Every Picture Tells a Story . . . Convincing Regulators and Courts of Your Client's Position

By: Jeffrey Bolin, *The Dragun Corporation,* and Todd Fracassi and Tom Wilczak, *Pepper Hamilton, LLP*

Executive Summary

When facing the potential of spending large sums of money on remediation, administrative enforcement, or litigation due to a chemical release to the environment, you must be able to take the collected information and data and tell a technical story that is clear, concise, persuasive, and memorable. One way to do that is by developing a Conceptual Site Model that generates a compelling story from data and information gathered from and about the site. This article outlines the process of creating just such a model.

Jeff Bolin is the Vice President of Technical Operations at The Dragun Corporation. He manages and oversees the consulting, litigation support, engineering, environmental compliance, remedial investigation, and remedial operations of the corporation in the US and Canada. Jeff has over 30 years of experience in environmental project management, consulting and litigation support with attorneys; financial institutions; and industrial, municipal, and commercial clients. He can be reached at 248.932.0228 or via e-mail at jbolin@dragun.com.

Todd C. Fracassi is a partner in the Environment and Energy Practice Group of Pepper Hamilton LLP, resident in the Detroit office. He also is a member of the firm's Sustainability, CleanTech and Climate Change Team. Mr. Fracassi is engaged primarily in matters of environmental litigation and regulatory affairs, and corporate environmental counseling. He can be reached at 248.359.7304 or via e-mail at fracassit@pepperlaw.com.

Thomas P. Wilczak is managing partner and head of the Environment and Energy Practice Group in the Detroit office of Pepper Hamilton LLP. Mr. Wilczak primarily is engaged in matters of environmental counseling, compliance, permitting and regulatory affairs, as well as environmental issues pertaining to litigation and transactional matters. He also is a member of the firm's Sustainability, CleanTech and Climate Change Team. He can be reached at 248.359.7398 or via e-mail at wilczakt@pepperlaw.com.

"After a presentation, 63% of attendees remember stories. Only 5% remember statistics." (Source, Best Selling authors, Chip and Dan Heath). A picture is worth a thousand words, and, when you get down to it, what is litigation or regulatory negotiation for your client? . . . Dare we say it's a presentation of a story? And, it better be an accurate, and even a compelling, story!

When your client is facing the potential of spending large sums of money on remediation, administrative enforcement, or litigation due to a chemical release to the environment, you must be able to take the collected information and data and tell a story. Not just a story, but a clear and convincing story! In fact, this story needs to be true and defensible, and it needs to be supported by all that data and minutia of information that, if presented improperly, will likely be forgotten. The truth is, the best information and data may support you, but it will fall on deaf ears if you fail to tell a compelling story.

So how do we tell a technical story that is clear, concise, persuasive . . . and memorable? By developing a Conceptual Site Model ("CSM"). A CSM is like a paint-by-numbers game, but the numbers that generate the picture come from data and information gathered from and about the site. Decisions regarding remediation, risk, litigation, etc., are not made based on a full understanding of the actual subsurface conditions; decisions are made based on the CSM; that is, it is based on the portrayal of that limited information into a fuller picture of what is in the subsurface.

What Is A CSM?

A Conceptual Site Model is an integration of everything we know about a site including (1) site history, (2) hydrogeologic information, (3) chemical release source and timing, (4) physical and chemical properties of the release, (5) contaminant fate and transport, (6) distribution of chemicals, and (7) risks, exposure pathways, and receptors. It is ultimately a multi-dimensional *picture* that tells the *story* about the site. "Just gather" all of this information and . . . Presto! It sounds easy, but . . . .

There are numerous guidance documents that discuss preparation of CSMs, including ASTM, Interstate Technology Regulatory Council ("ITRC"), U.S. Environmental Protection Agency ("USEPA"), U.S. Army Corps of Engineers ("USACE"), and many state regulatory agencies. However, knowing the basic steps from the guidance documents only gets you the pieces to the CSM and

the story. It does not tell the story. Only when the pieces are integrated, prioritized, and corroborated does the story take shape. **The problem is that we never** have complete information, and, frequently, there has been no integration, or there has been poor integration, of the available information. Complicating it more is that application of the guidance documents to a site are often subject to legal interpretations based upon regulatory programs and case law.

