

Team Approaches to the Development of Innovative Technologies and Processes to Facilitate Remediation

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The enactment of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) created a complex liability scheme for owners, operators and prospective purchasers of contaminated properties, particularly brownfields. As the program developed, liability issues related to contiguous property, prospective purchasers, and no further action determinations became barriers to brownfield property redevelopment. The national effort on the cleanup and redevelopment of brownfield sites took on new emphasis with the passing of the federal "Small Business Liability Protection and Brownfields Revitalization Act" in January 2002. This new law provides liability clarifications as well as funding to facilitate the cleanup of brownfield sites. President Bush stated in his 2003 State of the Union address, "In this century, the greatest environmental progress will come about not through endless lawsuits or command-and-control regulations, but through technology and innovation." The subject of this article is the Interstate Technology Regulatory Commission's Brownfield team, its current initiative, goals, and areas of special focus. © 2003 Wiley Periodicals, Inc.

INTRODUCTION

The redevelopment and cleanup of contaminated sites poses serious problems to communities across the country. Abandoned and contaminated properties known as brownfields are often located in the center of blighted areas. These blighted, underutilized properties can negatively impact the quality of life by contributing to the economic decline of an area and pose a threat to human health and environment.

There are many models and case studies that can be followed to facilitate the cleanup and redevelopment of brownfield sites. The redevelopment and reuse of brownfield properties has been a focus of the United States Environmental Protection Agency (EPA) and state governmental agencies for the past eight to ten years. The need to put these abandoned, underutilized properties back on the tax rolls, and back into productive reuse is a struggle that many communities are trying to overcome. The continued development and re-evaluation of existing brownfield programs is required to address the ever-changing landscape of brownfield sites. Many of the larger sites that had the right location have in the most part been cleaned up and developed. Many communities now struggle with how to entice developers to cleanup and redevelop the smaller properties located in less desirable locations. Defining and identifying tools for addressing the environmental concerns at contaminated properties and the evaluation of potential innovative technologies can enhance a redevelopment project. Innovative technologies can be used to facilitate cleanups and thereby assist in providing a sustainable approach to land management; however, these technologies are often not selected because of concerns regarding the use of

the technology and costs associated with implementation. Earlier technologies took a long time to deploy and implement than more traditional remedial measures. In addition, earlier technologies were not often considered a cost effective alternative to the more traditional methods of cleanup.

INTERSTATE TECHNOLOGY REGULATORY COUNCIL

The Interstate Technology Regulatory Council (ITRC) is an organization that has successfully demonstrated the use of innovative technologies and processes for remediating contaminated sites. The ITRC is a state-led organization that works with various stakeholders in the development of environmental technologies and strategies. The ITRC consists of approximately 40 states, federal partners, industry participants, community organizations, tribal nations, and other environmental organizations. Their team approaches to evaluating and investigating the use of innovative technologies produces a structure to facilitate the acceptance and use of these technologies. By gaining the support and acceptance of various interested parties, the testing, demonstration, and use of a technology can be enhanced and the regulatory processes can be streamlined by gaining a state's approval. The consensus approach employed by the ITRC team increases the knowledge base of the scientific data used in the development of that technology. This, in turn, promotes and provides a level of comfort to industry, consultants, and states that may otherwise be skeptical of using an innovative technology. The ITRC accomplishes its goals by using a team approach for developing guidance documents on the use of a technology as well as offering training sessions on its implementation. This allows for the maximum integration of the technology as an acceptable remedial option and meets the needs of the state regulator and the technology user. Moreover, the ITRC team approach provides the forum for the development and successful demonstration of a technology thereby saving time and money for the end user.

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Some of the benefits that the ITRC team approach provides include:

1. An atmosphere that promotes the thorough investigation of topics using the best available scientific data while soliciting the input from all team members;
2. A forum for technology developers to collect and disseminate data to multiple state agencies therefore eliminating the need for a technology to be demonstrated over and over again for individual states;
3. Networking among various stakeholders and members of the environmental community in a manner that promotes new ideas and encourages diverse critical thinking while building a consensus among Team members; and
4. Sharing of consistent information by making case studies readily available and ensuring the proper implementation of a technology through various training methods.

The "environmental community" approach used by the various teams of the ITRC allows stakeholders to learn from one another and create value in the implementation of their products and services. Team participants have the opportunity to voice their opinions and learn from one another the successes and failures of a technology. Teams are formed around a topic that is identified as an issue for a number of states in the remediation of contaminated sites. A team leader from one of the participating states is identified and a work plan is developed to address the topic. In the work plan the steps for

evaluating the issue and a timeline for implementation is developed. At this time an announcement goes out to the entire ITRC membership to solicit participants for the team, team members are identified, and the process is initiated.

