

# Northeast States' Improving the Quality of Site Characterization Conferences

## Survey Results

The Northeast Waste Management Officials' Association (NEWMOA), the Environmental Protection Agency (EPA) Region 1, and the EPA Technology Innovation Office (TIO) sponsored two one-day *Improving the Quality of Site Characterization* conferences in the region; on June 4, 2002 in Manchester, New Hampshire and again on June 6, 2002 in Farmington, Connecticut. The purpose of the conferences was to raise awareness of state and federal concerns about the traditional approach to site characterizations and present strategies and technology options that can help improve information collection and decision-making. As part of the conferences, NEWMOA distributed a survey to each participant to obtain attendee perspectives on the barriers to the greater use of flexible work plans and field-based analytics and their recommendations.

The survey asked participants to consider three issues: barriers to flexible work plans, barriers to field-based analytics, and the most effective outreach & training methods. Respondents were given the opportunity to describe the existing barriers or drawbacks that exist and then provide recommendations for improving their use within site characterization. Each participant was further given the opportunity to indicate the most effective means of outreach/training methods and suggest the subject matter. A total of 79 responses were received from the individuals who attended the conferences: 49 Consultants, 21 Regulatory personnel, 7 Facility/PRP personnel, 1 Environmental Lab Technician, and 1 Vendor. The following is a summary of the responses received from the three main categories of participants: consultant, regulatory staff, and facility/RFP representatives. NEWMOA and the states plan to utilize this information to better understand the issues surrounding dynamic work plans and field-based analytics, and to help focus future efforts to improve the quality of site characterization.

### 1.0 Consultant Responses

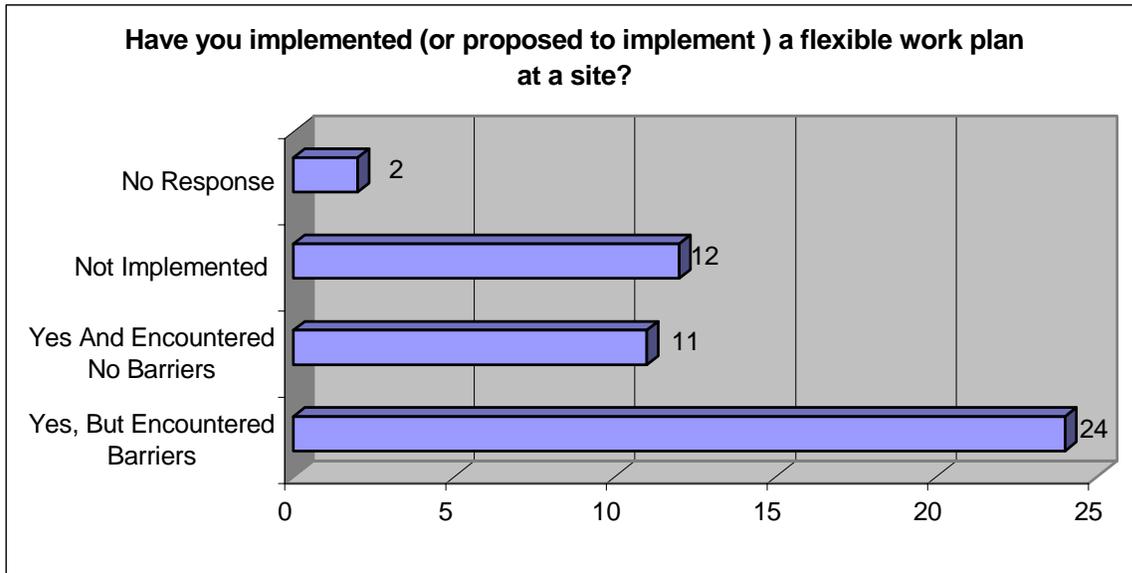
#### 1.1 Barriers to the Flexible Workplans

The consulting industry represented a majority, 62% (49 out of 79) of the respondents at both conference locations. Of the consultants, 71% (35) stated that they implemented flexible work plans at a site. Approximately 68% (24) of the consultants who implemented flexible work plans encountered obstacles.