Building an accurate CSM is a rigorous process of integrating data and technical and legal information about a site. It has a number of steps that can be broken down into (1) the Preliminary CSM, (2) the Revised CSM, and (3) the Robust CSM. The development of the CSM through this process will determine just how well your story is told. That is, are there "multiple lines of evidence" that paint a consistent picture and tell the complete and accurate story?

The Preliminary CSM

The absolute first step to the Preliminary CSM is developing a site history. The Preliminary CSM is the initial integration of available information about the site. It may, or may not, include any (or minimal) site-specific data regarding the subsurface conditions. The Preliminary CSM is typically comprised of information such as reference literature, public records, air photos, and interviews with people familiar with the site.

Why is understanding your site history so critical? It is critical because you want to know ***if it's your story to tell***. Companies have paid thousands to millions of dollars to clean up someone else's environmental contamination because of an inaccurate story based on a poorly–constructed, Preliminary CSM.

You need to build an accurate *site history story* about your property and the properties surrounding your property. This needs to be based on, and substantiated by, available, relevant, factual data gleaned from all available sources.

What type of information should you gather? Just about everything and anything that you can reasonably get your hands on and that can be substantiated. This step can be compared to conducting a "quasi" Phase I Environmental Site Assessment ("ESA") as if you were purchasing property. You want to understand the

You need to build an accurate site history story about your property and the properties surrounding your property. This needs to be based on, and substantiated by, available, relevant, factual data gleaned from all available sources.

"who, what, when, where, and how" of the property relative to chemical use, handling and disposal.

Typical information sources include historical incident reports, spill reports, environmental investigation reports, prior enforcement history and litigation regarding the site, spill response plans, purchasing records (chemicals used), aerial photographs, city directories, fire insurance maps, interviews with long-term employees or retirees, former owners or operators, database searches (e.g., EDR), a site inspection of the site and adjoining properties (with owner's permission), and Freedom of Information Act ("FOIA") requests to the USEPA, state regulatory office, and municipal offices. And in today's world, always "Google that."

The preliminary CSM builds the framework of the site. At this stage, you can usually begin to understand (1) what chemicals were used on your property, where they were used on your property, and their use and storage on neighboring properties; (2) when these chemicals were used; (3) what might happen to chemicals that are released at the site or neighboring property; and (4) how they might migrate in the environment. But you need to be cautious not to base too much solely on this framework. As with any good story, the plot may have many twists and turns. Relying on a CSM too quickly without confirming the story with additional information can be a pitfall when it comes to remediation, negotiations with administrative agencies, or litigation. It can lead to a "bad experience" in court, spending money foolishly on a poorly-designed remedy or on a poorly-crafted administrative order or agreement.

This leads to the next step in the process; the Revised CSM. It should be noted that there is no magic bright line that defines the Preliminary CSM from a Revised CSM. It all depends upon the amount of information in hand and how well that information tells the story. That is, do the data from different sources continue to build and tell the same story like chapters in a book?

Revised Conceptual Site Model

The preliminary CSM has provided a framework and a skeletal outline of the picture and a glimpse of the plot of the story. To "fill in" the framework, you need to look for corroborating evidence. With site history in hand, the questions become more focused and refined. The questions become more specific about the site. For our story, these

questions are answered by establishing the (1) geologic framework, (2) groundwater flow, (3) soil and groundwater chemistry, and (4) contaminant transport processes.

Developing a picture of the geologic framework is a critical component to understanding the potential movement and migration of a chemical release. You need to determine what the surface and subsurface conditions of the site are and how those conditions influence chemical migration. Are the surface and subsurface conditions natural, man-made, or both?

The surface features of a site will direct and establish a pathway for a chemical release. You want to determine items such as surface topography, the presence of paved surfaces and their condition, the presence of ditches, swales, storm water catch basins, truck wells, and retention ponds. Additionally, the presence of nearby surface water bodies (lakes, streams, rivers, wetlands, etc.) will provide insight as to surface water flow, groundwater flow, and receptors.

