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NEW TECHNOLOGY TO ENHANCE METHANE OXIDATION AT LANDFILLS

Methane oxidation occurs in the upper part of the landfill. However, when soil with low hydraulic conductivity is used in the top cover, landfill gas is discharged from gas wells and methane oxidation is decreased. When landfill gas quantity or concentration is low active gas extraction systems are not applied. Passive landfill gas venting systems have been combined with biological filtering units but because of low oxidation capacity the use of biofilters have not been economical and efficient enough.

In this study new technology has been developed in order to utilize methane oxidation capacity of the whole landfill top cover. Landfill gas is discharged through the sealing layer via landfill gas wells to the drainage layer. That is how landfill gas is delivered all over the landfill and gas flows through the oxidating top cover layer. No pumps are needed. However, homogeneity of the top cover has to be taken care of in order to avoid shortcuts of the gas.

Experimental field 50 m * 50 m in size was built at the landfill in Lohja in Finland in January 2000. The first measuring period in May 2000 gave promising results. 121 measurements of methane were made with FID-analyser. In most points methane concentration in the gas flow through the top cover was less than 1 ppm. In five points methane concentration was 6-21 ppm and in one point 245 ppm. Soil temperature was 8-30 °C. Further developments have been planned to be carried out in the next three fields to be built in summer 2000. Landfill gas will be delivered to the drainage layer via drainage pipes in order to achieve controlled gas flow. The new landfill gas delivery system via drainage layer to enhance methane gas oxidation is effective as well as labor and cost saving alternative for biofilters and flares.