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SOLID WASTE MANAGEMENT IN THE KALININGRAD REGION: SITUATION AND PERSPECTIVES

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One of the most serious problems in the Kaliningrad region is that of solid waste (mainly, household waste and industrial waste): its disposition, neutralization, landfilling and utilization.

This problem is complicated by specific exclave situation of the region, which is separated from the rest of Russia by Lithuania and Byelorussia. The region has borders with Lithuania and Poland only. In addition, Kaliningrad region has an area of only 15,1 sq. km, with a population of about 1 million.

Therefore, it's of highest importance to solve this important and complex problem of solid waste management. An important question "How to deal with waste in such conditions?" occupies the significant place in action plans of regional authorities.

In Kaliningrad region, annually, around 1210 thousand cubic meter (based on 1998 data) of solid household and industrial waste is sent to the landfill sites (only 10% of the total waste produced are recycled). Around 683 tons of industrial waste was disposed of properly in 1998.

The components of solid waste in percentage are shown in Table 1.

Table 1. Percentage of materials in total amount of solid household waste of Kaliningrad region (1998)

Material	Percentage of total amount of waste
Cardboard	33
Organic waste	23
Glass	5
Building waste	9
Metal	6
Plastic material	8
Textile	6
Bones	4
Wood material	2
Rubber, leather	4

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For disposal of solid household waste in towns, district and settlements of the region there are 59 sanctioned landfills, with an area of 121 hectares. There are non-sanctioned landfills also (in 1998 such landfills occupied 168 hectares of lands).

There is no even one landfill of solid household and industrial waste in the Kaliningrad region, which is in accordance with nature protection legislation. Most of them don't meet normative requirements: the waste is not compacted and is not covered; most of them are situated in the water protective zones of internal natural reservoirs and bays, within settlements, without fences. Mainly, these landfills are more like open dumps, which came up all of a sudden – and they should be closed (Kaliningrad, Baltijsk, Zelenogradsk, Sovetsk, Mamonovo, Ladushkin etc.).

For 1998 on the territory of the Kaliningrad region in places for disposal, collectors, storehouses and landfills 20293,8 tones of toxic industrial waste of four classes of danger (risk) has been amassed, taking into account the remainder of waste for 1997. In this total amount of toxic waste each of groups has:

1 class of danger (extremely dangerous)	31,5 tones;
2 class of danger (high level of danger)	14275,7 tones;
3 class of danger (very dangerouse)	373,3 tones;
4 class of danger (dangerous)	5613,3 tones.

From this total amount of the resulted toxic industrial waste: 1886,9 tones have been used in own production, 1278,5 tones have been received from enterprises, and 13107,5 tones have been completely neutralized at enterprises. Besides, 544,6 tones have been delivered to other enterprises for neutralization. About 800 tones have been removed to places of organized storage and industrial sites, 9,2 tones have been removed to sanctioned landfills.

Waste, which is not subject for recycling, is removed for landfilling. Most of places of organized landfilling of waste doesn't meet current regulations. The area for landilling of industrial waste occupied 42,3 hectares.

Kaliningrad has a big landfill near settlement Kosmodem'yansky. Many enterprises have on their territories sites for temporary disposal of industrial waste, however, mainly, waste of different classes of danger comes together with solid household waste of the city to the municipal landfill, where about 800 thousand m^3 of waste are annually landfilled. About 600 thousand m^3 (190 thousand tones) from this amount — from inhabitants. The composition of solid household waste from inhabitants is given in following Table2.

Table 2. Composition of solid household waste of Kaliningrad

Valuable materials	Percentage in household waste	Volume (tones per year)
Plastic material	10,0	19.000
Paper/cardboard	38,5	73.150
Glass	3,0	5.700
Metal	4,5	8.550
Varnish/paint	6,5	12.350
Wood material	7,5	14.250
Rubber	3,0	5.700
Textile	9,0	17.100
Building waste	4,5	8.550
Organic waste	10,0	19.000
Other	3,5	6.650
Total	100,0	190.000

Besides, there is more than 1,5 million m^3 of waste (in compacted condition) which accumulated for previous years.

The municipal landfill is situated 12 kilometers from Kaliningrad, 1,5 kilometers from the mouth of Pregolya. The landfill, constructed in 1978 as temporary site for landfilling of waste and planed for using during 3 years, therefore not provided for environment protection measures, is still functioning and occupies a territory of 13,5 hectares. The city landfill is located in swampy place which has a high water penetration of soil and its leachate comes to ground waters. Besides, rain flows from landfill reaches the river of Pregolya. Solid household waste is smoothed, compacted on gradually exploited sites. When the layer reaches 2 meters in depth waste is covered with 0.5-meter layer of a sand layer.

