

Metee Opasatian 2012: The Effect of Leachate Contamination on Groundwater Condition and Arsenic Movement. Master of Engineering (Environmental Engineering), Major Field: Environmental Engineering, Department of Environmental Engineering. Thesis Advisor: Mr. Suchat Leungprasert, Ph.D. 129 pages.

The biodegradation of organic substances may affect the movement and variation of arsenic species in groundwater. This research aimed to apply the mathematical groundwater modeling for estimation of effected area of leachate contamination and prediction of the arsenic species occurrence in groundwater. The groundwater flow and solute transport model were simulated by Visual MODFLOW. The contaminant was BOD concentration that was run in 2 scenarios: Advection-Dispersion and Advection-Dispersion-Reaction terms for compute the Oxygen Deficit. Then, applied to estimate the Oxidic-Anoxic groundwater area and predict the arsenic species occurrence in groundwater due to the leachate contamination.

The results of steady-state simulation in 10 years found that the groundwater flow through the landfill was distance maximum in 300 meters in main flow direction. The leachate plume was distributed approximately 100 meters from the point source (BOD 0.5 mg/l contour). The effect of leachate caused the Anoxic groundwater area, maximum distance in 200 meters in main flow direction (Initial DO 2 mg/l). In this groundwater condition, the effect of leachate contamination on the arsenic species was classify in 3 zones; (1) Impact zone that was As(III)-speciation in anoxic groundwater zone, (2) Buffer zone that was As(III) or As(V) – speciation in DO variation area due to the leachate biodegradation and (3) Non-impact zone that was not affect the DO changing due to the leachate organic concentration plume.

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Thesis Advisor's signature