One of the areas of concern involves the costs of implementation and use of a flexible work plan. Budgeting and funding for a site characterization requires a defined or fixed scope. Consultants state that clients are hesitant to fund a flexible work plan that could expand in field and increase costs. Due to the variability of contamination between sites, convincing clients that an "open budget" is required to allow flexibility in the field is extremely difficult.

Another area of concern involves the qualifications of on-site personnel. The respondents recognize that to be effective, flexible work plans are dependent upon the level of experienced field personnel implementing the work plan. As discussed later, many of the field-based

personnel lack a certain level of training and experience. Consultants report that obtaining qualified field-based personnel is difficult and believe that their use requires additional project funding.



The consulting community cited regulatory agencies' lack of understanding and acceptance of flexible work plans as another major obstacle. Respondents assert that a general sense of mistrust exists between the regulatory agencies and consultants regarding the implementation and use of flexible work plans. Given the amount of flexibility, regulatory agencies worry about the validity of data and the lack of adherence to mandated state policies. Consultants cite the lack of guidance and protocols by the state and federal agencies as the primary cause. As a result, consultants report they spend a great deal of time validating flexible work plans to the regulatory agencies instead of implementing them.

Some of the representative comments regarding the implementation and use of flexible work plans include:

- “Generally accepted practices have prevailed and have been successful and are more predictable (i.e. budgeting).”
- “I think a 1-2 week break between phases is better than overnight changes in approach.”
- “Within organizations - requires either more senior-level field staff or senior-level field staff continuously available by phone which increases costs.”
- “Ability to use [this approach] is highly dependent upon the qualifications of field staff...”
- “Requires a lot of dialogue with regulators.”
- “Submitting open-ended work plans is tough to get regulatory approval.”
- “Regulatory agencies still require going through too many convolutions to easily/cost effectively implement.”

### **1.1(a) Recommendations**

Getting the relevant parties to agree on an established set of protocols and guidelines is also seen as major deterrent to the implementation and use of flexible work plans. Consultants are looking

towards the states to take the lead role on this issue. Many of the suggestions on improving the use of flexible work plans and expediting their acceptance involve state agencies developing “guidance documents”. These documents would be used for making decisions about the required level of certainty for regulatory decisions (a decision tree/template of regulatory acceptance). Regulatory agencies could also promote and educate the consulting community on the type of flexible work plans that have been approved (via websites, memos, publications, workshops, and federal orders).

Some of more prevalent comments addressing how to make flexible work plans common included:

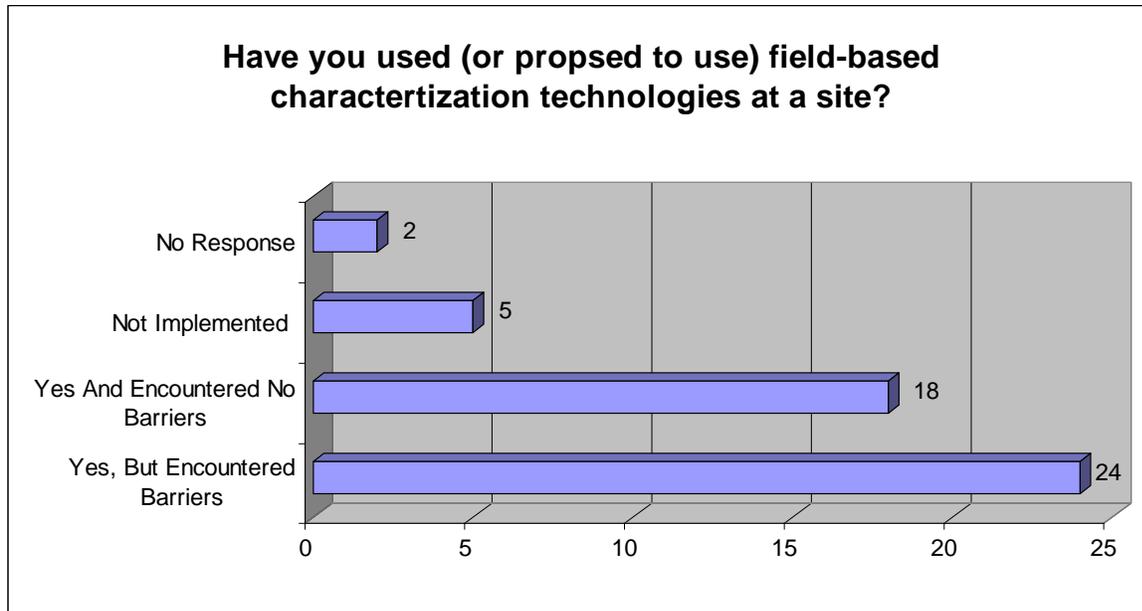
- “State Protocols/guidance documents.”
- “SOPs and guidance from regulators. More training and case studies.”
- “Provide examples which have been effectively implemented.”
- “Provide regulator accepted decision tree template.”
- “Educate regulators... once regulators are more accepting, then clients will be amenable to using this approach.”
- “Regulatory agencies really need to focus on individuals within the regulatory agencies.”
- “Client education regarding benefits of approach.”
- “Make more predominant on websites (i.e. Government EPA/State).”