In 1997 by the firm "ProKon GmbH" jointly with Kaliningrad firm "Ecogor" has been presented for the state expertise at the State Regional Environment Protection Committee the Concept of solving the problem of utilization of solid municipal waste in Kaliningrad (BISTRO-PROJECT # BIS/96/340/063).

In accordance with the presented Concept creation of united system on recycling and utilization of waste are planed by stages:

1 stage (ranged utilization), 1998:

- creation of the union on recycling and utilization of waste;
- constructing of new landfill for disposal of waste;
- organization of system of sale of valuable materials;
- disinfection of medical waste.

2 stage (creation of the structure on recycling), 1999:

- restoration of tires;
- recycling of mixed plastic materials;
- an industrial plant for landfilling of hazardous waste;
- a plant for processing of accumulators;
- a plant for recycling of glass into building materials.

3 stage (increasing of a number of plants on processing), 2000:

- a plant for recycling of scrap-paper into building materials;
- a center on recapping of tires;
- a plant for recycling of rubber;
- a center of dismantling of used technical makes;
- a modular boiler plant with using of wood waste;
- a plant for thermal processing of hazardous waste.

Perspectives in field of Waste Management are connected, mainly, with new technologies, the use of waste energy, and construction of necessary landfills and improvement of methods of landfilling.

By the Institute of Amber and Regional Resources new technology of utilization of polymeric materials elaborated, including waste from public health service (without incineration) and used oils for production of modified bitumen viscous materials (including hot roof mastic) for building industry and road-building industry. This technology has big importance because only in Kaliningrad, according to data of medical institutions, 10 million

pieces of single use systems are using. Existing traditional plants for incineration of medical polymeric waste gives 53% of common emissions of such hazardous poisons as dioxins.

As regard the future Kaliningrad landfill (construction of the landfill is planed near settlement Golubevo), that it will be playing important role and be one of the main links in the whole chain of landfilling and utilization of waste. It's planed to use it for termless landfilling of household and industrial waste, which are fit for landfilling. Potential of waste, which subject to landfilling, is 230 thousand tones per year. The exploitation period of the landfill was planed for 25-30 years, during of which 5-6 million m^3 of waste will be landfilled. The most important element of the landfill is its location and quality of isolation system.

The area of the landfill is planed with annual plots, and construction will be started from land surface with taking into account its slope. For isolation a basis film is laid and, simultaneously, installed the section of a pipeline for leachate. Every 25 meters a control pit is constructed.

Collected waste is unloaded on the prepared sector and, when the layer reaches 2 meters in depth, compacted, then above is strewed with building waste. Repeated compacting is executed every 2 months. In addition to this, it's necessary to sort waste for obtaining of raw materials.

For improvement of Waste Management on the territory of the resort zone of the Kaliningrad region the business plan of utilization and landfilling of solid household waste of the resort zone has been worked out: Zelenogradsk, Pionersky, Svetlogorsk. The elaborator of this plane is "Kaliningardpromproect", and the customer — the state enterprise "United Canalization Treatment Structures" (UCTS).

In according with the presented plan, constructing of the landfill for solid household waste for the needs of the resort zone is planed near settlement Romanovo. The landfill near Romanovo was originally planed for 5 years only with capacity of 100 thousand m^3 and these characteristics corresponded to needs of Zelenogradsk only. But the problem of landfilling of solid household waste is topical for all settlements of the resort zone. Therefore, is the task of enlargement of capacity of the landfill due to construction of the additional second part with a capacity of 380 thousand m^3. Due to obtaining of valuable raw materials from waste, the period of filling up of the landfill will be increased up to 7 years. There is consideration not only a place for landfilling of solid household waste but also a place for collecting of valuable row materials.

During functioning of points for collecting of raw materials the amount of waste, which should be landfilled, will amount 34,7 thousand tones per year (82,6 thousand m^3). The points of collecting of waste will not embrace the whole population; therefore, the significant part of waste will be sorted on the landfill.

Besides, now the problem, connected with determination of places for constructing of landfills for solid waste in Ladushkin, Mamonovo, Baltijsk, Sovetsk, are solving.

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