

ENV 6519: Physical & Chemical Processes for Groundwater Remediation

Spring 2021
Homework #1
Due Thursday, Jan. 21

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The United States Environmental Protection Agency (USEPA) maintains a list of contaminated sites that are believed to pose the highest risk to public health. This list is called the National Priorities List (NPL). Sites listed on the NPL are sometimes called “Superfund” sites, because the NPL is established under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), which is better known as the “Superfund” legislation. When a site is listed on the NPL, the USEPA issues a *record of decision* (ROD) for that site; the ROD describes the engineering method that is to be implemented for cleaning the site, explains why that method was chosen from among the candidates considered, and provides an estimated cost for the site clean-up.

1. Identify three Superfund sites that have the following characteristics:
 - soil and/or groundwater are contaminated by *organic* pollutants (as opposed to, say, heavy metals), and
 - the record of decision prescribes a *physical/chemical process* (i.e., not a biological process) for the site remediation.

There are probably a lot of ways that you could find this information, but one way is through the following EPA web site:

<http://www.epa.gov/superfund/>

2. Tabulate your findings so that you can easily compare the sites and look for similarities or differences. For each site, indicate (in tabular format) the following:
 - How was the site contaminated? (e.g., leaking underground storage tank? Improper disposal? Ruptured chemical vessel? etc.)
 - What are the contaminants of concern?
 - What media were contaminated (soil, groundwater, etc.)? In what volumes, and at what concentrations?
 - What physical/chemical processes were considered as possible remediation methods?
 - Which physical/chemical process was ultimately selected in the record of decision?
 - What is the estimated or actual cost of the clean-up? Try to express the costs in terms that allow comparison between the sites. For instance, you can express the cost as

“dollars per thousand gallons of groundwater treated,” or “dollars per cubic yard of soil treated,” etc.

- What is the estimated or actual time-frame for the clean-up?
3. Examine your table and look for patterns. Do you see any obvious similarities between the different sites? For example, are there particular contaminants or classes of contaminants that seem to be found commonly at these Superfund sites? Are there particular physical/chemical processes that are commonly considered as candidates for the remediation method? Any other patterns you see?
 4. List the sources of your information for this assignment. For this assignment, web sites are acceptable. Please make clear which references are affiliated with each of the contaminated sites you considered. Try to give as complete information as possible for the references.