Development of Proposals for Solid Municipal Waste Landfill Placing by Example of Regions of the Far North

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Abstract. The sustainable development of each region, the quality of its environment depends to a great extent on the provision of environmental safety, especially in the field of waste management. The growth of industrial production in the Tyumen region and the improvement of the population social base contributes to a significant increase in production and consumption waste. The article is devoted to the problem of the emergence, recycling and utilization of an increasing amount of solid municipal waste every year. The author considers the unresolved issues of the location, processing and disposal of waste in the Nefteyugansk District, the Khanty-Mansi Autonomous Okrug - Yugra, leading to increase in their volumes, the size of the territory they occupy, increase in the number of unauthorized landfills, intensive pollution of soils, surface and groundwaters and atmospheric air. Proposals for the placement of a comprehensive inter-municipal TKO testing ground have been developed. The most favorable territory for the location of the TKO enterprise was determined.

1. Introduction

Today, the problem of solid waste is not fully solved in any country in the world, their disposal remains on the agenda of the 21st century. As V. Vernadsky said, no species can survive in the wastes generated by it. Waste must be included in the natural cycle, removed and used. In the modern world, the problems of waste, or, as is more often said, garbage, become so global and relevant that solutions to their problems are discussed not only in individual countries, but also in international environmental forums. Practically for all cities of the Russian Federation, one of the global tasks in the field of environmental protection is to solve problems with the generation, processing and utilization of solid municipal waste (TWC). The main method of neutralization is the disposal of landfills and dumps. Wastes from improper handling not only affect the deterioration of the environment, causing pollution of the soil, water, air basin, but also affect the condition and health of people. According to experts, the economic effect in the Russian Federation from a separate collection of garbage will be about 300 billion rubles a year. For one person per year there are approximately 400 kg of TKO, which gives a total volume of 60 million tons per year. In monetary terms, the effect of a separate collection of TCR by experts is estimated at about 12,000 rubles per ton of TCO [1-5].

One of the main tasks at the meeting of the State Council, speaking of the solution of environmental problems, Vladimir Vladimirovich Putin called the decontamination of production and consumption waste, calling for the all-Russian cleaning and dumping of landfills in the outskirts of
cities. "They are already over 30 billion tons. Garbage is thrown out where and how it is necessary, almost 48 thousand hectares of land are occupied by such dumps ", - the president was indignant [6].

On January 5, 2016, the President of the Russian Federation signed the Decree on holding the Year of Ecology in 2017. Putin VV, speaking about environmental problems, remembered the words of the great Russian scientist, thinker and public figure Vladimir Ivanovich Vernadsky. "There will come a time when people will have to take responsibility for the development of both nature and man, and such time has certainly come. Mankind continues to experience nature for strength, although it has long accumulated a large number of environmental debts," the President stressed [7,8].

Since the beginning of the year, Ugra, like all regions of the Russian Federation, has actively joined the Year of Ecology. First of all, the Government of Ugra in order to ensure environmental safety and attract public attention on the issue of ecology approved the decree dated 03.06.2016 No. 277-rp "On the plan of the main activities for the year of ecology in 2017 in KhMAO - Ugra" [9].

In the above-mentioned plan, one of the most important is the event aimed at the design of complex intermunicipal landfills. Responsible executors of the event recognized the construction department of Khanty-Mansiysk Autonomous Okrug - Ugra and the Department of Natural Resources and Non-Commodity Economy Sector of Khanty-Mansiysk Autonomous District - Ugra.

This event is not accidental, because the sustainable development of Khanty-Mansiysk Autonomous Okrug - Ugra, the state of its natural environment largely depends on ensuring environmental safety, especially in the area of waste management of production and consumption.

The purpose of the study is to develop proposals for the placement of the TKO polygon in the Nefteyugansk district, KhMAO - Yugra.

The total volume of generated TCR of the study area is about 300 thousand tons per year. The percentage of separate waste collection in Ugra hardly exceeds 2%, the rest of garbage is sent for burial, whereas in the European Union countries this figure is at least 30-40%. At the same time, the lost profit in the disposal of TCO, which at the moment is the main way to combat waste in the Nefteyugansk district, is about 1.5 billion rubles. According to various estimates, TCO contains 45% to 55% of secondary raw materials, which may be involved in economic circulation. Another 15-25% of solid domestic waste can be disposed of in relatively safe ways [10].

Currently, there are problems in the region with a shortage of facilities for waste disposal. Ugra is provided with TCO landfills only by 53%. However, the problem is complicated by the fact that more than half of them (about 70%) do not meet the sanitary and environmental requirements. In addition, about 20% of TCO polygons are filled with more than 70%, which requires their expansion, or the construction of new ones [11]. These objects include Railways, roads, pipelines, power lines.

2. Objects and Methods
The object of the study is the Nefteyugansk district site, located 3 km 800 m south-west of the rural settlement of Ust-Yugan, proposed for placement of the complex inter-municipal TKO test site.

In the course of the work, the following survey methods were used: cartographic, comparative, analysis of the regulatory framework; The published data of various ministries and departments, data from official websites of municipalities and city okrugs were used. An important source in the course of the work was the legislative base in the sphere of handling waste products of production and consumption. As a cartographic material, schemes of territorial planning of the municipal district, general plans of rural settlements of Nefteyugansk district were applied.

3. Results
According to the regional waste cadastre, about 5 million tons of production and consumption wastes are generated annually in the region. Wastes in Ugra are formed much faster than their processing and disposal [10].

