



Remediation and its effect represented on long term monitoring data at a chlorinated ethenes contaminated site, Wonju, Korea

Seong-Sun Lee, Seung Hyun Lee, and Kang-Kun Lee

Seoul National University, Seoul, Korea, Republic Of (soon3311@snu.ac.kr)

A research for the contamination of chlorinated ethenes such as trichloroethylene (TCE) at an industrial complex, Wonju, Korea, was carried out based on 17 rounds of groundwater quality data collection from 2009 to 2015. Remediation technologies such as soil vapor extraction, soil flushing, biostimulation, and pump-and-treat have been applied to eliminate the contaminant sources of trichloroethylene (TCE) and to prevent the migration of TCE plume from remediation target zones to groundwater discharge area like a stream. The remediation efficiency according to the remedial actions was evaluated by tracing a time-series of plume evaluation and temporal mass discharge at three transects (Source, Transect-1, Transect-2) which was assigned along the groundwater flow path. Also, based on long term monitoring data, dissolved TCE concentration and mass of residual TCE in the initial stage of disposal were estimated to evaluate the efficiency of in situ remediation. The results of temporal and spatial monitoring before remedial actions showed that a TCE plume originating from main and local source zones continues to be discharged to a stream. However, from the end of intensive remedial actions from 2012 to 2013, the aqueous concentrations of TCE plume present at and around the main source areas decreased significantly. Especially, during the intensive remediation period, the early average mass discharge (26.58 g/day) at source transect was decreased to average 4.99 g/day. Estimated initial dissolved concentration and residual mass of TCE in the initial stage of disposal decreased rapidly after an intensive remedial action in 2013 and it is expected to be continuously decreased from the end of remedial actions to 2020. This study demonstrates that long term monitoring data are useful in assessing the effectiveness of remedial actions at chlorinated ethenes contaminated site.

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