhalin Island in the RF exclusive economic zone.

According to the explanation of the RF Federal Agency for Water Resources of September 20, 2011, No. VN-02-28/4462, the standards of the RF Water Code on the



Water Use Agreement and the Decision to grant a water body for use do not apply to water areas in the RF exclusive economic zone.

2014 Intake of sea water totaled 3947 thd. m<sup>3</sup>.

#### Water returned to the sea:

A total of 3599 thd. m<sup>3</sup> of treated sewage treatment water was returned to the sea from the platform. 90% of the total discharged water volume is standard clean water from the fire equipment cooling and testing system.

## **Air emissions**

### **Flared gas volume**

#### [WWF Criterion 2.2](#)

The volume of gas flared at the Chayvo Field in 2014 amounted to 132 815 ths. m<sup>3</sup> or 1.4% of the total volume of produced gas at the field, with the permitted flare volume equal to 5%.

The volume of flared gas at Odoptu Field amounted to 21545 ths. m<sup>3</sup> or 3.3% of the total volume of produced gas at the field, with the permitted flare volume equal to 5%.

During the Odoptu WS2 (NWS) expansion in 2014, a gas compression and injection unit was constructed that made it possible to maintain the Odoptu formation pressure and to reduce gas flaring rate.

### **Air pollutant emissions**

#### [WWF Criterion 2.1](#)

In 2014 the total of permitted pollutant emissions for the whole of Exxon Neftegas Limited (in accordance with the permits issued for the construction and operation periods) amounted to a total of 64 165 tonnes (taking into account the conversion of nitrous oxides to NO<sub>2</sub>). Actual emissions during the reporting period amounted to 15 439 tonnes (based on nitrogen oxides at NO<sub>2</sub> equivalent) – 24% of the authorized emission limit.

For Sakhalin Oblast the total quantity of permitted air pollutant emissions (according to the issued permits) was 61180 tons/year (including NOX in NO<sub>2</sub> equivalent). Actual emissions for the reporting period were 13,688 tons or 22.37% of the authorized emission limit.

For Khabarovsk Krai the total quantity of permitted air pollutant emissions was 2 964 tons/year (or 2 985 tons/year including NOX in NO<sub>2</sub> equivalent). Actual emissions for the reporting period were 1 749 tons/y, representing 59% of the authorized emission limit.

## **Oil Spills Prevention and Response**

#### [WWF Criteria 2.7 and 2.8](#)

In the entire period of Sakhalin 1 activities, there have been no incidents involving process equipment failure that resulted in crude oil spills.

In 2014, as a result of oil production operations and construction activity, Sakhalin 1 facilities recorded several minor incidents involving spills of petroleum products. The total volume of oil product spills in 2014 was 236.5 liters.

This figure includes cases of spills/leaks of oil products such as hydraulic fluids, lubricating oils, and diesel fuel. The main reason for such leaks is mechanical breakdown of heavy machinery and motor vehicles used in the production activities at Sakhalin 1 facilities. In each case, ENL experts working at the facilities promptly took appropriate action to respond to the incidents. All minor spills were responded to and cleaned up immediately.

The Sakhalin 1 Orlan and Berkut fixed offshore platforms are equipped with internal drainage systems operating in a closed system. In the event of oil or product leakage to any of the platform decks, all liquids are contained in a drain system that prevents them from release to the environment.

ENL is committed to a permanent reduction in the number of such incidents at company facilities through the development and implementation of various procedures aimed at enhancing production control, specifically:

- ◆ implementation of equipment tests before and after completion of work on the condition of hydraulic equipment and machinery;
- ◆ establishment of requirements for the mandatory presence of impermeable trays under heavy machinery in the parking areas;
- ◆ higher requirements for vehicles of contractors and subcontractors the perform services for the delivery of materials and equipment to Sakhalin 1 facilities.

ENL works constantly with contractors and subcontractors that provide services for Sakhalin 1 facilities. Contractors and subcontractors are notified on a regular basis of the requirement to make every effort to prevent spills and leaks of oil and oil products during production operations. ENL considers the prevention of spills and leaks of oil and oil products not only a priority but a necessary performance standard.

In 2014, in case of a spill, a written report was prepared and an investigation and analysis conducted of the spill sources.

## **ENL Expenditures on Environmental Safeguards**

Each Sakhalin 1 Project facility includes numerous environmental safeguards as part of the design and implementation of the project. Design solutions include modern environment protection equipment, the use of environmentally safe technologies and additional environmental protection measures. The table provided below shows ENL costs for environmental protection in 2014.

**Preliminary data on Spending on Environmental Programs in 2014**

<b>Category</b>	<b>Environmental Protection CAPEX Thou. rub.</b>	<b>Operating Expenses (Rubles)</b>
Environmental Technical Staff	317 330	37 428
Revegetation	0	119 547
Water protection	314 825	36 242
Air protection	0	31 348
Waste Management	677 208	198 161
Gray Whale Studies	44 905	62 262
Steller's sea eagle Monitoring	0	4 997
Monitoring of bird populations listed in RF Red Book	3 000	1 265
Environmental monitoring and in-process control	37 006	112 960
Environmental Surveys	23 102	0
OSR procedures	6 025	278 563
<b>TOTAL</b>	<b>1 423 401</b>	<b>882 773</b>
	<b>2 306 174</b>	

**Payments for Use of Natural Resources**

In accordance with the laws of the RF and the Sakhalin 1 Production Sharing Agreement, they provide for payment for the use of land, forests, and water resources associated with the project facilities. Payments in this category in 2014 are listed in Table 5.2.1.

