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Practice review of five bioreactor/recirculation landfills

C.H. Benson ^a ... J.M. Rawe ^{d, 3}

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Abstract

Five landfills were analyzed to provide a perspective of current practice and technical issues that differentiate bioreactor and recirculation landfills in North America from conventional landfills. The bioreactor and recirculation landfills were found to function in much the same manner as conventional landfills, with designs similar to established standards for waste containment facilities. Leachate generation rates, leachate depths and temperatures, and liner temperatures were similar for landfills operated in a bioreactor/recirculation or conventional mode. Gas production data indicate accelerated waste decomposition from leachate recirculation at one landfill. Ambiguities in gas production data precluded a definitive conclusion that leachate recirculation accelerated waste decomposition at the four other landfills. Analysis of leachate quality data showed that bioreactor and recirculation landfills generally produce stronger leachate than conventional landfills during the first two to three years of recirculation. Thereafter, leachate from conventional and bioreactor landfills is similar, at least in terms of conventional indicator variables (BOD, COD, pH). While the BOD and COD decreased

conventional indicator variables (BOD, COD, pH). While the BOD and COD decreased, the pH remained around neutral and ammonia concentrations remained elevated. Settlement data collected from two of the landfills indicate that settlements are larger and occur much faster in landfills operated as bioreactors or with leachate recirculation. The analysis also indicated that more detailed data collection over longer time periods is needed to draw definitive conclusions regarding the effects of bioreactor and recirculation operations. For each of the sites in this study, some of the analyses were limited by sparseness or ambiguity in the data sets.



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