With respect to subsurface conditions, you need to determine if the geology is likely sand, silt, clay, or bedrock, as chemical movement is influenced differently by each. Underground utilities and corridors (sewers, septic lines and fields, electrical lines, water lines, and wells, etc.) at a site can have a significant impact on the migration of a chemical release.

Information regarding surface and subsurface conditions can be obtained through numerous sources, such as online geological database information, USGS topographic maps, geological maps, geological survey reports, USDA soil surveys, geotechnical reports from building construction, and utility maps from municipalities. Past regulatory information, enforcement actions, or litigation regarding the property can be telling as well.

As you obtain this information, you continue to build the CSM by incorporating the natural and man-made features and creating a geological database. Note that, at this point, the CSM is based solely on data and information obtained from existing sources. **We have not yet advanced a soil boring or installed a monitoring well.** That is not to say that some subsurface information from soil borings or monitoring wells does not exist from previous site investigations.

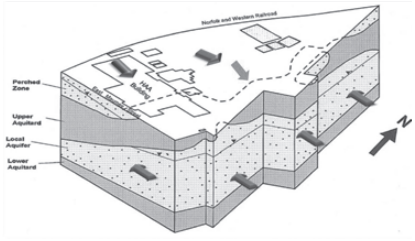
Cases are won and lost by convincing administrative agencies, judges, and juries about what happened, what is happening, or what is most likely to happen. A key factor is turning data and information into an easy-to-understand story.

As we build the CSM and integrate the data that may have been generated for the site, we must be critical of the data. For example, are there any obvious mistakes in the previous interpretations of the data? Are there other areas that need to be investigated? Is there information missing (non-continuous logging of soil, no grain-size analysis, borings not deep enough, etc.)? The answers to these questions help us identify data gaps and develop a work plan.

Using the CSM to identify the data gaps, you can tailor a work plan to obtain the "missing" data and information through focused investigation (the focused investigation also is influenced by exposure pathways that need to be addressed/evaluated – see below). This can include both intrusive and non-intrusive methods of investigation. Non-intrusive methods include geophysics, such as ground-penetrating radar ("GPR"), magnetometer surveys, electromagnetic ("EM") surveys, etc. Intrusive methods include drilling and sampling the subsurface soil and groundwater. At this point, the areas of investigation and placement of soil borings should be fairly defined. Accordingly, the investigation should be focused to gather data to create a more robust CSM.

Drilling at a site is very dependent upon the characteristics of the site. The Revised CSM should be a guide to deciding the best drilling techniques since you should have an understanding of geology (i.e., sand, silt, clay, bedrock), depth to groundwater (e.g., monitor well screen placement), types of chemicals of interest (e.g., soluble, LNAPLs, DNAPLs), depth of drilling required (e.g., confining layers, bedrock, etc.), and site access constraints (e.g., utilities, inside a building). Each of these site characteristics may require a different drilling technique which can include direct-push technology (e.g., GeoProbe©), hollow-stem auger, mud rotary, and sonic, to mention some of the more common.

Once you have this supplemental geological, hydrogeological, and chemical data to fill the data gaps, you can modify and update the CSM again. At this point, the CSM should provide you a good picture of what would happen to a chemical release at, or around, your property. To further refine the CSM, you need to establish groundwater flow characteristics. Which way does the groundwater flow, and how fast is it moving? This is a key component to determining where chemicals in the environment will move.



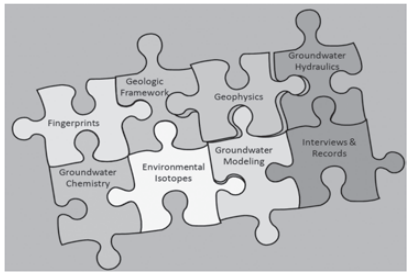
The investigation scope also will be influenced by the exposure pathways (groundwater ingestion, indoor air, direct contact with soil or water, etc.) that are considered complete and the purpose and objective of the investigation (e.g., source containment or removal, migration or exposure control, or site closure). The exposure pathways that are complete will likely need to be evaluated and addressed through the implementation of legally-enforceable agreements, restrictive covenants, or institutional controls. Legal counsel may help negotiate the extent of liability, the exposure pathway evaluation, or alternative controls that may be utilized, which, in turn, may then shape the scope of a more robust CSM or whether a more robust CSM needs to occur at all. Sometimes the revised CSM is as far as you have to go.

