

Treatment of MSOR (mechanical separation organic residues) in a landfill bioreactor

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ABSTRACT

At Essent (previously known as VAM) waste treatment company in Wijster, waste is mechanically separated prior to treatment. One of the product streams is the mechanically separated organic residue (MSOR). Dutch legislation does not allow direct landfilling of MSOR after 2000. Consequently, bioreactor technology is being considered as a possible pre-treatment technique for this material as a precursor to landfill and an integrated research programme has been developed to assess this option.

A full-scale 49.000 tonne demonstration cell was built in 1997 (construction details were presented at Lulea, 1998) and methanogenic conditions were rapidly established after closure of the cell. The bioreactor demonstration is intensively monitored for the composition of the waste input, the emissions to air during construction, and the leachate and biogas production and quality during operation.

Although leachate infiltration was hampered by the poor hydraulic conductivity of the waste, gas production from the MSOR is high: half time of biodegradation is about 2 years. Waste samples have recently been recovered from the landfill and analysed for composition, remaining gas generation potential and leaching behaviour. This enables a check on the material (mass) balance of organic carbon to be made.

Laboratory scale research has also been undertaken to investigate the medium to long term processes and emissions that affect the quality of stabilised and flushed MSOR.

The test cell and accompanying lab-scale research indicates that a bioreactor is a promising technology to treat organic residues with:

- ⇒ a biologically stable residue;
- ⇒ a high conversion of waste to energy, comparable to what can be obtained from incineration with energy recovery;
- ⇒ negligible emissions to air during construction and to soil and ground-water during and after the construction period;
- ⇒ an end-product with acceptable rest-emissions, which even may be suited for re-use within existing legislation.