Creation of an integrated inter-municipal TCO testing ground, the principle of which is to create an enterprise aimed at improving the environmental situation through the prevention of landfills, as well
as meeting the needs for quality TCO services in the cities of Nefteyugansk and Pyt-Yakh, as well as settlements in Nefteyugansk District will provide:

- increase in the volume and productivity of processing and sorting;
- improve the quality of secondary raw materials derived from waste;
- slowing down the expansion of land areas intended for the disposal of waste;
- reduction of waste disposal costs and elimination of environmental consequences of waste storage.

The enterprise will be a complex polygon with a capacity of 90,000 tons per year located on a 21.5 hectare land site located in the Nefteyugansk District, 3 km 800 meters south-west of the rural settlement of Ust-Yugan. It will be one of the leading, carrying out its activities to collect, transport, process, dispose and dispose of TKO.

The infrastructure of the landfill will consist of a landfill, a waste sorting station and a garbage processing plant. The subject of the activity will be:

- complex sorting of TCR with extraction of valuable materials;
- processing of secondary resources;
- burial of non-recyclable wastes;
- Participation in the implementation of urban sanitation plans

The main suppliers of TCR will be industrial and municipal waste of a residential area: from residential buildings; from public buildings and institutions; from the enterprises of trade and public catering; street, garden and park estimates; construction garbage; some types of solid industrial wastes of 3-4 hazard classes [12,13].

Before the design of waste disposal facilities, complex preparatory work is carried out, where one of the most important components is determining the best location for the landfill. Having studied the region, taking into account the observance of all conditions and requirements, we proposed the most favorable site (Figure 1). This territory is located 1 km 200 m from the highway of federal importance and 3 km 800 m from the nearest rural settlement of Ust-Yugan. The city of Nefteyugansk is located 43 km 200 m to the northwest from the landfill, Pyt-Yakh is located 38 km 200 m to the south-west of the proposed area of work [14].

![Figure 1. Fragment of the master plan in the boundaries of the MO rural settlement Ust-Yugan.](image)

The structure of the land fund of the selected territory for the placement of the TKO landfill is agricultural land. Having studied these lands with the help of the scheme of territories with special conditions of use of the Nefteyugansk district, it can be seen that they are highly disturbed and are very unlikely to be unfit for agriculture.
In geomorphological terms, the area of the site is confined to the IV terrace above the floodplain. Obi. The relief of the surface is weak and weakly dissected. The average absolute marks of the surface are 55 - 60 m.

Having studied the rose of the winds of the area, we can say that in relation to settlements, the site is located on the leeward side, corresponding to sanitary requirements.

Hydrography in the area of the site is represented by the channel of Ochimkin, which flows into the river Yuganskaya Ob. The distance to the channel is about 1300 m. In order to prevent pollution, clogging, silting of these water bodies, special water protection zones are established according to the "Water Code" of 03.06.2006 No. 73-FZ (revised October 31, 2016). Having carefully studied the hydrographic network, it was revealed that the territory of the site is located outside the boundaries of the water protection zones, the width of the nearest water body to the section of the Ochimkin channel is 50 m [15].

The site is part of the upper marshland of the Ob-Irtysh district, marsh is 36%. The area of works for the placement of landfills is part of the Demyan-Vasyugan subarea, which is characterized by particularly large bog systems. The wetland area for the landfill is about 10-15%. The depth of the upper marsh is 0.5-1 m.

When developing proposals for the location of the landfill, it is necessary to take into account the absence of oil and gas fields on the territory of the facilities. Having investigated the layout of the main deposits and special-purpose facilities, it can be seen that there are no objects of oil and gas deposits on the territory of the site (Figure 2).

Having studied the scheme of territories with special conditions of use of the Nefteyugansk district, one can come to the conclusion that there are no objects of specially protected natural territories on the territory of the site. The nearest reserve "Nefteyugansk" is located 52 km. [16].

TCO landfill, in accordance with the "Town Planning Code of the Russian Federation" No. 190-FZ of 29.12.2004, will be part of the special-purpose zone within which town-planning regulations are established, which specify the types of permitted use of land plots, restrictions in their use, Parameters of permitted construction and the maximum size of land plots [17].

In accordance with urban planning regulations sp.p. Yuganskaya Ob and others. Ust-Yugan, an analysis of the site, which can be considered on the fragments of the public cadastral map (Figure 3).
The considered site is located 3 km 800 m to the south-west from the rural settlement of Ust-Yugan, it is the optimal site for the placement of the TKO landfill. It is not far from the urban districts, having great problems with the disposal of waste. In this area, it is possible to significantly reduce the cost of building a road for access to the landfill, it is possible to connect to an operating air line with a minimum extension of the transmission line.

The proposed territory must necessarily be transferred from agricultural land to industrial, energy, transport, communications, radio broadcasting, television, informatics, land to provide space activities, defense, security and other special purpose land for further licensing of activities for the collection, burial, Neutralization, utilization, transportation and placement of TCR.

According to the "Land Code of the Russian Federation" of January 25, 2001, No 136-FZ, the transfer of agricultural land or land plots in such lands from agricultural land to another category is allowed only in exceptional cases. In this case, the transfer will be associated with the location of industrial facilities on land, the cadastral value of which does not exceed the average level of cadastral value in the municipal district [18,19].

4. Conclusions
Summing up, it can not be concluded that the placement of a complex polygon in the Nefteyugansk district will significantly reduce the area of land. Local governments will be able to solve the problem of placing TKO in the territory of municipalities with minimal economic costs and minimal negative impact on the environment. The construction of this landfill will create new jobs; Will introduce new principles of the labor organization in the process of sorting and processing of TCR; Will increase the social and social importance of the TCO; Will give impetus to the development of small business; Will strengthen market relations in the economy of the region; Will ensure the attractiveness and stability of investments in this area; Will increase the population in relation to the treatment of TCR.

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