**2014 Natural Resource Use Payments**

<b>Types of payment</b>	<b>Amount in rubles</b>
Land use (on lease)	32 534 048.26
Subsoil use fees	2059.00
The natural resources extraction tax;	5 493 272.00
Water Tax	47 004.20
Payments for Use of Natural Resources	114 473.60
<b>TOTAL</b>	<b>38 90 857.06</b>

**2. KEY PROGRAMS FOR ENVIRONMENTAL PROTECTION AND ECOLOGICAL MONITORING**

**Work on the restoration and maintenance of the pipeline routes in 2014.**

Measures for repair and maintenance of the pipeline Right Of Way (ROW) for the Sakhalin 1 Project in 2014 included: Work to eliminate erosion sites and restore natural vegetation, and construction of protective structures. Trees and shrubs cleared within ROW in some parts of the OPF – DeKastri terminal main oil pipeline, and Chayvo OPF – Boatasino site main gas pipeline. Regular visual inspections and aerial surveys.

Regular inspections of all pipeline routes were conducted from the air during the entire season, both on the island and the mainland. These inspections were carried out to assess the condition of the pipeline ROW and evaluate the effectiveness of

engineering protection, as well as for early detection of potentially areas of adverse exogenous processes.

Work on filling soil subsidence locations over the pipeline and building shore protection structures at the site of the Nutovo River crossing by Odoptu NWS – Chayvo OPF pipeline was completed.

Work on elimination of soil erosion effects was performed in the section of the Odoptu NWS – Chayvo OPF flowline, which resulted in elimination of 21 soil erosion sites and restoration of the pipeline backfill layer (increased to the standard level) at 18 sites. Informational/descriptive signs, air navigation markers, and road signs were also reinstalled throughout the pipeline route.

The installation of the permanent erosion protection was completed at the site of the Chayvo OPF – DeKastri terminal main pipeline near the crossing of Ryabchik Creek, where erosion was observed through the surveillance program.

The project also included remediation work at the section of the Chayvo OPF - DeKastri terminal main pipeline to eliminate erosion sites, restore engineering protection facilities, and restore to the required thickness of the pipeline backfill layer.

In 2014 no reclamation work in Khabarovsk Krai was required, hence none was conducted.

### **Environmental Monitoring and In-Process Monitoring Activities for 2014.**

The environmental monitoring and in-process control implemented in 2014 at ENL construction and operating sites included the types of operations listed below.

#### Monitoring stationary air pollutant emissions sources:

- ◆ Onshore processing facility (OPF) at Chayvo;
- ◆ Chayvo Wellsite;
- ◆ DeKastri oil export terminal;
- ◆ Orlan offshore platform;
- ◆ Odoptu-2 WS (North)
- ◆ Olympia Housing Complex.
- ◆ ENL Yuzhno Headquarters.

#### Monitoring of air quality

- ◆ At the Chayvo WS;
- ◆ DeKastri OET;
- ◆ Odoptu-2 WS (North);
- ◆ on the Orland platform
- ◆ ENL Yuzhno Headquarters.
- ◆ Olympia Housing Complex.
- ◆ Chayvo OPF temporary waste storage area (TWSA);
- ◆ DeKastri OET TWSA;
- ◆ DeKastri OET industrial and domestic waste landfill;
- ◆ Odoptu-2 WS (North) TWSA;
- ◆ Subsoil Block «Odoptu SWS Borrow Pit 1»
- ◆ Subsoil Block «Odoptu SWS Borrow Pit 2»
- ◆ Subsoil Block «Borrow Pit 3A-ENL»
- ◆ Motor Road Odoptu WS-1 (South) - Odoptu WS-2 (North)

Potable water quality monitoring:

- ◆ Chayvo OPF;
- ◆ At the Chayvo WS;
- ◆ on the Orland platform
- ◆ Berkut fixed platform
- ◆ DeKastri OET;
- ◆ Odoptu-2 WS (North);
- ◆ in the Olympia residential community
- ◆ ENL Yuzhno Headquarters.

Domestic wastewater quality monitoring:

- ◆ Chayvo OPF;
- ◆ At the Chayvo WS;
- ◆ on the Orland platform
- ◆ Berkut fixed platform
- ◆ DeKastri OET;
- ◆ in the Olympia residential community
- ◆ ENL Yuzhno Headquarters.
- ◆ Odoptu -2 Well Site (North).

Injected Waste water / formation water quality monitoring:

- ◆ Odoptu-2 WS (North);
- ◆ Chayvo OPF;
- ◆ on the Orland platform
- ◆ Groundwater level and quality monitoring:
- ◆ At the Chayvo WS;
- ◆ Chayvo OPF;
- ◆ DeKastri OET;
- ◆ Odoptu-2 WS (North);
- ◆ Description of Subsoil Block «Odoptu SWS Borrow Pit 1»
- ◆ Subsoil Block «Odoptu SWS Borrow Pit 2»
- ◆ Groundwater level monitoring:
- ◆ Along the routes of main oil pipelines Chayvo OPF - Cape Uangi (Sakhalin Oblast) and Cape Kamenny – DeKastri terminal (Khabarovsk Krai).

