For compliance with the requirements of the international and RF legislation, Sakhalin Energy performs environmental activities. Operating expenses for the environmental activities performed in 2014 amounted to RUB 4,440,886 thousand. The company's activities are regularly overseen by the federal and regional authorities, and in 2014, no significant violations of the environmental legislation resulting in a negative impact on the environment were identified.

In conclusion, the main trends in ensuring environmental safety by Sakhalin Energy comprise the control over air emissions, water use and discharge, as well as waste management. The standards develop by the company can be used as guidelines by other oil and gas enterprises operating on the territory of the RF.

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ENVIRONMENTAL ISSUES IN MARINE OIL PIPELINE ENGINEERING

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The main focus of the current study is a thorough analysis of ecological issues related to oil marine transportation. Precisely, it examines the ecological risks that can easily occur during oil transportation.

Most oil fields are located far from the place of refining, i.e. refineries, and loading terminals or stations. Due to its fast and economic delivery, «black gold» is essential for the prosperity of the petroleum industry.

It is a commonly agreed fact that pipeline is the cheapest and the most environmentally safety way of oil transportation. It can be stated that transportation of oil through pipelines is a continuous and rather reliable process [1]. Oil moves inside at 3 m/s under due to pressure gradient maintained by pumps located in pump stations throughout the pipeline system. It is possible to lay pipeline on the seabed. It is obvious that it is rather complicated task in terms of technical support and financial costs. Underwater pipelines are usually used for oil transportation within a single oil complex. As oil pipelines are long-term projects, expensive to construct, and have fixed routes to follow, there is an alternative – transportation with vessels or tankers. Therefore, today offshore oil can be transported not only by marine pipelines, but also by various vessels or tankers. It is necessary to examine both ways of oil transportation and estimate the relevant environmental risks.

Transporting petroleum fluids with tankers has a long history. Peter I approved the first instruction on the transportation of Russian oil by ships or tankers on the Caspian Sea and Volga River in 1725.

In course of time due to increased demand for oil and oil products, exploration and production of oil in the offshore regions intensified, which, in its turn, inevitably led to the rise in the number of accidents and emergency situations. Today, it is possible to state that transporting oil with vessels or tankers poses potential risks to the environment, public health and safety.

Offshore oil is transported by tankers - vessels of enormous size, which transport petroleum within special tanks (compartments). Oil and oil products are loaded to the tankers in specially-equipped loading stations located on the coast. The loading process is facilitated by ship pumps and pipelines of small diameters installed in tanks and along the deck.

The main risk related to this type of transportation is the possibility to damage the facilities, which can results in oil spill [3]. The most vivid example is the accident with vessel «Prestige», i.e. a single-hull tanker registered under Bahamian flag. The accident led to the largest environment disaster on the European coast. The ship capsized during violent storm in its way through the Bay of Biscay on 13th of November, 2002. In result, 35-length crack was formed on its hull. After that, there was a leak about 1000 tons of oil per day. Spanish coastal authorities denied towing the vessel into the nearest port from the accident site. The attempt was made to tow the vessel to the nearest Portuguese ports; however, Portugal banned the entry of a “disaster” tanker in its waters. Disaster vessel was towed to the sea.

On November 19, 2002 the vessel split into two parts and sank at 210 km from Galicia coasts. It remained laid at the depth about 3700 meters. In result, more than 20 million gallons of oil it were spilled into the sea. Oil stain stretched at thousand kilometers near the coast line doing terrible damage to marine animals and coast fauna, as well as to the local fishing industry.

This oil spill was the most large-scale environmental disaster during all Spanish and Western Europe history. In response to this accident, on December 20, 2002 European Commission banned the transportation of heavy oil by single-hull tankers. A project to bring into service double-hull tankers was offered. This project is currently being actively implemented.

Besides, a number of preventive measures were proposed: vessels must move at a safe distance from each other and from coastline providing special transport corridors for oil tankers; construction of special ports – shelters which must be available for safety evacuation of average tankers; provision of fast exchange of information between vessels’ captains and shore services.

In Russia, this problem is very urgent too; however, the main reason for numerous tanker accidents is old equipment. Many vessels which are used for transportation of oil products down the river Volga have been operated for more than 20 years. Besides, large concentration of carriers at certain routes could contribute to a chain reaction at alert condition. Crude oil transportation from the Caspian Sea to other places is less risky endeavor. Most vessels are 10-20 years old. However, the level they are maintained is much lower than that of international ones.

Great Russian scientist D.I. Mendeleev proposed an idea of using pipeline for oil and oil products. He introduced the main principles of pipeline construction and provided the arguments in favor of this type of oil transport.

Pipeline intended for transportation of liquid hydrocarbons by sea is referred to pipeline engineering; precisely, it is referred to main pipeline which is laid at the sea bottom.

This type of pipeline is very prone to mechanical damage which can happen for many reasons. It can be mechanical damage caused by ship anchors and trawl-fishing vessels. Besides, waves and currents can cause the erosion of soil under pipeline, which, in its turn, results in distortion or sag of pipe sections, pipeline vibrations and endurance failure, corrosion damage. To prevent such damage, offshore pipelines are usually submerged into the ground. The burial depth depends on the specific geological conditions of the construction area.

To protect offshore pipelines from damage in the coastal zone or approach area, technology of rock placement, also termed as rock dumping, is most commonly used. Stone dumping is carried out from barges with fall pipes and vibrators. The ships are often used with rigid deck where the bulldozer resets stones. The accuracy of such dumping is rather low.

Another technology is so-called pipe-in-pipe solution [2] which is used for arresting the propagation of a buckle. In addition, such a solution ensures that the temperature of the oil remains as constant as possible.

In conclusion, it can be stated that despite all the safety precautions, new engineering solutions and environmental standards and regulations, accidents still happen. Therefore, the question of the environmental problems related to marine oil transport remains open.

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THE PROCESS OF SUFFUSION ON TOMSK ROADS

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It is a common place to come across with unexpected potholes on the roads of Tomsk, even on the central streets such as Lenin Street and Frunze Street. There are some cases when cars and trucks may even fall down into these holes. These days such events are not extraordinary for local people. People are used to blaming road workers and the authorities claiming that they do not follow the rules and regulations of road building. They also criticize the local councils for doing nothing to keep under control the conditions of city roads. However, it should be stated that potholes on the roads are not always caused by negligence. Sometimes, it is suffusion that becomes the main reason. The suffusion is a widespread exogenous geological phenomenon. Therefore, the formation of suffusion potholes presents an urgent problem not only for people living in Tomsk but also in other regions of the Russian Federation. That’s why, it is necessary to