DRAGUN CORPORATION'S
ENVIRONMENTAL MINUTE
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Mike is a hydrogeologist with a passion for getting things right the first time. He also isn't afraid to buck conventional thought, when necessary. Mike brings these two characteristics to every environmental project he touches. Mike has a deep and broad background in hydrogeology, formed from a demanding geological engineering undergraduate degree, followed by a Ph.D. from the world-class hydrogeology program at the University of Waterloo. Mike's 15-year academic career prior to consulting served to further broaden his knowledge and hone his communication skills.

Dragun Corporation
Environmental Advisors

Conceptual Site Models (Part 3 of 8)

Before You "Dig" In, Dig into the Files

In Environmental Minute #2, I discussed the importance of developing a robust Conceptual Site Model (CSM). And, while developing a robust CSM will include site-specific data, it often does not (and probably should not) start with site-specific data that includes drilling and sampling soil.

One of the first things my advisor told me when I started working on my Master's thesis was not to recreate the wheel. When looking at a "Site," there is usually a wealth of literature available about the region, the municipality, and sometimes even the Site itself. My advisor told me this "back in the day" when you had to search and find the information in libraries. In today's world and with the internet, it is almost a crime not to review and utilize existing data and knowledge before actually digging or drilling at the Site.

You can start to outline your CSM by taking full advantage of existing geologic information and knowledge published in government agency documents, peer-reviewed journals, and other documents.

Review every report that you can reasonably find that has been prepared about, and around, the Site. Not all the data will necessarily be great, but it will get you started in the right direction. Not recreating wheels can save your client a ton of money and also save you potential embarrassment if your initial geological interpretation is "off."

Another reason you need to conduct a literature search is to document the Site history (releases and potential sources of releases) versus what is known about adjoining and surrounding sites.

In an article I co-wrote with my colleagues in 2006 in Chemical Engineering Progress, *Who Done It? The ABC's of Environmental Forensics,* we wrote,

"The allocation of financial responsibility requires matching scientifically derived timing to the site history. The main purpose of developing the site history is to identify potential sources and potentially responsible parties who at some time contributed to the contamination at the site and who, therefore, should bear some financial responsibility…"

Basic stuff, right? However, this basic stuff was missed in a recent remediation project that was frustrating our (current) client and

was confounding our client's (previous) consultant. During our peer review, we looked at historical information, including fire insurance maps, and found the previous consultant completely missed a buried tank on an adjacent property (a really basic mistake), amongst other significant mistakes that were made in interpreting data.

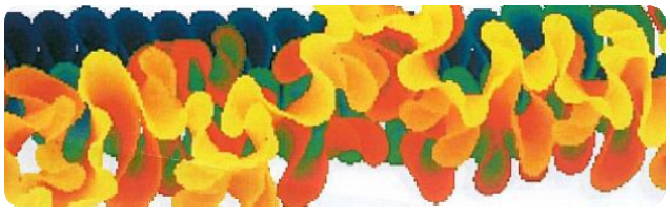
Once we discovered the old tank in our literature review, the CSM looked even better, and existing data made even more sense. With just a little more Site work to confirm what we suspected from the existing data, we were able to convince the regulators that the Site could be closed with no further remediation.

How would you remediate here without reading the literature?

We are currently working on a project in Kansas where an old government report helped us to understand that the Site was geologically and hydrogeologically very complicated. The literature showed that there are meanders from two "parallel" streams (right). Stream meanders (twists and turns) systematically deposit coarser sediments at certain locations and finer sediments at others. That is relatively easy to understand in the "present day," but … over many, many years, it is not so straight forward.

An old map (Fisk, 1994 [right]) shows the complex, surface geology along the Mississippi River formed by meanders criss-crossing the river valley over geologic time.

Through geologic time, newer meanders will overlay, intersect, and cover older meanders, but not in a systematic pattern. This computer-generated time sequence of meanders (below; source unknown) shows hopeless complexity (darker are older and deeper). So how might this affect your decision on a remedial method?



Knowing this information was extremely helpful in outlining our CSM in Kansas. It helped us to understand how the contaminants would be distributed and indicated to us that pinpointing where the contaminants are would be futile. This information is key in formulating our site characterization work and in formulating remedial strategies. The literature search gives us a "peak" at what we expect to see at the Site. It is a critical piece to developing a thorough understanding of the Site, and it is why "digging into the files" is one of our eight keys to successful environmental remediation.

In the next Environmental Minute, we will explore how understanding the basic geology of the Site will dictate how contaminants migrate to, through, and from the Site. If you have any questions about this series of Environmental Minutes, or if you have an immediate question or concern, please contact Dr. Michael Sklash (msklash@dragun.com) at 248-932-0228, ext 120.

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