

Wichit Sriwong 2006: Monitoring and Assessment of Groundwater Contaminated by Volatile Organic Compounds from Municipal Solid Waste Landfill. Master of Engineering (Environmental Engineering), Major Field: Environmental Engineering, Department of Environmental Engineering. Thesis Advisor: Assistant Professor Cheema Chomsurin, Ph.D. 200 pages. ISBN 974-16-2108-6

This study used field investigation and computational assessment to assess groundwater contamination. Volatile organic compounds (VOCs) were analysed in sampled groundwater from 4 groundwater monitoring wells within the municipal solid waste landfill under provincial administration of Nonthaburi, Thailand.

Results of groundwater monitoring during June, 2005 to March, 2006 show that groundwater levels were - 0.63 to - 2.55 m below surface. The groundwater flow pattern was in lateral movement with the direction of particle pathlines from the South to the North and averaged linear velocity was about 1.25×10^{-6} cm/sec. From the measurement, leachate were contaminated with VOCs particularly Trichloroethylene (TCE) with concentrations significantly high and imposed potential risk to groundwater use. The maximum detected concentration of 16,525 µg/L TCE was used in the worst-case scenario prediction by Visual MT3DMS Model. Conditions for the models were steady state, continuous contaminant supply, saturated porous media, homogenous and isotropy subsurface and mechanisms that control the solute transport of TCE were advection and dispersion. When it was considered by the age of the landfill, in the present year (25th year, 2006), TCE can transport 240 m away from source of contaminant (BH-2) and for the next 50 year, it might disperse 310 m away from BH-2 along the flowline. If this landfill site was remediated and protected by composite liners which have hydraulic conductivity less than 1×10^{-7} cm/sec, then the dispersion of TCE in the future (50th year, 2031) would be less than 40 m away from BH-2.

At present, the landfill site was at its full capacity and it was suggested to be closed by capping its top with impermeable layer. However, soil and groundwater remediation were not at immediate need since risk evaluation showed that it would take more than 186 years for VOC contaminated groundwater to move to groundwater supply with concentration higher than Thailand's groundwater standards.

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