Surface stream hydrology and morphology monitoring:

- ◆ on waterways at the locations of crossings by main oil pipelines Chayvo OPF - Cape Uangi (Sakhalin oblast) and Cape Kamenny– DeKastri terminal (Khabarovsk Krai);
- ◆ River crossings along Odoptu-2 WS (North) – Chayvo OPF Flowline.
- ◆ Nameless creek (Chayvo OPF area).
- ◆ Seawater quality monitoring:
- ◆ Into the Chikhachev Bay
- ◆ In Piltun Bay;
- ◆ In the Sea of Okhotsk in the Arkutun-Dagi field area.

Water protection zones monitoring:

- ◆ Chikhachev Bay, DeKastri OET area.
- ◆ Piltun Bay in the TOF area for Odoptu onshore facilities. Odoptu 2 (North) Wellsite Expansion. Temporary Offloading Facilities

Monitoring of marine aquatic life and bottom sediments:

- ◆ In Piltun Bay;
- ◆ In Sea of Okhotsk in the Orlan platform area and along the Orlan – Chayvo WS pipeline
- ◆ In the Sea of Okhotsk in the Arkutun-Dagi field area.

Monitoring of plant communities:

- ◆ Odoptu-2 WS (North);

Soil pollution monitoring:

- ◆ Chayvo OPF TWSA;
- ◆ DeKastri OET TWSA;
- ◆ In the area of the DeKastri OET industrial and domestic waste disposal facility;
- ◆ Odoptu 2 WS (North) TWSA;
- ◆ Odoptu-2 WS (North);
- ◆ Olympia Housing Complex.
- ◆ Automobile Road “Odoptu WS-1 (South) – Odoptu WS-2 (North)”;
- ◆ Description of Subsoil Block «Odoptu SWS Borrow Pit 1”
- ◆ Description of Subsoil Block «Odoptu SWS Borrow Pit 2”
- ◆ Subsoil block «Borrow pit-3A-ENL».

Geotechnical monitoring:

- ◆ Along the routes of main oil pipelines Chayvo OPF - Cape Uangi (Sakhalin Oblast) Cape Kamenny – DeKastri terminal (Khabarovsk Krai);
- ◆ along Odoptu 2 (North) WS–Chayvo OPF Flowline
- ◆ Along the Chayvo OPF - Boatasino main gas pipeline;
- ◆ Along the Chayvo OPF- Orlan platform gas reinjection line.
- ◆ Along the FWS flowline for Orlan wells
- ◆ Along the Chayvo OPF – Berkut platform produced-water reinjection line.
- ◆ Chayvo OPF;
- ◆ At the Chayvo WS;
- ◆ DeKastri OET;
- ◆ Odoptu-2 WS (North);
- ◆ Offshore OFL pipeline crossing of the Piltun bay
- ◆ In the TOF construction area during Sakhalin 1 implementation Odoptu Onshore Facilities. Odoptu 2 (North) Wellsite Expansion. Temporary Offloading Facilities

Geo-dynamic (seismic and geo-deformation) monitoring

- ◆ Seismic activity monitoring;
- ◆ Geo-deformation monitoring at places where the oil export pipeline crosses active faults (Garomay and Central Sakhalin Faults).
- ◆ Physical impact factor monitoring:
- ◆ on the Orlan platform
- ◆ Chayvo OPF;
- ◆ At the Chayvo WS;
- ◆ DeKastri OET;
- ◆ Odoptu-2 WS (North);
- ◆ ENL Yuzhno Headquarters.
- ◆ in the Olympia residential community

## **Summary of the Results of Environmental Monitoring and Industrial Control in 2014**

### *Monitoring of stationary air pollutant emissions sources.*

In most cases the results of stationary source emissions monitoring did not indicate any exceedance of maximum permissible emissions standards with respect to the monitored indicators, which is made possible by timely equipment maintenance, the use of high-quality fuel, and normal operating conditions.

### *Air quality monitoring*

In most cases measured pollutant concentrations did not exceed the standard requirements for residential and workplace air quality.

### *Potable water quality monitoring*

Water samples according to all indicators for the monitoring period met the regulatory requirements of Health Code GN 2.1.5.1315-03 "Maximum Permissible Concentrations (MPC) of Chemicals in Domestic Water Supply and Recreational Water Bodies" and Health Code SanPiN 2.1.4.1074-1 "Potable Water. Health Requirements for the Water Quality of Centralized Potable Water Supply Systems. Quality Control."

### *Domestic wastewater quality monitoring*

The results of analyses of wastewater samples taken at the intakes and outlets of biological treatment facilities indicate that on the whole, treatment efficiency in terms of regulated indicators conforms to treatment facility specifications.

With respect to microbiological and parasitological indicators, the water samples after treatment also met regulatory requirements.

### *Injected waste water monitoring*

The Produced Water Treatment System at the Chayvo OPF and Odoptu NWS includes the removal of oil from the water. After the initial treatment the water is pumped to the separator to remove light hydrocarbons and then it is injected into a disposal well while all injection parameters are constantly monitored.

