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NEGATIVE ASPECTS OF LAND FILLING IN MOSCOW REGION UP-TO-DATE

The article touches upon the issue of the negative impact of solid domestic waste landfills in Moscow region. Municipal solid waste consists of everyday items emitted. The composition of municipal waste does not vary greatly in the region but its amount changes significantly over time. The dynamics of the increase of the norms of waste accumulation per capita of the Russian Federation is investigated. Today, disposal of wastes by land filling or land spreading is the ultimate fate of all solid wastes in Russia. Modern landfills are dangerous to the environment and to public health and safety. A scheme of the geo-ecological impact of landfill gas on the biosphere is compiled. Different types of pollutions in the places of disposal of solid domestic waste, negative effects which lead to loss of the usefulness of all environmental components are considered. The norms of payment and conversion factors for emissions from landfills into the air are given. They are low and do not cover the costs of the damage caused to the environment. It is necessary to find ways to decrease negative effect of landfill gas and to incorporate it into the economic turnover of the country as an alternative to natural gas.

K e y w o r d s: solid domestic waste, landfill, landfill gas, geo-ecological impact, pollution of the environment.

Today's contribution of renewable energy sources to the energy balance of Russia makes, unfortunately, a minor part — about 0,5 %. In the world energy balance, however, the contribution of renewable energy sources reaches 10 %. In the European Union this contribution is supposed to exceed 25 % by 2020 and to reach 40 % by 2030 [1]. As it is known, in the European countries the organic component of domestic waste is an alternative energy material for obtaining heat and energy for the economical purposes. The official figures of Federal Service of State Statistics (Rosstat) show, according to preliminary data of the All-Russia census of 2010, that the total population of Moscow and Moscow region is 11,643,060 and 7,092,900 people, correspondingly.

The total norm of accumulation of solid domestic waste (SDW) for well-developed residential and public buildings has grown since October 2010, at the present time making 300 kg/year. The dynamics of increase of the norms of SDW accumulation from 1988 to 2012 is presented in Table 1[1].

T a b l e 1

Dynamics of increase of the norms of accumulation of SDW per one resident of the city of Moscow

Year	1988	1995	2000	2005	2010	2012
Rate of accumulation kg/person	190	203	221	270	272	300

At the present time, on the territory of Moscow region there are more than 188 buries of SDW. According to the official data, the total amount of accumulated waste in Moscow region is about 20 mln tons (including waste water mud and

[1] Decree of Moscow Government No. 9-PP, 15.01.2008 "On establishment of norms of accumulation of solid domestic waste and bulk waste" (in Russian).

construction waste), which includes about 5 mln tons of SDW and 2 mln tons of farming waste. Over the period of 15 years, a stable trend of increase of the amounts of waste formation has been observed. Under the developed Concept of the Regional Target Programme "Handling Production and Consumption Waste in Moscow Region for 2006—2015", 50,000 containers for garbage disposal in Moscow, 11 new landfills, and 35 waste-sorting stations and units for thermal disinfection of remaining waste with production of combustible gas are to appear in the years to come[2].

Disposal of production and consumption waste by land spreading or land filling remains the predominant way of waste management so far[3]. The load upon the territory of Moscow region with respect to specific indicator of waste amount disposal is one of the greatest in Russia. It results in degradation of the natural complexes, as well as in decrease of the recreational potential of the territories and the quality of the environment of Moscow region.

Examination of the integrated effect of dumps and landfills upon the environment reveals that negative effect affects both human beings and natural components, and even anthropogenic objects. Below is given the full diagram, compiled by the author, of the geoecological effect of emissions of landfill gas upon the biosphere [2].

