

Research Article**Analysis of Environmental Impact Assessment
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ABSTRACT

The article highlights the problems of the negative impact of oil and gas facilities (OGFs) on the environment. Therefore, strategic developments on land use greening on the basis of production monitoring that are aimed at reducing adverse industrial effects become particularly important. This can also be achieved by assessing the effects of human impact and making the necessary technological and managerial decisions to minimize or eliminate them. The article presents the results of the environmental impact assessment analysis, zoning is conducted by the degree of impact and criteria for the degree of impact are defined. The results of the environmental impact assessment analysis made it possible to assess the degree of anthropogenic impact of the study object and to develop recommendations for reducing adverse industrial effects in order to protect the environment.

Keywords: Environmental impact assessment, Technological impact, Oil and gas facilities, Production monitoring, Land degradation.

INTRODUCTION

With the growth of energy consumption, the extraction of hydrocarbons and the number of developed fields increase, which leads to an increased anthropogenic impact on the environment. The development, construction, and exploitation of deposits cause changes in the natural landscape, accompanied by pollution of the adjacent territories, degradation of the soil cover, disturbance of the water regime, and destruction of vegetation [1]. The anthropogenic impact on the environment leads to severe environmental effects at the ecosystem, biosphere and population-species levels. Due to the presence of huge hydrocarbon reserves, harsh climatic conditions, and, as a result, slow natural recovery processes, the Northern territories of the Russian Federation were more susceptible to the man-made impact from oil and gas facilities [2].

Scientific research by Solodovnikova, Pikovsky, Buks [1,3,4] and practice have shown that one of the tools for preventing and minimizing damage from oil and gas facilities is the environmental impact assessment (EIA) procedure, as a process aimed at the timely identification of potential problems for further assessment of economic feasibility and the degree of environmental impact.

EIA, as an activity for identifying, analyzing and accounting for direct and indirect effects of the environmental impact, is enshrined in the Federal Law "On Environmental Protection"[5]. The environmental consequences of irrational use are easier to prevent than to eliminate [6]. Therefore, EIA aimed at ensuring environmentally sound decisions to minimize adverse technology-related effects of oil and gas facilities is becoming more significant for

making decisions on ensuring environmental safety.

MATERIALS AND METHODS

The study object is the "Methanol storage tank with a filling station" at the Yurkharovskoye deposit located in the Nadym District of the Yamalo-Nenets Autonomous District (YNAO).

In this research, the results of ecological and geological surveys in the territory of the study object were used as study materials. Abstract-logical, forecasting, cartographic, computational-constructive, analytical, statistical research methods, the method of analysis and synthesis were used.

In terms of methodology, EIA is carried out in three stages.

The first (preliminary) stage is meant for collecting, compiling and analyzing information on the environmental conditions of the study object, on a preliminary forecast of the impact of the proposed anthropogenic activity on the

natural environment according to the available literature and archive materials.

The second (assessment) stage is meant to clarify the materials of the preliminary assessment and to form the materials on EIA of the objects to be placed in the environment.

The third (final) stage is meant to prepare the final version of the materials on EIA, taking into account the compliance with comments to the preliminary version of the materials.

RESULTS

As a result of the study object environment condition literature and archive materials analysis and the preliminary EIA materials clarification, the main types of anthropogenic impacts on the study object within the boundaries of the sanitary protection zone were identified: 1) impact on the soil cover; 2) impact on water bodies; 3) impact on atmospheric air.

Zones areas and radii according to the degree of impact on the study object are presented in Table 1.

Table 1: Zones areas according to the degree of impact of the study object

Impact zone	Degree of impact	Radius of the impact area, [m]	Zone area	
			[ha]	[%]
I zone of low impact	Weak	200-500	19.8	52
II zone of average impact	Average	100-200	13.7	36
III zone of high impact	Strong	0-100	4.5	12

The zones of the study object environmental impact are presented in Fig. 1.