Domestic wastewater on the Orlan platform passes through the electrical waste water purification system at the treatment plant and then is pumped from the storage tank into the reinjection well. No waste water is discharged into the sea.

### *Groundwater level and quality monitoring*

The results indicate that natural factors play the primary role in determining groundwater levels. No manmade disturbances of ground water levels (and associated changes in groundwater level depths) were observed.

Groundwater quality analysis results have remained stable by comparison with past monitoring years.

Static groundwater levels on the grounds of the DeKastri Terminal are located at depths of 8 or more meters below ground level, i.e. groundwater does not come into contact with OET facilities. No manmade disturbances (and associated changes in groundwater depths) of groundwater levels were observed.

Groundwater quality has generally remained stable over the entire period of observations.

Fluctuations in groundwater levels in monitoring wells at the Odoptu NWS are minor and seasonal.

Water samples to test for the presence of oil in the borrow pits at the Odoptu SWS were collected from flooded pits in the area of Borrow Pits 1 and 2.

Laboratory results show the effectiveness of environmental protection activities during the operations.

#### Monitoring of groundwater level

#### **Main oil pipelines Chayvo OPF - Cape Uangi (Sakhalin Oblast) and Cape Kamenny - DeKastri oil export terminal (Khabarovsk Krai)**

Studies in 2014 have confirmed the results of past year studies. Comparison of the pipeline burial depth and groundwater level reliably indicates the absence of rising groundwater levels in areas adjacent to the monitoring wells.

#### Surface stream hydrology and morphology monitoring

#### **Along Chayvo OPF - Cape Uangi export pipeline**

Hydromorphological monitoring was performed on the Nilau and Yuktalin creeks and Uniya-Tana, Askasay, Evai, Tuksyu, and Hunmakta rivers. The conditions are satisfactory at Nilau creek and Tuksyu and Hunmakta rivers, good at Yuktalin creek, and good and stable at the Uniya-Tana, Askasay, and Evai rivers.

At most streams the shore slopes in the route corridor are covered with sand and silt and actively overgrown with grass and shrub vegetation (projected cover area is about 100%), indicating stabilization of the riverbed process.

The coastal protective strips and water buffer zones at all stream crossings are in a stable condition (apart from slopes). The route markers at all crossings are intact and in good condition.

#### **Cape Kamenny – DeKastri terminal main oil pipeline**

Hydromorphological monitoring is performed on five rivers: Medved, Chernaya, Sushchevskiy Klyuch, Kadi and Tatarka. The conditions are good at the Tatarka and Sushchevskiy Klyuch rivers and satisfactory at the Kadi and Chernaya rivers.

Sand and silt built up on all waterway slopes in the route corridor and actively growing grass and shrub vegetation (projected vegetation cover area - about -100%).

Condition of coastal protection and water protection zones at all crossings is stable. Traces of water entering the floodplain and forming a floodplain current with erosion of the corridor surface are not observed at any of the crossings. Signs of route protection are available, slopes protection condition is good.

#### **Odoptu 2 WS (North) - Chayvo OPF pipeline**

Hydromorphological monitoring is performed on the Mukhto, Paromay, Ossoy, Nutovo, Maly Garomay, and Bolshoy Garomay rivers and Marevy and Bolotny creeks.

Conditions of the Piltun and Maly Garomay Rivers are rated as satisfactory. Observed negative processes include growth of the bend and deepening of the left bank, the accumulation of drowned wood, and subsidence of river bank protection on both sides.

The condition of crossings of all the surveyed watercourses are good.

#### **The Nameless creek (Chayvo OPF area)**



The monitoring was conducted during the ice-free period in July – October 2014. The specialists measured the current speed and the creek depth. The hydrological characteristics of this creek are similar to all creeks of the North Sakhalin.

### Seawater quality monitoring

#### **Chikhachev Bay. The treated wastewater (possess and surface) discharge area**

During the reported period the sampling was conducted before and after the discharge. Lab test results confirm that wastewater discharge did not have any impact on the composition and properties of sea water in the monitored area.

#### **Chikhachev Bay. Single Point Mooring (SPM) area**

This portion of the Bay was heavily used for navigation as well as potentially impacted by DeKastri port therefore some petroleum content above Maximum Permissible Concentration (MPC) was occasionally observed in sea water samples analyzed.

The sea water pollution by petroleum products in the course of navigation activities is mostly attributed to various discharges of oily wastewater generated onboard due to operation of power generation units.

The main criteria for evaluation of sea water quality in the area of Single Point Mooring are MPC of water contaminants, affecting fishery. Over a period of monitoring some cases of petroleum and copper content above MPC had been observed. At the same time the monitoring results do not show any correlation of higher petroleum and copper content cases with tanker loading operations which is confirmed by measurements taken before and during loadings.

#### **Piltun Bay Area of Temporary Offloading Facilities (TOF)**

Monitoring of the Piltun Bay water area was performed before and during construction of the TOF.

Studies on the bay surface in the area of water use indicate no visible manifestations of environmental impact. According to laboratory test results, it was determined that all parameters are within acceptable limits for the area. No exceeded Maximum Permissible Concentrations were recorded.

