

An Investigation of Remediation Reagents Injection at a Groundwater Contamination Site by Using ERT and SP Method

*Tzu-Pin Wang^{1,2,3}, Yung-Chieh Chuang¹, Chien-Chih Chen¹, Yi-Chieh Chen³, Chih-Hung Cheng³, Tien-Hsing Tung⁴, Yao-Tsung Chen⁴, Hsin-Chang Liu⁵, Shih-Nan Cheng², Chun-Yi Yu², Ching-Jen Ho⁶, Yi-Hsin Chen⁶, Hao-Kai Chan⁶

1.Dep. of Earth Sciences and Graduate Institute of Geophysics, National Central University, Taiwan,
2.Disaster Reduction Research Center, Chien Hsin University of Science and Technology, Taiwan,
3.Geophysical Technology and Engineering Co.,Ltd. R.O.C, 4.Apollo Technology Co.,Ltd. R.O.C.,
5.D.P.W.E. National Chiao Tung University, Taiwan, 6.Environmental Protection Administration,
Taiwan

The treatment of groundwater contamination is complicated and difficult, especially for extensive distribution of contaminant or non-removal source of contamination. Whether the remediation reagents can effectively transmit to the target area or not is important. In this research, we combine electrical resistivity tomography method (ERT) and self-potential tomography method (SPT) to investigate the diffusion and spatial distribution of remediation reagents at a large groundwater contamination site. We inject flowable reagents near the source of contamination, and define its preferential flow pathways and diffusion direction by ERT and cross-well ERT. On the other hand, we inject non-flowable reagents at the forefront of contamination to prevent the downstream diffusion from contaminant, and image the long-term existence of injected reagents from two-weeks monitoring of cross-well ERT, 3-D ERT, and SPT. As a result, combining cross-well ERT with monitoring wells can make the wells not only for groundwater sampling and remediation, but also for geoelectrical investigation to enhance the wells' efficiency.

Keywords: ERT, SP, Resistivity, Groundwater, Pollution, Remediation