Design of Groundwater Monitoring Networks Considering Conceptual Model and Parametric Uncertainty

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Uncertainty built into conceptual groundwater flow and transport models and associated parametric uncertainty should be appropriately included when such models are used to develop detection monitoring networks for contaminated sites. We compare alternative approaches of propagating such uncertainty from the flow and transport model into the network design. The focus is on detection monitoring networks where the primary objective is to intercept the contaminant before it reaches a boundary of interest (e.g., compliance boundary). Different uncertainty propagation approaches identify different well locations and different well combinations (networks) as having the highest detection efficiency. It is thus recommended that multiple uncertainty propagation approaches are considered. If several approaches yield consistent results in terms of identifying the best performing candidate wells and the best performing well network for detecting a contaminant plume, this would provide confidence in the suitability of the selected well locations.