#### **The Sea of Okhotsk area near the discharge of treated wastewater from combined Discharge No. 1 from the Berkut platform. Sakhalin 1 Project Arkutun-Dagi Field Development Onshore and Offshore Facilities**

18 samples of seawater were collected in the area of combined wastewater Discharge No. 1.

The results of the study indicated that in August, in the control range of combined wastewater Discharge No. 1, there were isolated cases of exceeded MPCs for copper and iron.

In September the seawater quality in the Discharge No. 1 control area met the regulatory requirements for water quality for fishery water bodies (Order No. 20 of Rosrybolovstvo of January 18, 2010).

#### **Area of the Sea of Okhotsk in the discharge for wastewater containing drilling process water, Berkut platform, Discharge № 2.**

Sampling of seawater was performed to monitor wastewater discharge, containing process water for drilling intervals 1 and 2 of the initial well on the quality of seawater in the control range and at a distance of 5,000 meters northeast of the platform.

Sampling was performed in late September and early October 2014.

Monitored variables: suspended solids, bentonite, barium sulfate (as barium), sodium hydroxide (as sodium), sodium carbonate (as sodium), calcium carbonate (as calcium).

The quality of the sea water in the Discharge No. 2 control range for wastewater containing drilling process water did not exceed the established water quality standards for water bodies or the background levels for seawater at a distance of 5 km northeast of the discharge point.

#### Monitoring of water protection zones (WPZ)

##### **Chikhachev Bay. DeKastri OET area**

Visual monitoring in the area of DeKastri OET was conducted in the Chikhachev Bay WPZ. Monitoring showed no changes in the size of the areas covered with grass, shrubs, trees, and trees & shrubs vegetation as compared to the previous monitoring results.

##### ***Piltun Bay Area of Temporary Offloading Facilities (TOF)***

Monitoring was performed within the land allocation boundaries in the water protection zone adjacent to the water use location. No visible erosion processes were detected during observations. Most of the WPZ area is grassed area. During the observation period, the areas of land occupied by vegetation decreased due to the construction work at the facility.

#### Monitoring of marine biota and bottom sediments

##### **Piltun Bay**

Monitoring of marine biota was performed to determine the qualitative and quantitative composition of benthos and macrophytes along the pipeline route across the Piltun Bay and implemented in 52 locations along the Odoptu-2 (North) WS – Chayvo OPF pipeline through the Piltun bay. Piltun.

##### Zoobenthos.

In general, there were no significant changes in the qualitative or quantitative composition of zoobenthos from 2008 to 2014.

##### Macrophytobenthos

Compared to 2008-2010 and 2013, the species composition of macrophytes in Piltun Bay did not change.

##### ***Construction area for the Temporary Offloading Facilities for the Sakhalin 1 Project. Odoptu Onshore Facilities. Odoptu 2 (North) Wellsite Expansion. Temporary Offloading Facilities***

Monitoring was conducted during the most intense work for placement of sandy soils.

Analysis of the aquatic biota in September 2014 in Piltun Bay showed that fish eggs and larvae were absent in the catches.

##### *Sea of Okhotsk in the Berkut stationary platform area.*

Monitoring was performed to determine the effect of discharged wastewater containing drilling process water on the qualitative and quantitative composition of marine biota.

##### Ichthyoplankton

The total species composition of ichthyoplankton near the Berkut platform and 5,000 meters northeast of the platform was limited to four species of three families - *Gadidae*, *Pleuronectidae*, and *Hezagrammidae*.

at the control station 5 km northeast of the Berkut platform, ichthyoplankton was absent in vertical layer-by-layer catches (above and below the thermocline). In the surface layer, both close to the platform and 5 km away, the catches were successful.

### Phytoplankton

The structure of the phytoplankton community near the Berkut platform in September 2014 was made up of 71 species and an intra-species taxon from five divisions; in October 2014 (during the discharge of effluents from the second interval) it was made up of 82 species and an intra-species taxon from five divisions. In regard to the number of species, the leading position was occupied by dinoflagellate and diatomic species (94% of the total number of species). The development of phytoplankton was weak, as reflected in the quantitative characteristics. The average abundance of phytoplankton in September amounted to 10,249 cells/L, and the average biomass was 22.579 mg/m<sup>3</sup>. The average abundance of phytoplankton in October was 11,533 cells/L, and the average biomass was 104.616 mg/m<sup>3</sup>.

### Zooplankton

According to research in late September and October 2014 in the Berkut platform area, 41 species of planktonic organisms belonging to 15 faunal groups were discovered and identified. Most groups are true plankton (53%) represented by mass species of northeastern Sakhalin coastal waters. Six other groups (40%) are temporary or optional plankton and are represented by pelagic larvae of benthic animals.

The first survey, conducted in late September, was characterized by a larger set of different species and significantly higher quantitative indicators. In October, in spite of the short time between surveys, quantitative indicators were significantly lower with a similar species composition.

*Sea of Okhotsk in the Orlan platform area and along the Orlan – Chayvo WS pipeline.*

## **Orlan Offshore Platform**

### Ichthyoplankton

During the surveys, ichthyoplankton in the survey area was represented by eggs and larvae of boreal ichthyofauna from five species of two families - *Pleuronectidae* and *Liparidae* - typical of the shelf waters of northeastern Sakhalin. Near the Orlan platform the average abundance of ichthyoplankton reached 2.64 specimens/m<sup>3</sup>, and average biomass was 1.23 mg/m<sup>3</sup>, which is slightly higher than in the previous study periods. In the control area the abundance was 0.77 specimens/m<sup>3</sup>, and biomass was 0.82 mg/m<sup>3</sup>.

