

## **Estimation of the unknown DNAPLs source mass and dissolved concentration: Based on analytical solutions considering the partial source depletion**

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In this study site, previous studies have reported that trichloroethylene (TCE) was spilled on a surface as inappropriate management from 1982 to 1997, which has aggravated groundwater quality until the present day. However, the precise information for initial mass and concentration of the spilled TCE was unknown. For this reason, it was hard to characterize sources that caused pollution and to find appropriate remediation strategies. Prior to the delineation of remediation strategy, the quantitative evaluation such as identifying the initial source mass and dissolved concentration for contaminant sources should be conducted with the various evaluation methods. Analytical solutions which can assess and quantify the impacts of partial mass reduction is used to estimate the unknown dense non-aqueous phase liquid (DNAPL) source mass and dissolved concentration using long-term monitoring data. Analytical solutions can also evaluate the efficiency of the intensive remedial action, and predict a residual source mass and dissolved concentration as time passed before and after the remedial action. Evaluation of source mass reduction and prediction of residual mass and concentration as time passed were performed. Initial spilled TCE mass (1,000 kg) and dissolved concentration (150,000 µg/L) were estimated using analytical solutions. The results of this study indicated that analytical solutions can be applied to give the quantitative information for contaminant source such as initial source mass and dissolved concentration at contaminated sites even when there is no document on source history such as spilled amount and concentration.

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