Team-produced documents and technology validation have been undertaken with noted successful outcomes. Many examples of these success stories can be found on the ITRC website www.itrcweb.org. From shortening approval times and cutting costs to finding better solutions to address contamination, the teaming of various stakeholders is paving the way for new technology implementation and exploration.

The ITRC teams develop a five-year plan to solicit data, investigate technical areas, develop ideas for addressing an issue, prepare guidance documents for the use of a new technology, and provide training on the implementation of the technology. It should be noted that all guidance documents can be downloaded from the website. The complete listing of ITRC teams for 2003 can be found in Exhibit 1.

ITRC—BROWNFIELD TEAM

The Brownfield Team, established in 2001 was assembled to investigate new approaches to the remediation and redevelopment of abandoned, underutilized contaminated sites found in many of the urban areas across the country. The team consists of over 40 participants representing various stakeholder groups. Initially, the team focused on identifying ten model sites across the country that could be investigated to determine what strategies were implemented to address the contamination and redevelopment of the site. A schedule was devised to visit the site and interview all individuals that had a role in the remedial activities and ultimate redevelopment of the site. Interviewed individuals included the mayor of the town, community organizations, the developer, the financial institution that provided funding for the project, in addition to the state and federal regulatory personnel that provided oversight for the remedial activities. The process is being undertaken to ascertain "what is working and what is not" in the cleanup and redevelopment of brown-

Alternative landfill Technologies
 Brownfields
 Constructed Wetlands (not funded in 2003)
 Contaminated Sediments
 Dense Nonaqueous Phase Liquids
 Diffusion Samplers
 In Situ Bioremediation
 In Situ Chemical Oxidation (not funded in 2003)
 Mitigation Wetlands
 MTBE-Contaminated Groundwater
 Permeable Reactive Barriers
 Radionuclides
 Remediation Process Optimization
 Risk Assessment Resources
 Sampling, Characterization, and Monitoring
 Small Arms Firing Range
 Unexploded Ordnance

Exhibit 1. Interstate Technology Regulatory Council teams

field sites across the country. The data are still being compiled and five sites remain to be visited and interviews completed. A document containing the case studies and data associated with the model site project will be available at the end of 2003. Simultaneously, the team initiated three subgroups that are currently gathering data and investigating topics such as the dynamic workplan or Triad approach to sampling and gathering data at sites to facilitate the remediation and redevelopment, indoor air and vapor intrusion issues, and finally long-term monitoring and maintenance of engineering controls at brownfield sites.

Triad Approach Subgroup

The Triad subgroup was responsible for the investigation of the applicability of the Triad approach and recently has decided to join the efforts of the ITRC Sampling, Characterization, and Monitoring Team that is also currently collecting data regarding improving the performance of remediation as a result of innovations to the sampling methods currently being implemented in the field. The Triad approach consists of three components: (1) systematic planning; (2) dynamic work plans, and (3) real-time characterization data collection. In the field of brownfield cleanup and redevelopment it is thought that this tool could produce cost savings by providing the real-time analysis of data. The Triad approach is being studied and supporting data will be made available in the future. Visit the ITRC website for additional information on the projects being developed by the Sampling, Characterization, and Monitoring Team.

Indoor Air and Vapor Intrusion Subgroup

The findings so far indicate that direct measurements of potential contaminants are often subject to interferences that normally occur in households and other buildings.

The indoor air and vapor intrusion issue is being identified at many sites across the country due to residual contamination remaining in place and, in certain instances, remaining in groundwater. The Indoor Air and Vapor Intrusion Subgroup of the ITRC Brownfield Team are investigating how to handle these situations as well as develop a process to lessen the occurrence. In some instances where structures, sometimes of historic nature, are being rehabilitated a process to contain and address vapor intrusion is being evaluated to abate the concern. Preliminary data collection has included gathering information on indoor air quality and vapor intrusion of asbestos, radon, pathogens, particulate matter, carbon monoxide, and other volatile toxins. The findings so far indicate that direct measurements of potential contaminants are often subject to interferences that normally occur in households and other buildings. Sampling the sub-slab was investigated as an option for obtaining credible samples but was determined to be destructive to the slab. In addition, discussions on the use of modeling such as the Johnson & Ettinger Model, have taken place to determine the impact of contamination. Some other strategies being evaluated are passive abatement strategies, interim actions, and long-term strategies to address the contamination. A number of case studies are being evaluated and will be included in the final document produced by the subgroup.

