

Virtual Ground Water Monitoring and Remediation: Where Do We Go from Here?

by Michael J. Barcelona

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Ground Water Monitoring & Remediation grew out of the need for ground water and associated scientific professionals to have a forum for the free exchange of ideas on the evaluation and treatment of contaminated subsurface systems. The contributions of our readership have had major impacts on the quality of our practice and the discovery of new approaches to confront the real obstacles we encounter as we work to improve the environment. Winter is over. On its cruel heels a balky spring gives promise of the rebirth of the earth's magnificence and reason for renewed optimism.

New submissions to our publication were up by more than 20 percent this year over each of the past 17 years. Most of these papers address new approaches to nagging difficulties in meeting the letter and spirit of regulation as well as the real fiscal and time constraints we live with daily. We've recognized the importance of natural processes (e.g., sorption, dispersion, poor-mixing, and biogeochemical processes) which act to reduce the environmental consequences of past product and waste management practices. The importance of exposure and risk reduction as well as cost-benefit considerations are well recognized.

Monitoring tools have improved in their value and quality. We have clearer paths to follow in the discovery of nonaqueous phase contaminant residuals via targeted soil gas measurements

coupled with improved multiphase modeling approaches. The value of geochemical measurements and discrete, lower cost, multilevel piezometer, drivepoint profiling, water sampling, and field analysis techniques add real value to even the simplest underground storage tank investigations. Minimal-draw-down, low-flow purging and sampling methods reduce the volumes of investigation-derived wastes, thus reducing our potential exposures to contaminants as well as the time and cost of our projects.

Remediation efforts have advanced far beyond pump-and-treat hydraulic containment actions. Newer methods have been implemented which minimize the intermedia contaminant transfer and inefficiencies associated with past efforts. Coupled soil vapor extraction and bioventing strategies are beginning to show real promise. Reactive transport model applications have led to more focused remedial actions and the use of integrated vapor, surfactant, and cosolvent-based contaminant extraction methods. Eventually, enhanced in situ bioremediation and bioaugmentation strategies will treat dissolved contaminant plume exposure potentials. One would think that before the next decade passes we'll be back building facilities and opportunity rather than remediating past problems.

Remnants of the past exceptionally hard winter persist, however. We have recently been beset

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by select portions of the industry and national standards organizations which, on the blurry mission to reduce costs, seek to remove experienced professional judgment from the pursuit of the monitoring and remediation objectives of the last two decades. Standard practice guidance and manuals for previously tailored investigation and cleanup projects could be reduced to rote, robotic malpractice if they are adopted. These changing "standards" are not unique to our industry. Geotechnical, automotive, health care, and biomedical groups have experienced the same type of "creep" in professional practice. We must be alert to the threat represented in the intellectual slide to a '50s "all's well" mentality. Here are some things we need to consider carefully.

In the monitoring arena, we need to recognize that "nonpurge" approaches to the diagnosis and surveillance of contaminated properties are hopelessly inadequate and draw well-deserved public criticism and regulatory doubt. They represent retrenchment from the real world. Produce (i.e., fruits, grains, and vegetables) represents only part of a diet. The proposal of these procedures and their subsequent adoption recently in some previously "enlightened" areas of the country will lead to more expense, litigation, and citizen outrage. We cannot allow this to spread; vocal peer-reviewers are asking "where's the protein?"

Remedial strategies have become more efficient, focusing containment, removal, and risk abatement actions where these options make sense. Risk-based

corrective actions have a place now and in the future for some contaminated sites. As we confront the complex challenges of remediation and redevelopment of urban brownfield properties, all of the collective advances of the past will be needed to find solutions with which we can live.

We are up to the challenge, but we need to tend our garden, lest the harvest suffer. There'll be more to come, I hope, from you, our readership. Please let your voice be heard in our collective backyard.

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