## 1.2 **Barriers to the Field-based Analytics**

Of the consultants who responded, 83% (42) reported using a field-based site characterization technology on-site. Field-based GCs, PIDs, and XRFs were the most commonly mentioned in the responses. The following is chart provides a breakdown of the technologies most commonly used by consultants. Please note that the technology types listed are those written in on the survey by the respondents, and therefore the technology used is sometimes not clear.

Field-based Technology	Responses	Type of Contaminant(s)
Field GC	14	PAHs, PCBs, VOCs, BTEX
PID	13	
XRF	11	Metals
Immunoassay	7	PCBs, TPHs
PID for Soil/Gas	6	
Petroflag	5	TPH
Direct Push Sampling	6	VOCs, PAHs, Ground water sampling
Metals Screening	2	
UVF	2	Multi-contaminants
Dexsil	2	
FID	1	
Field Test Kits	1	PCBs
Jerome Hg Vapor Meter	1	
Lab Screening	1	Metals
Passive Soil Gas	1	
Redox	1	

Approximately 57% (24) of the respondents who used a field-based technology experienced some form of an obstacle. Similar to issues raised in implementation and use flexible works, the costs and lack of acceptance of field-based technologies, the absence of regulatory protocols and guidance, and the lack of qualified personnel are the primary problems involving the use of field-based analytics. Emphasis was placed on the qualifications of on-site personnel and validity of data. Consultants site the inadequate training, high turnover rate, and lack of knowledge of field-based analytical methods as the major areas of concern with on-site/field personnel.



Some of the representative comments addressing these concerns include:

- "Not proven enough... not readily accepted... need list of approved technologies from state agencies."
- "RP does not want consultants to find too many AOCs, only expected one or two."
- "Data interpretation process is more time consuming."
- "Biggest concern is the lack of defensible data."
- "Capital cost for equipment, knowledgeable operators with decision making authority lacking."
- "Initial assessment of sties requires full analytical capabilities of fixed lab."
- "Reproducivity of data collected without benefit of fixed field monitoring points."
- "Difference between detection levels for field-based characterization compared to risk-based triggers/goals."
- "Lack of understanding or procedures for how to recognize and deal with interferences (i.e. soil moisture)."
- "Potential for error great if untrained personnel responsible for operation of field screening methods."
- "Field samplers are young and entry-level. Turnover is great and may require a training program at the time of hire."

