

# XXXVIII IAH Congress

Groundwater Quality Sustainability  
Krakow, 12–17 September 2010

## Extended Abstracts

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University  
of Silesia  
Press 2010



abstract id: **421**

topic: **6**  
**General hydrogeological problems**

**6.3**  
**Groundwater contamination — monitoring, risk assessment and restoration**

title: **Geophysical investigation (electromagnetical induction method) as a useful tool for monitoring the remediation of groundwater and soil pollution**

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keywords: monitoring, EM induction method, groundwater pollution, remediation

Geophysical methods (geo-electrical and electromagnetical investigations) have since a long time been used in environmental studies to delineate groundwater and soil pollution. A condition for their usefulness is that the pollution must have caused a significant change in ground conductivity or resistivity. This approach is very effective when being applied in combination with the traditional method of investigation of soil and groundwater pollution, consisting in the installation of piezometers followed by soil and groundwater sampling for chemical analysis. Yet, the integration of both investigation methods is unfortunately not common practice, even if a new application of extended integration has recently been proposed: the monitoring of remediation, as ground conductivity will change throughout the remediation process. This innovative approach is illustrated by an example. At a food processing factory, groundwater pollution is caused by rinsing out the delivered vegetables in pickle in the open field before they were processed for consumption. The water loaded with salt infiltrated into the soil with a salt water intrusion as a result. Although the procedure of uncontrolled rinsing has been stopped, the pollution is still present. The groundwater reservoir has a total thickness of approximately 18 m and, based on the results of borehole logging, consists of 2 aquifers separated by a continuous clay layer of around 5 m. The pumping wells are placed above the clay layer, where the pollution is situated.

The groundwater will be pumped and cleaned before being discharged into surface water. To evaluate the progress of the remediation, monitoring is performed: electromagnetical profiling with the EM34-3 instrument and EM induction well logging have been carried out. Before the start of the remediation, the horizontal and vertical extent of the pollution have been defined. Also a reference profile has been set up, to detect possible influences due to changes of depth of groundwater level. During the remediation, the investigations are carried along the same profiles and in the same wells to evaluate the changes in conductivity due to the remediation. Groundwater analyses are used to validate the results. The first results show that the measured conductivity decreases in the vicinity of the pumping wells. So far, it can be concluded that EM induction method is a reliable tool for monitoring of remediation.



**International Association of Hydrogeologists**



**AGH University of Science and Technology**

**2-vol. set + CD**  
**ISSN 0208-6336**  
**ISBN 978-83-226-1979-0**