

Fate and Transport Modeling

Once introduced into the environment, a chemical will migrate, attenuate, transform, and decay. The environmental setting, contaminant properties, and various physio-chemical processes in the subsurface will determine the contaminants fate and transport. The current condition can also be used to evaluate the contaminants prior transport to define release location and timing.

The first step in fate and transport analysis is the development of a site conceptual model (SCM) – a working hypothesis on how the contaminant will behave in that particular setting. The SCM is developed at the early stages of an investigation and is continually refined until characterization is complete. In fact, the characterization program will be partly designed to confirm, modify or refute the SCM.

The environmental setting, contaminant properties, and physio-chemical processes that determine the fate and transport of the contaminant are complex. In some cases, a SCM alone is insufficient to evaluate contaminant fate and transport. Thus, at some point in the characterization process, sufficient data will be available to allow the development of a numerical fate and transport model. The model incorporates site data into its framework and mathematical algorithms are used to simulate the behavior of the contaminant in the environment. In some cases, modeling of the physical processes alone is sufficient to evaluate contaminant fate and transport, such as groundwater flow modeling. While in others, actual chemical properties and physio-chemical processes must be considered in a full fate and transport model. Such models can be developed for air dispersion, sediment transport, subsurface vapor phase transport, solute transport, and even multi-phase transport.

Aquilologic has extensive experience developing SCMs to evaluate fate and transport in complex environmental settings, with sensitive receptors either impacted or at risk. **Aquilologic** staff has also developed numerical transport models for groundwater flow, vapor phase transport, and solute transport.

EVS simulations of contaminant plume, Sacramento, California