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STOCHASTIC MODELLING OF LANDFILL LEACHATE AND BIOGAS PRODUCTION INCORPORATING WASTE HETEROGENEITY AND DATA UNCERTAINTY

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ABSTRACT

Landfill is a very complex environment and as such it presents many modelling difficulties. Attempts to develop models that reflect these complexities generally involve the use of large numbers of spatially dependent parameters that cannot be properly characterised in the face of data uncertainty. An alternative method is presented which couples a simplified microbial degradation model with a stochastic hydrological and contaminant transport model. This allows the complex effects of spatial heterogeneity within the landfill to be represented, along with other key variables. A methodology for handling data uncertainty is also integrated in the model structure. Illustrative examples of the model's output are presented to demonstrate effects of data uncertainty on leachate composition and gas volume prediction. The model application to the Brogborough test cell experiment data is also presented.