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METHANE EMISSIONS IN PREVIOUSLY EXCAVATED KUDJAPE LANDFILL

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Abstract

Landfills are one of the largest sources of anthropogenic methane. Therefore, the emission of methane should be prevented or reduced to minimum. During the closure project of Kudjape landfill, about 55 000 m^3 of previously disposed waste was excavated and sieved. The main objective was to extract fine fraction and use it for construction of methane degradation cover layer for the whole landfill. The aim of the research was to study the efficiency of methane degradation layer to oxidize methane. Fieldworks were made two years after the cover layer was installed at Kudjape landfill. Methane and carbon dioxide emissions were monitored during a period of nine months. The measurements were carried out six times in twenty-nine measuring points on top of the layer and once at a depth of 50 cm. Additional measurements were done in the area of the highest leakage of methane. All measurements were done by static chamber method.

As the result of the study it appeared that the methane and CO_2 emissions were very small or none. Methane was detected each time only from two measuring points out of twenty-nine and the values were low. Spatially presented results demonstrate slight variations of CO_2 emissions over time. The highest methane emission was spotted through a clearly defined U-shaped area of just 1.9 m^2; located on top of the landfill. According to the results, landfill mining may be considered as a useful tool for sustainable closure of small to medium landfills. Methane degradation layer may well be made from excavated fine fraction. Spots with somewhat higher leakage of methane refer on a need for repair actions.

Keywords

Landfill gas; Methane emission; Methanotrophs; Methane degradation layer; Landfill mining