### 1.2(a) Recommendations

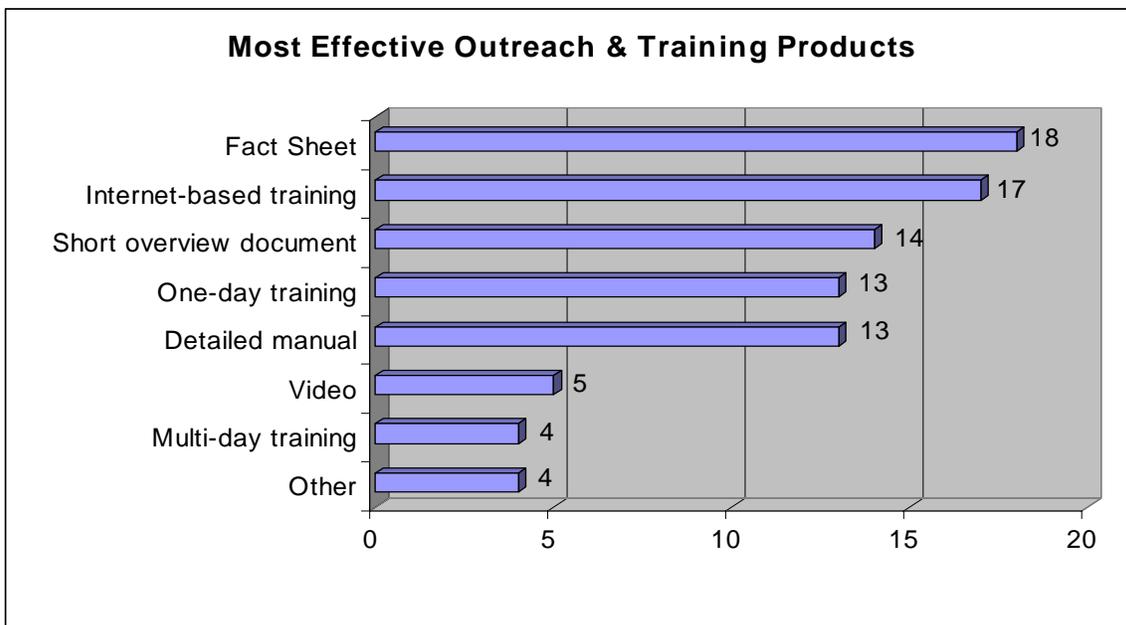
Consultants state the given the lack of regulatory guidance and acceptance of field-based analytical methods, the validity and defensibility of field analytical data is often called into question. Regulatory agencies frequently “second guess” the method and technologies used by consultants on-site. Consultants again seek a “top-down” approach looking towards the federal and state agencies for guidance on this issue. Many of the suggestions involve EPA and states agencies publishing guidance documents/fact sheets on acceptable technologies and how to use them. Other recommendations seek more specific guidance suggesting the development of protocols for statistically based sampling for regulatory decision-making. One respondent suggested a creating a certification program for field personnel. Once protocols are established/mandated, the regulatory and consulting communities will be more accepting of field-based analytical approaches. Further, efforts must be made to educate the agencies and PRPs on the various field-based analytical technologies and the application of field techniques.

Some of more prevalent comments addressing how to make field-based characterization more common included:

- “Policies from state agencies.”
- “SOPs, training on how to use, rate vendors - what products to use.”
- “Develop guidance regarding statistically-based sampling for various regulatory decision-making.”
- “Establish guidelines for the minimum number of samples that are required to drive higher sample density requirements.”
- “Acceptance by regulators (not just at the Director level).”
- “Educated regulators that are open-minded. Finalization of the new SW-846 document.”
- “Better training of regulatory staff in application of field techniques.”
- “Offer training or certification courses more widely (taught by vendors and overseen by regulators).”
- “Certify field labs/personnel.”

### 1.3 Recommendations for Outreach & Training Products

Of the consultant responses, 18 (37%) deemed developing fact sheets the most efficient and effective means of outreach followed closely by internet-based training with 17 responses.