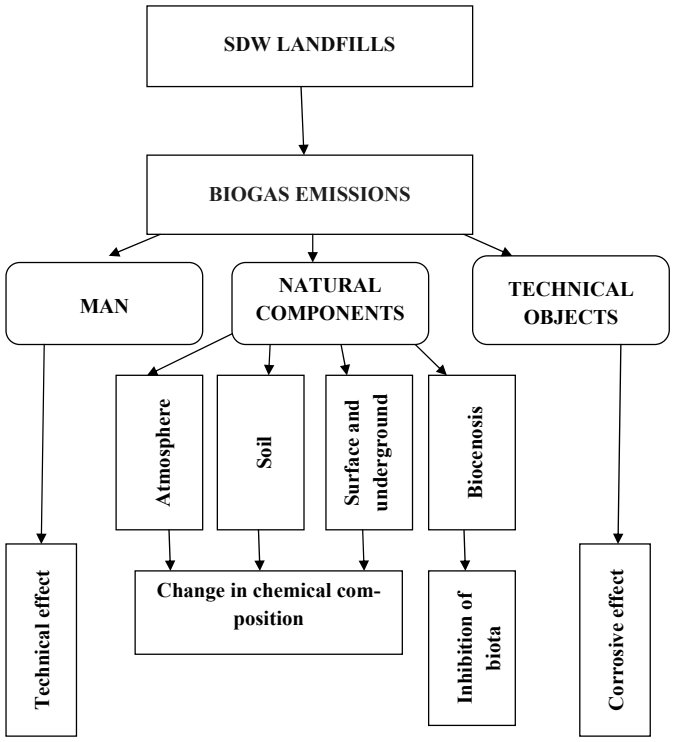

Fig. 1. Full diagram of geoecological effect of emissions of landfill gas upon the biosphere

[2] Project of the Regional Target Programme "Handling Production and Consumption Waste in Moscow Region, 2006—2015". March 2th 2005, No. 6/131 (in Russian).

[3] Federal Act ."On production and consumption waste", 1998 (in Russian).

Throughout the period of exploitation of the dump, polluting substances in the landfill gas emissions affect the recipients of the natural-anthropogenic system of the landfill. Every impact of the biogas components leads to a change in the usefulness of the recipient[4]. Change in the usefulness leads to quality losses, which may manifest themselves in change in the composition of atmospheric air, exhaustion of soil, reduction of the land of recreational territories, deterioration of the health of the personnel and the residents of the area adjacent to the dump territory.

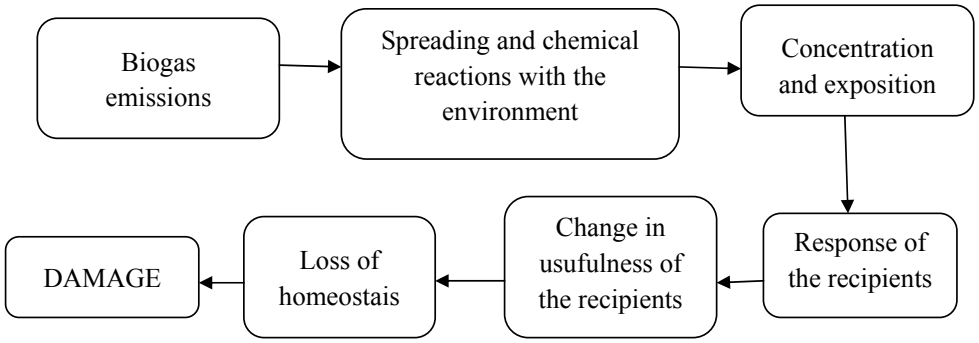

Fig. 2. Technique of the analysis of the ways of the biogas effect

The loss of usefulness of the environment components is expressed in a money equivalent, which, in its turn, is indemnified by payment of reimbursement for the damage caused to the environment. Actualization of relations in the sphere of environment protection is at the present time inefficient because of absence of economical guarantees and environmental actions that would adequately reimburse the harm caused by the effects in the places of waste storage [3].

The norms of payment for emissions of polluting substances by stationary and mobile sources to the atmospheric air, discharges of polluting substances to surface and underground water objects, and disposal of production and consumption waste were established in 2003 by Russian Federation Government Decree No. 344 of 12 June 2003; at the present time they are applied using coefficients that take into account ecological factors[5]. Pursuant to Federal Act No. 371-FZ of 30 November 2011, the norms of payment for negative impact on the environment, established by the Russian Federation Government in 2003 and 2005, are in 2012 applied with the coefficients 2.05 и 1.67, respectively.

For rehabilitation of the places of SDW disposal and environmental safety, it is necessary, on the one hand, to correct the economic indicators by means of real valuation of the loss of natural components of the environment with the purpose of their recuperation, to estimate the ecological-economical damage from all kinds of pollutions that are caused by SDW dumps and landfills and lead to exhaustion and destruction of the living environment [4]. These investigations constitute a difficult complex scientific problem.

[4] Federal Act “On environmental protection”, 2002 (in Russian).

[5] Decree of Moscow Government No.131/16, 28.04.2001 .”About indexation of payment for environmental pollution on the territory of Moscow region” (in Russian).

On the other hand, it is necessary to legislate incentive measures to stimulate the creators of units for collection, utilization and usage of landfill gas; the funds received from penal sanctions for discharge of landfill gas and from other sources should be channeled to the solution of this technical task.

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