High ichthyoplankton quantitative indicators near the Orlan platform indicate favorable conditions for spawning and development of the early stages of fish, mainly yellowfin sole, in August 2014. The effectiveness of yellowfin sole spawning at both sites was confirmed by the high abundance of larvae of this species: 0.73 specimens/m<sup>3</sup> near the platform and 0.34 specimens/m<sup>3</sup> in the control area.

### Phytoplankton

The structure of the phytoplankton community in the Orlan platform area in August 2014 was made up of 91 species and an intra-species taxon of five divisions. In regard to the number of species, the leading position was occupied by dinoflagellates and diatoms (92% of the total number of species). The average abundance in the study area was 79.68K cells per liter, while average biomass was 432.97 mg/m<sup>3</sup>.

### Zooplankton

In 2014 the zooplankton survey identified 29 species of marine, brackish water planktonic invertebrate fauna of the 14 faunal groups in the Orlan platform area, and zooplankton was characterized by the dominance of epipelagic and neritic species.

Apart from zooplankton, the samples contained optional or larval plankton, including pelagic larvae from 6 groups of benthic animals - bivalves and gastropods, decapods and barnacles, polychaetes and echinoderms.

Quantitative indicators were at a high level. The average overall biomass of zooplankton for the work area was 1193.65 mg/m<sup>3</sup>, and the average abundance was 72,009 specimens/m<sup>3</sup>. Structural differences in the state of zooplankton near the drilling and monitoring stations were found. All indicators are in the range of mean multi-year values.

### Benthos

A benthos survey within a two hundred meter radius of the Berkut platform found 30 species of benthic aquatic organisms. The basis of the species composition was formed by two groups of invertebrates: crustaceans and polychaetes. Significant species in the benthic structure are the flat sea urchin *Echinarachnius parma* and bivalves *Megangulus luteus*, *Siliqua alta* and *Spisula voyi* (which collectively account for 92.9% of the total biomass). Quantitative characteristics of zoobenthos were 578 ± 55 specimens/m<sup>2</sup> and 208 ± 27 g/m<sup>2</sup>.

An analysis of past research has shown that the characteristics of planktonic and benthic communities have not undergone any significant changes.

### Bottom sediments

The bottom sediments in the Orlan platform area are fine sand. The sediment samples are dominated mainly by medium and fine sand. No significant differences of soil in the study area compared with previous observations were noted. The content of petroleum hydrocarbons in sediment samples was at the level of the minimum detectable concentration in the area of expected impact and at the control points and were below the limits of background concentrations, as in previous years, .

In terms of biological contamination, the soil samples around the Orlan platform can be classified as clean.

## **Orlan – Chayvo WS offshore pipeline**

### Benthos

The survey found 78 species of benthic aquatic organisms. The basis of the species composition from year to year is formed by three groups of invertebrates: crustaceans (31 species, 22 of – which are amphipods), bivalve molluscs (16 species), and polychaetes (22 species). The basis of the benthos population density in 2014 was formed by crustaceans (78.6%). The main contribution to total benthos biomass, as in 2009-2011, came from several groups: sea urchins, bivalves, and sea squirts. The overall quantitative characteristics of macrozoobenthos were 680 ± 85 specimens/m<sup>2</sup> and 182 ± 21 g/m<sup>2</sup>.

### Bottom sediments

The sediments in the area of the Orlan – Chayvo WS offshore pipeline were represented by clean, well-sorted sands of variable grain size, with dominance of medium sands.

The results of 2014 studies revealed no impact to sediments with oil products. Metal concentrations (total content and acid-soluble forms) were low. The average values were within the natural background range.

In terms of biological impact, all the soil samples can be classified as clean.

### **Monitoring of plant communities**

#### **Odoptu-2 (North) WS**

Permanent test sites located near the Odoptu MWS which were initiated during the preconstruction monitoring and newly created in 2014 ensure full control over the status of all major types of vegetation (thickets of dwarf cedar, wetlands, coastal grasslands and shrub-lichen phytocenoses) for which monitoring is required.

The results showed that during the period from 2011 to 2014, there were no cardinal changes in the condition of vegetation in the area of the Odoptu NWS.

### **Soil surface monitoring**

In terms of their chemical, microbiological, and parasitological indicators, the analyzed soil samples meet regulatory requirements at all company sites.

### **Geo-dynamic (seismic and geo-deformation) monitoring**

In 2014, field surveys continued and geodeformation monitoring measurements were conducted at locations where the pipeline crosses the Central Sakhalin and Garomay faults. As a result of the joint processing of 2006-2014 measurements and analysis of deformation of the earth's surface, it was found that largely unidirectional tectonic movements can be traced in the areas of the Central Sakhalin and Garomay faults. Small alternating movements with amplitude up to 5 mm and a period of 8-10 years are manifested in both survey grids only in individual components of the horizontal displacements. At this stage, the results of measurements are interpreted in the form of strain rates of fault zones for the entire 2006-2014 observation period.

