Leachate purification system (LPS) of MSW landfill, Adler

Landfill as a core object of waste management*

Human kind exists on Earth not so long ago. However, over the past 50 years, humanity has doubled its presence on Earth – and the population of the planet has doubled accordingly. Thus, it is clear that humankind starts facing serious consequences with the problem of waste disposal.

This tendency escalates with the increasing migration flow in densely populated areas and with the growth of megalopolises, already facing the problem of generated waste. According to the Interfax news agency, the total area of legal and illegal waste deposits and landfill sites in Russia exceeds 4 mil. hectares (which is comparable to the territory of Switzerland and twice as big as Israel) and it is growing annually by 0,4 mil. ha. The total amount of waste, located there, is about 90 bln. tones and it was growing annually by 5 bln. tones.

Furthermore, the specific feature of the Russian waste management is a lack of the correctly designed landfills. A landfill threatens the ecology of surrounding areas with the real disasters. Among them are:

The aggravation of epidemiological situation and rapid spread of infectious disease. Contaminating the atmosphere with landfill gas, which, moreover, has the highest ratio of greenhouse effect.

Numerous spontaneous combustions due to the temperature rise of waste layer as a result of moldering, methane emission in the form of landfill gas and human negligence. If the dump contains sufficient amount of used tires (happens quite frequently), then such a fire turns into a natural disaster because the combustion heat of tires is almost equal to the heating capacity of oil.

What shall we do to prevent this problem? What strategy of

waste management today is considered the most acceptable and reasonably safe for the environment?

Every step starts with the planning of a long-term strategy of waste regional management.

It includes:

— master plans of sanitary purification,
— environmental and economic assessment of waste management system,
— experimental studies of the waste accumulation ratio,
— feasibility studies of the projects,
— construction of the processing facilities (equipment).

The percentage of the recycled waste in the Russian Federation is considerably low. Absence of separate waste collection practice and necessity of waste sorting stations that are located at the landfills, make landfill a core object of the Russian waste management strategy.

Full package of landfill construction design the landfill may include:

— Site selection for a landfill and engineering survey
— Calculation of a landfill capacity
— Landfill layout
— Design of the storage area
— Design of the utilities
— Design and calculation of the sanitary protection zone and monitoring systems
— Calculation in the mechanization needs, etc.

Designing the perfect landfill, one must take into account biogas collection systems and its utilization, landfill leachate removal and purification system, which covers the entire territory of the landfill. Landfill is to be isolated from the environment by geomembranes to prevent the leak of toxic leachate into the subsoil water. It must be equipped with the waste sorting station (required in the absence of separate waste collection) as well as with some specific waste treatment and utilization facilities. Among the last ones are incinerators for medical and biological waste treatment, pyrolysis plants for fuel generation from plastics, rubber, used tires, bioreactors for methane production and landfill gas collection system. MSW gasification facilities, actively promoted by several Western companies, did not get a traction in Russia because of their high prices, insufficient cost-effectiveness and ecological and economic feasibility.

All the above mentioned is a sophisticated equipment, some of the processes involved are potentially hazardous. This equipment is manufactured by various manufacturers and there is only one company in Russia capable of accomplishing of all works related to landfill construction and reclamation under one roof.

The name of the company is Safe Technologies, Inc. and since 2000 it has been occupying the leading position in the environmental protection services market. Safe Technologies has all the required licenses and permits for landfill design, furnishing and construction.

It is important to give detailed information about the plants processing different types of waste. Just recently, waste was simply deposited in landfills; the main concern of municipal

A landfill – is a complex engineering object where all the aspects of different types of waste management must be taken into account. Paraphrasing P. Connett, a famous world expert in the field of ecology, waste is not a substance, but a way to merge immiscible elements, defining its place in the landfill and there is no surprise that this mixture turns out to be useless, toxic and nonflammable.