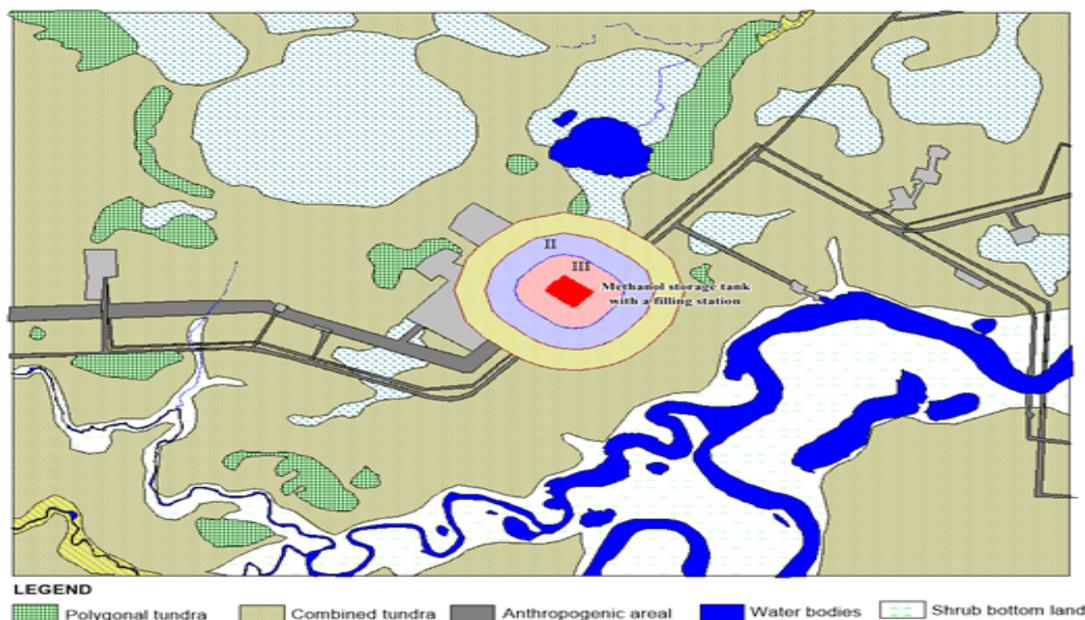


Fig. 1 Areas of the study object environmental impact.

Table 1: The study object environmental impact criteria

Degree of impact	Impact description
Weak	- impact on the soil cover: mechanical damage of soil, the chemical impact is not detected or is below the MPC standards; - impact on water bodies: no derangement of surface or underground runoff; - impact on atmospheric air: insignificant, below the MPC standards
Average	- impact on the soil cover: mechanical damage or destruction of soil, chemical impact within the limits of the MPC; - impact on water bodies: flooding of the territory is indicated; - impact on atmospheric air: within the limits of maximum permissible concentration
Strong	- impact on the soil cover: derangement of the properties and structural damage of soil cover (including moss cover), reduction of snow cover thickness, chemical impact – exceeds the MPC standards; - impact on water bodies: changes in the chemical composition of surface and subsoil water; - impact on atmospheric air: the thawing effect of wells, changes in snow accumulation conditions, exceeds the MPC standards

At the final third stage, materials are prepared and an EIA report is generated.

As a result of the *soil cover impact assessment* analysis, it was established that the concentration of oil products is 8.0-8.7 mg/kg, which is significantly lower than the background value (100 mg/kg). Exceeding of the MPC standard by 1.6 times in copper and by 1.5-2.6 times in chromium is indicated. The rest of the monitored indicators do not exceed the MPC standards and their quantity is at the level of background concentrations (<100 mg/kg) [3]. Soil contamination with oil products showed an acceptable level of <1000 mg/kg when compared with the standards).

Analysis of the *surface water impact assessment* showed that the concentration of most pollutants in the Yurkharovo River that flows to the east of the study object does not exceed the MPC standards, with the exception of zinc exceeding them by 2.8 times, copper – by 1.6 times and manganese – by 2.4 times. The increased content of these substances in surface waters is typical for the region. The content of petroleum products is below the existing MPC.

As a result of atmospheric air impact assessment analysis, it was found that the assessment of air pollution was carried out on the basis of data provided by the "Yamal-Nenets Center for Hydrometeorology and Environmental Monitoring" Federal Service for Hydrometeorology and Environmental Monitoring. The degree of air pollution is determined by the degree the results of the harmful components content measurements

exceed the MPC while taking the hazard class into account. Submitted materials indicate the absence of air pollution within the study area.

DISCUSSION AND CONCLUSIONS

Using the evaluation criteria and the results of zoning, one can conclude that the study object has a medium degree of impact on the environment. In order to reduce adverse man-caused impacts on the environment of oil and gas facilities during the operations of the "Methanol storage tank with a filling station" facility, it is necessary to conduct production environmental monitoring, which includes monitoring the state of environmental components in the immediate vicinity of infrastructure facilities and allows tracking environmental changes under influence of anthropogenic factors both before the start of construction and then annually during operations. The performed environmental impact assessment analysis will allow determining the extent of negative processes associated with the extraction of hydrocarbon raw materials impact in a timely manner as well as outlining measures for its reduction.

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