As the study of this topic moves forward a guidance document will include a discussion of the relative risks associated with vapor intrusion. Moreover, the document will include the development of how to inform brownfield practitioners on when to evaluate for the problem and when vapor intrusion should be addressed during the redevelopment process. For example, during the due diligence Phase I process, during the Phase II site assessment, and when establishing cleanup criteria.

A draft vapor intrusion document should be available by late 2003.

Long-Term Maintenance of Engineering and Institutional Controls

The Long-Term Maintenance of Engineering and Institutional Controls subgroup is evaluating the long-term maintenance of engineering and institutional controls at contaminated sites and is currently compiling data from various state and federal government sources.

When contamination remains at a site most states require a document such as a deed notice that outlines the restrictions placed on the property to prevent future exposure. In addition, many states require the environmental agency to notify the municipality that contamination remains on the site and, if necessary, take the extra precaution of listing the restrictions on a document that remains at the site. Moreover, it has been learned from the data collection effort that some states require a person to notify the municipality or state regulatory agency before they start any redevelopment at the site if the redevelopment activities have the potential to disrupt the engineering control or disturb the contamination that remains on the property. The implementation of such requirements such as identifying the start date of the redevelopment, the name, address, and business telephone number of the person implementing the redevelopment as well as a brief description of the redevelopment activities will allow municipal or state regulatory agency personnel to track the disturbance of contamination and ensure that exposure is limited. In addition to these precautions some states are requiring that the regulatory agency or local health department inspect the sites in a specified time to ensure that the engineering controls are being properly maintained and remain protective of human health and the environment. For example, in the state of New Jersey the "Brownfield and Contaminated Site Remediation Act" of 1998 requires the New Jersey Department of Environmental Protection to approve the use of an institutional/engineering control and for the agency to inspect the site at least once every five years to ensure that the controls are being properly maintained and remain protective of public health and the environment. It also provides that any subsequent owner, lessee, or operator submit to the agency a certification that the controls are being properly maintained and protective every two years. Moreover, it provides that the property owner of the site shall notify any person who intends to excavate on the site the nature and location of contaminants to prevent exposure pathways. To ensure that these steps or precautions are being continually implemented the person who established the control must maintain their current address with the agency in the event they need to be contacted should additional remediation need to be performed.

Another example of how some states are evaluating various options to track the long-term maintenance issue is a pilot test project that was completed in Oregon. Several years ago in Portland, Oregon, a pilot test was completed to evaluate the use of the State's "one-call" system as a mechanism to keep track of the use of engineering controls, ensure they remain protective, and prohibit exposure to remaining contamination. The "one-call" system was established to provide excavators with the location of all utility lines prior to the excavation of the site. The system establishes a telephone hot line that developers, excavators, and other parties can dial to notify utility companies of future excavation activity and this enables the utility companies to visit the site and identify their utility lines to avoid accidental damage to them during the excavation activities. The City of Portland implemented the identification of environmental concerns as part of this effort. This pilot test has proven to be successful although the long-term maintenance of the environmental information on the system

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became an issue. Many states have evaluated the use of the “one-call” system as a control mechanism to keep track of engineering and institutional controls. However, the question of how to address the maintenance of the environmental information to enable this system to be used efficiently and cost effectively is a point of discussion and should be evaluated. The Long-Term Maintenance of Engineering and Institutional Control subgroup will discuss the “one call” system as a viable option as well as potential solutions to the maintenance of environmental data and information.

CONCLUSION

The use of the teaming approach and the tools that the ITRC offers can truly assist in the cleanup and redevelopment of urban areas as well as brownfield sites across the country. The goals of the ITRC include: (1) achieving better environmental protection through innovative technologies, (2) reducing the technical and regulatory barriers to the use of new environmental technologies, and (3) building confidence about using new technologies. Additional services and products offered by the organization include regulatory and technical guidelines, technology overviews, case studies, peer exchange, technology advocates, classroom training courses, and Internet-based training sessions. Some of the successes that the ITRC has created while tackling regulatory barriers include the clarification of RCRA 3020(b) that furthered the deployment of in-situ technologies, i.e., state officials integrating the use of ITRC documents into its processes. In the approval time of a natural attenuation remedy, Kansas officials have reported an estimated savings of 50 percent.

The use of the ITRC as a forum to discuss broad-based issues such as the topic of brownfields allows for a free flow of information between states and stakeholders thereby removing barriers. This process, in turn, generates alternatives to the cleanup and redevelopment of brownfield sites across the country.

Remediating and encouraging the redevelopment of contaminated properties facilitates the urban, developed communities to rebuild themselves—providing safe communities by eliminating the environmental eyesore, providing jobs, and improving the quality of life for its citizens.

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