What influence may agency negotiations and resulting legal agreements have on the story? For example, if the groundwater ingestion pathway is complete, but the client (with the help of its consultant and counsel) is able to negotiate an agreement with the regulatory agency or private parties to address the pathway through a control mechanism, such as a restrictive covenant or institutional control, invasive soil or groundwater sampling to evaluate this pathway as part of the CSM process may be reduced or eliminated. Similarly, a direct contact pathway may need to be addressed through engineering controls, restrictive covenants, or deed notice; or an indoor air pathway may be addressed through presumptive mitigation measures. Again, how your team tells the story, or paints the picture, may limit investigative costs to develop the CSM and, ultimately, the scope and cost of any remediation.

However, if your site is complex, there are pathways that remain unaddressed, or you are in litigation and are trying to show that your client is not responsible for a release or is only responsible for a portion of the release, a more robust model is likely needed.

Robust Conceptual Site Model

A CSM can be significantly enhanced by integrating more advanced data such as groundwater modeling, chemical fingerprinting, and isotope testing. If the CSM is accurate, site-specific data can be used to "ground truth" the CSM and the conclusions drawn about chemical fate and transport. Ultimately, does the "feedback" fit the rest of the picture?



Groundwater modeling can be used to explain the past, corroborate the current, and predict the future. Groundwater models are used to answer questions such as:

- Who is responsible for all or a portion of a release?
- When did the release occur?
- Why is contaminant level falling?
- Are there enough (pumping) wells to capture a plume?
- When will the contamination reach a property boundary or water well and at what levels?

Imagine trying to describe the Apollo rocket to someone by describing every nut, bolt, panel, heat shield, computer chip, switch, thrust, etc. Their eyes will gloss over and they will be lost in a few minutes. But show them a picture of Apollo 13 and they will understand it immediately. Cases are won and lost by convincing administrative agencies, judges, and juries about what happened, what is happening, or what is most likely to happen. A key factor is turning data and information into an easy-to-understand story. As with any story, pictures are easier to understand than words, especially technical and chemical terms. Creating a strong, robust CSM makes it easy to answer the key questions:

Is there a problem?

Whose problem is it?

How do you know?

A robust CSM also makes it easier to convey the answers to these questions to others, which can be critically important if those others include a regulator, a judge, or a jury.

1. ASTM. 2006*Standard Guide for Development of Conceptual Site Models and Remediation Strategies for Light Nonaqueous-Phase Liquids Released to the Subsurface.* Method E 2531-06e1. www.astm.org/Standards/E2531.htm.

2. ASTM. 2014. *Standard Guide for Developing Conceptual Site Models for Contaminated Sites*. Method E 1689-95.www.astm.org/Standards/E1689.htm.

3. ITRC (Interstate Technology & Regulatory Council). 2012. *Incremental Sampling Methodology. ISM-1*. Washington, D.C.: Interstate Technology & Regulatory Council; Sampling, Incremental Sampling Methodology Team. www.itrcweb.org.

4. US Army Corps of Engineers. *Conceptual Site Models*, Environmental Quality. EM-200-1-12. December 28, 2012.

5. U.S. Environmental Protection Agency (US EPA), 1989. Risk Assessment Guidance for Superfund, Volume 1: Human Health and, Volume 1: Human Health Evaluation Manual, Part A, Interim Final. EPA/540/1--89/002.

6. U.S. Environmental Protection Agency (USEPA), 2001. Improving Sampling, Analysis, and Data Management for Site Investigation and Cleanup (Fact Sheet). EPA --542 --F--01--030a. April. pp. 1--2. Available online at Available online at http://cluin.org/download/char/542 http://cluin.org/download/char/542.