Chaiyawit Suwunpukdee 2012: Utilization of Solid Waste Leachate for Plant Cultivation on Landfill Area. Master of Engineering (Environmental Engineering), Major Field: Environmental Engineering, Department of Environmental Engineering. Thesis Advisor: Associate Professor Chart Chiemchaisri, D.Eng. 124 pages.

This research is carried out to study the utilization of solid waste leachate for plant cultivation on landfill Area. An eight-month field study was conducted in landfill to quantify plant response, treatment efficiency and impact to percolated water, gas emission and soil quality of one plant (*Jatropha curcas*) and two grass species (*Cynodon plectostachyus* and *Panicum maximum*). Four conditions of RO concentrate were used by making dilutions with tap water at 0, 25, 50 and 100%. The results showed that *Panicum maximum* is the most effective plant for irrigatation with RO concentrate in landfill because of it exhibited highest growth rate under all experimental conditions at a growth rate of 0.72, 0.82, 0.89 and 1.24 cm/day when using RO concentrate of 0, 25, 50 and 100%. Moreover, it also had highest efficiency in reducing percolated water contamination especially in terms of COD, TKN and TP at 88.27, 82.13 and 77.17 % and most effective for controlling methane emission at 0.60, 0.141, 0.168 and 0.244 g/ m^2/day when 0, 25, 50 and 100 % RO concentrate was applied respectively. An application of 50% RO concentrate is found most suitable for irrigating on plants in landfill because of all plants spicies had highest nitrogen recovery of 18, 37 and 33% for *Jatropha curcas*, *Cynodon plectostachyus* and *Panicum maximum*.

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