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## Landfill Liner Failure: an Open Question for Landfill Risk Analysis

PDF (Size: 1143KB) PP. 287-297 DOI: 10.4236/jep.2011.23032

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### ABSTRACT

The European Union Landfill regulations (1999/31/EC) are based on the premise that technological barrier systems can fully contain all landfill leachate produced during waste degradation, and thus provide complete protection to groundwater. The long-term durability of containment systems are to date unproven as landfill liner systems have only been used for about 30 years. Many recent studies have drawn attention to some of the deficiencies associated with artificial lining systems, particularly synthetic membrane systems. Consequently, failure modes of landfill liners need to be quantified and analysed. A probabilistic approach, which is usually performed for complex technological systems such as nuclear reactors, chemical plants and spacecrafts, can be applied usefully to the evaluation of landfill liner integrity and to clarify the failure issue (reliability) of liners currently applied. This approach can be suitably included into risk analysis to manage the landfill aftercare period.

### KEYWORDS

Landfill Liners, System Reliability, Risk Analysis, Landfill Aftercare Period

### Cite this paper

A. Pivato, "Landfill Liner Failure: an Open Question for Landfill Risk Analysis," *Journal of Environmental Protection*, Vol. 2 No. 3, 2011, pp. 287-297. doi: 10.4236/jep.2011.23032.

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