In both geodeformation monitoring grids, the rate of the vertical deformation of the earth's surface is substantially greater than the horizontal rates. In the area of the Central Sakhalin fault, no significant horizontal displacements of the fault sides were detected in 2006-2014. In the area of the Garomay fault, a dextral lateral displacement is observed at a rate of 2.1 mm/year.

Potential ground movements at the places where the pipeline crosses the Garomay and Central Sakhalin Faults as a result of local and remote earthquakes are negligible and have had no effect on the slip rates of local grid stations.

#### ***Physical impact factor monitoring:***

Studies of physical impact factors revealed that on the whole working conditions are optimal or acceptable, can be considered safe, and do not exceed established workplace health standards.

## **Environmental Protection and Monitoring Programs**

### **Western Gray Whale Population**

In 2014, ENL, with the assistance of experts from the Institute of Marine Biology (IMB) of the Far-Eastern Branch of the Russian Academy of Sciences, the Pacific Oceanology Institute of the Far-Eastern Branch of the Russian Academy of Sciences and with the participation of the Sakhalin State University, continued environmental studies of the gray whale feeding group distribution and condition as well as its habitat off the coast of north-east Sakhalin.

The studies were conducted during summer and fall periods pursuant to the programs approved by the relevant authorities of the Russian Federation. Office processing and analysis of the extensive field data collected in 2014 was completed. The final reports were submitted to the MNRE, RPN, and FFA in the second quarter of 2015.

Preliminary findings demonstrate a stable condition of both the Sakhalin gray whale feeding group and the food benthos. The Photo-ID Catalog includes 243 whales (according to the 2014 data) and has been permanently added to.

ENL Marine Mammal Protection Plan was updated and successfully implemented during the summer-fall offshore and coastal activities. Not a single incident involving marine mammals was recorded in 2014.

### **Pinniped (Seal) Studies in the Piltun Bay**

In 2014, pinniped studies were conducted in the Piltun Bay by ENL with the assistance of experts from the Pacific Oceanology Institute of the Far-Eastern Branch of the Russian Academy of Sciences. The objective of the studies was to assess the seal abundance and species diversity in this area as well as to study their spatiotemporal dynamics.

The findings of the studies were as follows:

- The seal haul-out in the Piltun Bay is found to be non-reproductive and multi-species. It is simultaneously used by three types of seal: ringed seal, bearded seal, and spotted seal (large seal), with spotted seal dominating in numbers;
- The haul-out has a complicated chorologic structure. It includes five areas, some of which are used periodically;
- Diurnal dynamics of the seal number at the haul-out located in the Piltun Bay mouth is governed by trophic factors and is directly dependent on the sea level cycles. The onshore seal number reaches its maximum during low tide when the land area in the estuary part of the bay increases. The lowest numbers are typical for high tide periods.
- In 2014, emergence of seals in the haul-out was first recorded in mid-June, and their overall number was low until early August. The seal abundance changed in a wide range during the summer-fall period reaching its highest in the second half of September.

### **Steller's sea eagle**

The general situation in the spring of 2014 was favorable for sea eagle nesting. The vast majority of sites in the monitoring area were occupied, and some were active, i.e., the birds had already begun incubating eggs.

At the same time, the 2014 summer season was poor for sea eagle food resources. In June, July, and early August, in the bays and rivers of the northeast coast, pink salmon runs were weak, which could not help but affect the future productivity of the birds. The vast majority of the "active" nests had only one chick.

The status of nest stock has not changed significantly over the past five years, and the fluctuations were random and non-directional in nature. From 38 to 49% of nests are in good condition, and another 20-32% are satisfactory. The state of the nest stock to date is rated as good.

The analysis of predation traces for the 2006-2014 period shows that the impact of bears on the eagle population is waning. While 34% of the trees had bear visitation marks in 2005, by 2009-2010 the percentage of such trees had gradually decreased to 20%, and the figure in 2014 was 13%. At the same time, the risk of destruction of active nests remains at the same level of 21-23%.

## **Monitoring bird populations on the Rare and Endangered Lists of the Russian Federation and Sakhalin Oblast**

### *Odoptu NWS – Chayvo OPF onshore pipeline route from 1 km to 7 km*

The nesting period of 2014 within monitoring site No. 1 continued to be inhabited by species listed in the Red Book of the Russian Federation and the Red Book of Sakhalin Oblast. In June 2014, 10 rare species of birds were noted in this area: Kamchatka Tern (*Sterna camtchatica*), Sakhalin dunlin (*Calidris alpina actites*), Red-necked Phalarope (*Phalaropus lobatus*), long-toed stint (*Calidris subminuta*), black-tailed godwit (*Limosa limosa*), Ruff (*Philomachus pugnax*), black ducks (*Anas poecilorhyncha*), White-tailed Eagle (*Haliaeetus albicilla*), Steller's Sea Eagle (*Haliaeetus pelagicus*), Eurasian hobby (*Falco subbuteo*). The first 7 species nest in the study area.

These species' nesting and feeding grounds were not disturbed significantly during pipeline construction, which is why the spatial configuration of their colonies was preserved in the operation phase and they continued to nest in the same places where they nested before construction began. In 2014 the abundance of the most numerous species nesting within the monitoring area (dunlin of Sakhalin subspecies, Aleutian tern) was higher than in previous years of observation. The abundance of the black-tailed godwit and the red-necked phalarope during this season was at the level of the preconstruction period. Ruff nesting at the monitoring site was first noted in 2014.

