

## The Environmental Corner

*By: Steve Henshaw, President and CEO of EnviroForensics*



### Long-term Stewardship of Contaminated Sites, Vapor Intrusion Mitigation and Monitoring Fit The Requirements

The latest wrinkle in the cleanup process of sites contaminated with chlorinated solvents (PCE and TCE) is in understanding how long the site and those sites downgradient, will need to be monitored when complete contaminant removal is not possible and potential human exposure remains. Generally speaking, the more contamination left in place, the longer the site will need to be monitored. I want to tell you this because the cleanup costs that will be generated for your site, will be greatly affected by two things; 1) the removal of contaminated soil and groundwater in the source area and 2) the long-term monitoring requirements (how many locations need to be monitored and for how long). If you are not aware of these two big issues, you are not looking at the full picture and you could be unwittingly reviewing cleanup cost estimates that may have been prepared using the old “bait and switch”.

Let me make no bones about it, the environmental consulting industry is highly competitive and like many purchases consumers make, price is a large factor when you select a consultant to clean up environmental contamination. Nowhere is this price more susceptible to variation than in asking for the consultant to give a true site closure cost estimate. The most important thing to understand about what I am telling you is that you know to ask the hard questions about the provided cost to closure and don't get caught up in hearing

what you want to hear. Consultants don't enjoy being the bearer of bad news and they realize that they might be competitively shopped, especially if the provided costs are higher than the party paying for the contamination expects. Consequently, the consultant may try to soft pedal the remediation costs. I refer to this as, “telling people what they want to hear”. I see this all the time, particularly when insurance companies are responsible for paying for the cleanup.

*Continued on page 2*

*As Seen In...*

**Cleaner &  
Lauderer**

**December 2014**

When we prepare a cost to closure estimate, we calculate in the cost for the remediation of the soil and groundwater and we calculate a separate section that deals with the cost to monitor potential human exposure from the remaining groundwater plume and more importantly the vapor intrusion risk associated with that plume. Many consultants will address some source area cleanup, but then assume that the site can be closed using risk based cleanup criteria for the residual impacts to estimate the elimination of exposure. They omit, however, a fundamental risk closure concept, which is that the long-term protection of human health must be demonstrated to the regulatory agency for the long-term. To be clear, if contaminated soil and groundwater is left in place, long-term monitoring will be required to be protective of human health.

Long-term protection of human health has been named Long-term Stewardship (LTS) by regulators and the associated costs are real and they can be significant. Probably the biggest cost associated with LTS is the cost to continue to ensure that people are not breathing contaminated air that is created when volatile organic compounds known as VOCs, such as PCE and TCE, partition from the contaminated soil and groundwater to a volatile state and migrate as a vapor into basements and buildings. This process, known as vapor intrusion, has been highly scrutinized by the regulatory agencies in recent years and is one of the exposure pathways that need to be addressed when requesting site closure.

Vapor intrusion meets the criteria for LTS when contamination is left in place close to a home or building. To satisfy the regulators that long-term protection of the public health will be

monitored and addressed if unacceptable, a plan will be required laying out the proposed steps to be taken, alongside the proposed remedial action. The LTS plan's activities will need to present precisely which properties will need to be monitored, the criteria for which they will be monitored, the monitoring frequency and the length of time (e.g. how many years into the future). Determining how many properties will need to be monitored is based on many factors including the levels of contaminants left in the soil and groundwater, the depth to the contaminated groundwater under houses and buildings and the historical vapor intrusion data collected in specific structures and homes.

If vapor mitigation systems such as sub-slab depressurization systems were installed in homes and buildings as part of the environmental assessment, these systems will need to be maintained for years to come. The fans in the systems are typically expected by their manufacturer to last about 7 to 10 years, but they will need to be inspected on an annual basis to ensure they are operational. The cost to operate the system's electrical fans will need to be accounted for in the plan as well and that can run between \$5 and \$15 per month. Costs will also be incurred since vapor sampling will need to be conducted periodically to ensure that the vapor mitigation systems are operating as designed. Buildings and homes that are within the impacted footprint, but where no vapor mitigation systems were installed will still need to be monitored to ensure that vapor intrusion is not occurring and the public is being protected.

So now we have costs for maintaining vapor mitigation systems annually, testing vapors in homes (which

would probably start out annually, maybe even semi-annually and then be reduced to bi-annually and maybe every 5 years as time goes by) and reporting the results to the agency and the property owners and occupants. Many states and the US EPA are also requiring a financial assurance component of the LTS plan to ensure that funds are available to pay for it.

We also need to determine how long into the future the monitoring and system operation and maintenance will be required. The monitoring time requirement will vary from site to site depending on the site specific conditions, but it is not unreasonable for the monitoring period to extend for a minimum of 10 years and as many as 50 years or more. Probably a safe method for estimating the LTS costs would be to plan for between 25 and 30 years into the future. A reasonable minimum cost estimate to conduct Long-term Stewardship on a small building or home is in the vicinity of \$2,500 per event, which ends up being in the range of \$55,000 per location over the life of the LTS.

In summary, understanding that if contaminated soil and groundwater is left in place and a vapor intrusion risk to human health exists then LTS activities will be required as part of obtaining site closure. The costs to conduct Long-term Stewardship, including vapor monitoring and mitigation system operation and maintenance, is significant. Knowing that these costs are real, you won't be misled when a consultant provides you with a cost to closure that does not include LTS costs. At times, the cost of LTS activities to be performed dur-

*Continued on page 3*

ing the post-closure time period could even become greater than the cost of performing additional source removal during remediation activities. This is another consideration that should be made when reviewing cost to closure cost estimates.

Remember, the bulk of cleanup costs are associated with either removing the contaminated soil and/or groundwater mass in the source area during the early stages of the remediation, or in monitoring the protection of human health for approximately 30 years into the future. If someone is telling you another story they may also have some great swamp land you could invest in.

*With 30 years of experience, Steve Henshaw holds professional geology registrations in numerous states. As President and CEO of EnviroForensics, Henshaw serves as a client and technical manager on projects associated with site characterization, remedial design, remedial implementation and operation, litigation support and insurance coverage matters. He has acted as Project Manager or Client Manager on several hundred projects involving dry cleaners, manufacturers, landfills, refineries, foundries, metal plating shops, food processors, wood treating facilities, chemical blenders and transportation facilities. Henshaw has built a leading edge environmental engineering company that specializes in finding the funding to pay for environmental liabilities. By combining responsible party searches with insurance archeology investigations, EnviroForensics has been successful at remediating and closing sites for property owners and small business owners across the country, with minimal capital outlay from clients. He is a regular contributing writer for several dry cleaning trade publications on environmental and regulatory issues and remains active with dry cleaning associations by providing insight on changes in law and policy. Contact [www.enviroforensics.com](http://www.enviroforensics.com); e-mail: [shenshaw@enviroforensics.com](mailto:shenshaw@enviroforensics.com).*