Thermal Decomposition Plant TDP-2-800
for used tires and rubber processing, Smolensk region

administration was waste removal out of sight and out of mind. However today, due to the restrictions in environmental legislation, complicating the land alienation procedures for the landfill usage, waste processing came to the fore.

Now we are speaking not only of medical waste, for which incineration is the best choice due to requirements of SanPin disinfection and irrevocable changing of appearance (and which is quite successfully accomplished by KTO incinerators equipped with gas cleaning systems of Safe Technologies make), but also of other types of waste.

For example, it is HC containing waste, which is treated best of all at TDP pyrolysis plants (IPEC Company). Pyrolysis plant TDP-2-800 is capable of processing hydrocarbon-containing waste in continuous operation mode with production of fuels, which in turn can be rectified into gasoline and diesel fuel components.

Such TDP plants are successfully operated at municipal and industrial landfills (as an example, Service organization on industrial rubber and used tires utilization, Smolensk region, GP KO ESOO Unified Waste Management System, Kaliningrad region). They are based on pyrolysis principle involving oxygen restriction, which results in preservation of valuable fuel components in raw materials. The quality of the output products depends very much on the source materials; however, with the help of rectification column equipment it is possible to produce gasoline and diesel components.

Old tires and rubber utilization enhances environmental safety of the landfill considerably improving cost efficiency of the landfill at the same time.

The further enhancement could lie in the landfill gas collection system (with consequential liquefied gas production, which is feasible for south regions of Russia) and in landfill leachate collection and purification. These two relatively modern technologies are indispensable in reclamation of old landfills.

Safe Technologies Industrial Group has such projects in its portfolio as well (at Sochi, Astrakhan, Moscow region landfills) port substitution.

Assessing the overall situation in waste management area, we cannot ignore the fact, that, according to the words of the Minister of Natural resources and Environment of the Russian Federation, Sergey Donskoy, said at ECOTECH Exhibition, industrial waste from raw materials extraction constitutes up to about 98% from the total amount of waste generated in the Russian Federation. The greater part of them consists of oil and drilling sludge that have been accumulated in sludge pits and ponds for decades.

Restrictions of the environmental legislation lead to considerable increase of the ecology payments from resource-extracting companies. Annual revenue from the environmental taxes can approach 10 billion rubles already this year. However, this tax is aimed not to the profit but to environmental responsibility development.

The enterprise bears responsibility for the waste it generates and therefore must utilize it. Such concept inevitably leads to creation of environmental funds where ecology payments accumulate later to be invested into waste treatment facilities construction, the Minister was also saying.

For the companies building their own waste treatment facilities, the environmental levies will be partially relieved.

In case of oil and gas production companies the drilling waste utilization is possible directly at the production site. This way was chosen by LLC Slavneft-Krasnoyarsk-Neftegas, which entrusted its waste utilization to the dedicated service company.

Pyrolysis plants TDP-2-800 at the premises of ST Promotkhody are capable of processing the content of sludge pits into harmless dry residue and synthetic oil.

Waste disposal is no longer to be found among the key priorities of waste management, as per the new legislation. It reflects both world and local tendency. In other words, even properly constructed, from the environmental point of view, landfill is not a future of the industry. The landfills will be reclamated gradually; recycling will take place at the disposal site. However, though it will surely happen in some not too near future, and for now on the ecology industry concerns itself with providing maximum possible isolation of the landfill from the environment and maximum possible waste processing.

Fortunately with such a company as Safe Technologies there is no need in purchasing imported equipment as the company is capable of substituting the most part of it with in-house made goods and products.

Safe Technologies
Industrial Group
Russia, St. Petersburg,
Krasnogvardeysky lane. 15 D
+7 (812) 339-04-58
office@zaobt.ru
** sponsored statement*

Incineration plant KTO-50.K40. Automatic loading system excludes service personnel contacts with hazardous medical waste

Thermal Decomposition Plant TDP-2-200