

CASE HISTORY

Groundwater Flow and Capture Zone Analysis of a Chlorinated Solvent Plume, Pump & Treat System, and nearby Municipal Well

Challenge:

Groundwater beneath and industrial site was contaminated with chlorinated solvent and located within about 1,600 feet of a municipal supply well in Arizona. A pump and treat remedial system had been in operation since 1998 and had helped to maintain the plume on the Site. From 1998 to 2009, the nearby City pumped intermittently from a municipal supply well upgradient of the Site. In 2018, the City began pumping this municipal supply well again. Data indicated that the pumping of the municipal well reversed the groundwater flow direction, so special attention was needed to ensure the pumping of the municipal well did not capture the Site's chlorinated plume. Accordingly, the Arizona Department of Environmental Quality requested that a capture zone evaluation be conducted to determine if the groundwater treatment system would maintain plume capture if the City resumed operation of the municipal supply well. In 2021, MUNDELL was asked to review and update an analytical element model (*i.e.*, WinFlow® Solver AquiferWin³² groundwater modeling software) which had been prepared by a previous consultant. In particular, the model needed to demonstrate how the municipal well might impact the operations of the Site's remedial system and determine what pumping rates were needed (both of the Site's remedial system and of the City's municipal well) to assure the municipal well did not capture the Site's groundwater plume.

Action:

To update the groundwater model, MUNDELL reviewed the history of the project and modeling work prepared by the previous consultant. MUNDELL incorporated over 20 years of groundwater data, including groundwater elevation monitoring data, historical well pumping rate usage, and pumping test data to assess the existing model. MUNDELL identified various aspects of the model that needed updating and re-calibrated the model accordingly. After confirming the validity of the updated model, MUNDELL executed the model considering various pumping scenarios to explore the groundwater flow dynamics and capture zone of the chlorinated plume.

Results:

MUNDELL successfully updated the groundwater flow model and demonstrated its effectiveness. The various pumping scenarios were presented and demonstrated that the operation of the municipal supply well was not anticipated to capture the contaminant plume beneath the Site. In addition, the capture zone analysis indicated that no additional extraction wells would be required on the Site to maintain plume capture.

