

# 29 Potentially Costly Soil and Groundwater Investigation Mistakes

Solutions to soil and groundwater assessment/remediation efforts, however well designed and intended, will not work when a deficient site characterization leads to a *poor* conceptual site model.

Below are some of the errors, in some cases expensive errors, we have found when conducting **peer reviews**.

## Source and Background Issues:

1. Faulty Phase I investigations – e.g., other source(s) of contamination missed or contaminated soil removed in the past but not documented.
2. Not recognizing background conditions.
3. Failure to identify/test for all potential sources of impacts – e.g., older tanks were not investigated; gas stations with a dry cleaner formerly on the site, but solvents were ignored.
4. Misapplication of risk-based standards.

## Basic Hydrogeology Issues:

5. Incorrect determination of hydraulic conductivity.
6. Incorrect determination of groundwater flow rate.
7. Incorrect determination of groundwater flow direction.
8. Incorrect location of soil borings and monitoring wells.
9. Incorrect test methods (fraction organic carbon, for example).
10. Wells improperly installed/screened.

## More Advanced Understanding of Hydrogeology Issues:

11. Incorrect interpretation of geological and hydrogeological data.
12. Failure to identify multiple aquifers.
13. Failure to determine whether geological, hydrogeological, chemical, and other data, as a group, make sense.
14. Failure to understand the interactions between groundwater and surface water.
15. Failure to consider the influence of sewers and other infrastructure.



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### Surveying Issues:

16. Incorrect measurement of distances.
17. Horizontal survey errors (wells not in location presented on maps).
18. Vertical survey errors (reporting ground level instead of top-of-casing elevations; other gross survey errors).

### Investigation Design Issues:

19. Insufficient vertical delineation of impacted soil and/or groundwater.
20. Inadequate horizontal delineation of impacts.
21. Failure to recognize the need to double case wells.

### Chemical Behaviour Issues:

22. Chemical transport rates faster than groundwater flow rate.
23. Failure to understand that retardation of chemicals is site and chemical specific.
24. Thinking dissolved TCE in groundwater sinks (it is not separate phase TCE).

### Modelling Issues:

25. "Contouring gone wild." This can occur when using programs like Surfer without considering geology and hydrogeology.
26. Inappropriate model code selection for site conditions and/or objective.
27. Inappropriate parameter assumptions in models.
28. Inappropriate boundary conditions in models.
29. Biased modeling. This is a model that purposefully contains unrealistic input that forces a desired outcome.

All of the above can lead to proposing **unnecessary remediation** and/or **wrong allocation of liability for contamination**.

To learn more about how our peer review service works, or if you would like to schedule a phone call or meeting, call our office (below) or email Alan Hahn ([ahahn@dragun.com](mailto:ahahn@dragun.com)).

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