Infiltration of groundwater to stabilize groundwater levels in the area of wetlands

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Abstract To preserve wetlands of ecological interest located north of the Garzweiler open cast mine, extensive infiltration measures have been taken since the early 1990s. The infiltrated water has been produced by the dewatering of the Garzweiler mine and is treated in various water works. In these water works, iron and manganese are separated from the water before it is conveyed to the infiltration systems. The infiltration of water has allowed a large-scale stabilization of the groundwater level in the groundwater-dependent wetland habitats.

Planning, construction and operation of the infiltration systems is an ongoing and recurring process that requires the collaboration of the company's planning and operating departments and public authorities. The location of the infiltration systems and the necessary discharge quantities are determined by means of a groundwater model that also forms the basis for the permit applications under water law and is updated on an annual basis.

The planning of new infiltration components requires excellent knowledge of the prevailing geological and hydrological conditions and determines the location and the type of infiltration component used. The operation of the infiltration systems has an impact on the groundwater levels that are continuously monitored both by the company via observation wells and by the authorities in charge.

The monitoring system that has been used for more than ten years now is based on a combination of deterministic (groundwater models) and stochastic (multi-channel Wiener filtering, neural networks) hydrological analyses and forecasting tools as well as ecological studies. It confirms that the targets specified in the permits granted are achieved and helps create transparency that promotes mutual trust and acceptance.

The monitoring system will continue to support the supervision of current ecological and hydrological developments in the wetlands and the planning of measures. This ensures that the wetlands are protected during open cast mine operation and beyond until the final groundwater levels have been reached after filling of the residual lake and the last remaining infiltration systems are shut down.