

***BASIC PROGRAM ELEMENT:***  
**Bioremediation and its Societal  
Implications and Concerns**

## Communicating Effectively with NABIR Stakeholders

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Based on preliminary work in FY98, public engagement events were tested to attempt to reduce suspicion and forestall conflict in the conduct of bioremediation research and the siting of Field Research Centers. Many public engagement forums are known for the tendency to communicate in hostile, polarizing or problem-centered ways. In contrast, the design we tested brought together three groups not often exposed to one another: NABIR scientists, seasoned stakeholders and previously uninvolved stakeholders. We focused interactions in micro-community systems of three to 20 people rather than a presentational or expert-based forum that depended on one-to-many communication. Our goal was to place public science in a context that encouraged discussion of a range of issues associated with bioremediation and Field Research Centers. We developed a design that encouraged citizens and scientists to interact and included scientists as stakeholders. From previous work, we were interested in (1) the development of trust; (2) identifying scientific and programmatic information needs; (3) the process of communication; (4) identifying issues and concerns; (5) discovering ways for citizens and scientists to engage in productive dialogue; and (6) identifying the strengths and limitations of dialogue methods for use in public engagement.

Our events were designed to explore one general research question and a number of derivative questions. The general question was: Can dialogue be used in an engagement event to enable scientists, policy makers, internal stakeholders, and external stakeholders to discuss basic science in productive ways? Other questions included: Can the way NABIR scientists communicate about NABIR science enhance trust? Can scientific information be conveyed interactively using dialogue design and techniques? Does dialogue provide a clear alternative to expert delivery models that currently prevail? What kinds of scientific information are required to initiate a productive dialogue about science? What kinds of information needs must be met for productive dialogue? What kinds of communication skills are used in productive dialogue? What does productive dialogue look like? Does productive dialogue look the same to all participants? Can event design be used to construct a context in which productive dialogue can occur?

The Public Dialogue Consortium of Albuquerque, N.M., was chosen to conduct the events. Their facilitators are experienced in handling contexts with widely varying histories and degrees of conflict, and are familiar with DOE's issues and interested parties. Preliminary results identified five categories of concerns: environmental and economic impacts; allowing scientists to do their jobs; public understanding of the problems, techniques and results of NABIR science; programmatic strategies and policy issues; the current state of knowledge about bioremediation; the problems to which bioremediation is being applied; and the micro-organisms being studied. During the events, all three participating groups contributed to each category, all of which overlap. However, given the interests of the three groups, the first three areas of concern seem particularly appropriate to group-specific interests. Although it is clear that a dialogue method of public involvement supplements rather than replaces other methods of information-gathering, the use of small groups and the participants' mixed levels of expertise made it possible for novices and experts to interact without fear of ensuing conflict.

# The Determinants of Social Acceptability of Genetically Engineered Microorganisms for Remediation: Applying the Public Acceptability of Controversial Technologies (PACT) Framework to Improve Communication

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This project builds upon a previous NABIR/BASIC effort that produced a conceptual framework—PACT (Public Acceptability of Controversial Technologies)—that addresses the social acceptability of the site-specific use of genetically engineered microorganisms (GEMs) for remediating hazardous waste. “Acceptability” is defined as serious consideration, as opposed to out-of-hand refusal to consider, and is distinct from technology selection or deployment. We focused on GEMs as a member of a class of controversial technologies for which society regularly faces public policy choices about technology adoption and implementation.

PACT has the following three overarching goals: (1) enhance understanding of the interactions among stakeholder groups that lead to context-specific, formalized decisions about the acceptability of controversial technologies; (2) provide insights into the dynamics of that decision-oriented dialog process; and (3) establish a basis for recommendations to improve the ability of stakeholder groups to engage in productive dialogs that lead to deliberate decisions about the use of technologies. The model is structured along four dimensions. The first dimension, the decision-rule continuum, describes the dynamics of multi-constituency group dialog over time. The second dimension consists of constituency groups’ values, motivations and strategies, within the general context of bioremediation. The third dimension encompasses specific attributes of bioremediation strategies relative to other remediation technologies. The fourth dimension consists of the physical, social and institutional context within which cleanup decisions are made.

In the past year we have worked to refine PACT—primarily its dialog and constituency group dimensions—by examining empirical evidence of cleanup-related dialog. Specifically, we focused on one institutional structure for public participation promoted by the Department of Energy, site-specific advisory boards (SSABs). We analyzed audio or video recordings of SSAB meetings held during the course of one year at three of the 12 DOE sites that have these formally chartered advisory groups. Because GEMs were not discussed and other types of bioremediation rarely were mentioned, we looked to the SSAB meetings mainly to detect patterns evident in cleanup-oriented dialogs. As examples, we investigated the kinds of technological issues raised and the issues that seemed particularly controversial. We also examined the kinds of constituency groups represented at the SSAB meetings, how they presented their positions and how they shifted their positions over time.

Among our preliminary findings are the following: SSABs function very differently at the various DOE sites, affecting who participates, the process of interaction and the kinds of issues discussed. Further, the issues discussed reflect the sites’ social, physical and institutional attributes—though there are similarities across sites, there also are striking differences. Thirdly, the SSAB meetings contain relatively little discussion of the technological and risk-related attributes of various cleanup options.