In 2014 the dunlins nesting at the marine sand bar on 1-7 km area close to the pipeline totaled 225 pairs and 134 pairs of dunlins nested directly in the monitored area.

In 2014 the Aleutian terns nesting at the marine sand bar on 1-7 km area close to the pipeline totaled 250 pairs and 167 pairs of dunlins nested directly in the monitored area.

The number of godwits nesting within the monitoring area is 4-5 pairs.

The number of red-necked phalaropes nesting within the monitored area is about 10 pairs.

About 4-5 pairs of long-toed stints nested on the sea spit at the monitoring site, and there was one pair on Bolshoy Wrangel island.

The rare species that use the monitoring sections as feeding grounds (Steller's sea eagle, white-tailed eagle, Eurasian hobby, etc.) also did not change their hunting grounds. The major nesting areas of the colonial birds remained in place in the investigated area. The abundance of colonies of river and Aleutian terns, both within

the monitoring site and in the control area at the Wrangel Island natural monument, increased in 2014 compared to 2013 and practically recovered to optimal levels.

*Construction area for the Temporary Offloading Facilities (TOF) in Piltun Bay and the coastal area of the Sea of Okhotsk*

The monitoring of avifauna obtained baseline data on the abundance and distribution of ducks on the bay waters of the TOF area as the main group which may be disturbed during the formation of migration clusters. The importance of the coastal zone in the Piltun Bay pilotage area for migratory birds was assessed. Data were obtained on the abundance and distribution of shorebirds and gulls along the coastline. The significance of various parts of the coast and the adjacent sea area for migratory birds was assessed, and baseline data were obtained on their abundance and distribution in the area from the Odoptu NWS to the neck of the bay.

The results indicate that the TOF construction site is located in the biotope typical of the sea spit. The range of the disturbance impact during construction for shorebirds and gulls does not exceed a few tens of meters, 200-400 meters for diving ducks, 400-700m for dabbling duck clusters up to 1000 birds, and 1.2 km for dabbling ducks clusters of more than 1000 birds. No impact on species listed in the Red Book was detected. The nearest habitat of rare species is the spit area along the road between the TOF and the Odoptu NWS. The distance from the nearest nesting sites to the road is 200-300 meters. The nearest large colony of Aleutian terns is 2.5 km away. The direction of movement of swans in the construction area has not changed, and the swans retain traditional movement routes and locations of migration clusters. The largest Bewick's swan clusters are 4 km north of the TOF. Ship traffic may impact the dabbling clusters totaling up to 10,000 birds located 1 km from the shipping route. As observations of the dynamics of cluster formation in the area indicate, the potential impact will be a short-term and reversible impact. These clusters will be the primary target during in-process monitoring.

### **Fish Damage Compensation**

In 2014 ENL resumed the process of compensation for harm to aquatic biological resources caused by the Sakhalin 1 Project.

#### ***Sakhalin Oblast***

In 2014 ENL implemented compensatory measures for the artificial reproduction of Pacific salmon to compensate for damage to aquatic biological resources in Sakhalin Oblast for the following projects:

- ◆ Sakhalin 1 Project. Orlan – Chayvo WS offshore flowline 16.5 million juvenile chum salmon worth 24,842,376 (twenty-four million eight hundred forty-two thousand three hundred seventy-six) rubles and 19 kopecks;
- ◆ Sakhalin 1 Project. Odoptu NWS – Chayvo OPF flowline (second phase of repair work). 2,189,237 juvenile chum salmon worth 10,830,989 (ten million eight hundred thirty thousand nine hundred eighty-nine) rubles;
- ◆ Sakhalin 1 Project. “Arkutun-Dagi Field. Onshore and Offshore Facilities. Construction of Offshore Pipelines in the Area from Tie-in to Onshore Flowlines to the Berkut Offshore Platform.” 54,491,430 juvenile chum salmon worth



165,222,262 (one hundred sixty-five million two hundred twenty-two thousand two hundred sixty-two) rubles.

Hence during the reporting period, as part of Sakhalin 1 compensation in Sakhalin Oblast, ENL released 73,180,667 (seventy-three million one hundred eighty thousand six hundred sixty-seven) juvenile chum salmon with a total value of 200,895 627.19 (two hundred million eight hundred ninety-five thousand six hundred twenty-seven rubles) and 19 kopecks from the Ado-Tymovsk, Pobedinsky and Buyuklovsky salmon hatcheries.

### ***KHABAROVSK KRAI***

During the reporting period ENL developed and approved compensation measures for harm (damages) to aquatic biological resources and their habitats during repair work on the offshore section of the export pipeline in Chikhachev Bay, Sea of Japan in October 2013.

In order to implement the aforesaid activities, ENL signed contracts with the Amur Territorial Administration of the Federal Agency for Fisheries and FGBI Amurrybvod to provide services for the cultivation and release of juvenile chum salmon to compensate for damage to aquatic biological resources and their habitats as a result of commercial activity.

These activities include the release of 56340 of chum salmon fry with the total cost of 35.673.365,74 RUR.