Suggested topics widely varied, but the more predominant suggestions (and the suggested target audience(s)) included:

#### Fact Sheets

- Case studies of regulatory accepted flexible work plans and field-based technologies and analytical procedures. (Regulators, Consultants)
- Development of a sampling plan. (Regulators, Consultants)
- Field-based screening and characterization technologies. (Regulators, Consultants)
- Acceptable methods for site characterization. (Regulators, Consultants, Project Managers, Field-personnel)

#### Internet-based Training

- Webpage containing updates, news, links case studies, fact sheets, detailed information concerning field-based methods and technologies. (Regulators, Consultants, PRPs,)
- Internet training and list of products (Regulators, Consultants, Samplers, PRPs)
- Explanation of field-based methods and techniques. (Regulators, Consultants, Technicians, Field-personnel)

#### One-day Training

- Triad Approach – work plan development process. (Regulators, Consultants, Project Managers)
- Application of field-based innovative technologies. (Regulators, Consultants)
- Regulatory acceptance of field-based analytics. (Regulators, Consultants)
- Detailed description of the “nuts and bolts” on various field/screening methods (i.e. XRF, immunoassay). (Regulators, Consultants, Technicians, Field-personnel)

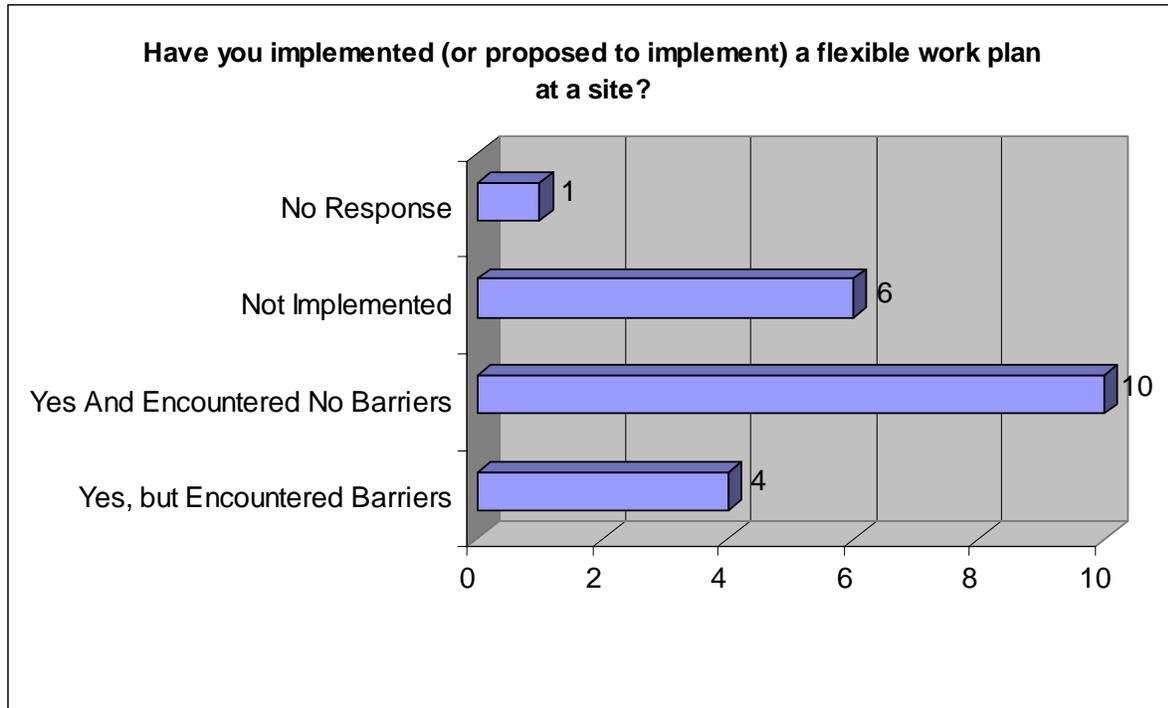
#### Detailed Manual/Short Overview Document

- Guidance Documents. (Regulators, Consultants)
- Statistically-based sampling technologies. (Regulators, Consultants)
- Field-based characterization technologies and methods. (Regulators, Consultants, PMs, Field-personnel, Clients)
- Contact list of New England vendors/contractors. (Regulators, Consultants)

## 2.0 Regulator Responses

### 2.1 Barriers to the Flexible Work Plans

The regulatory agency staff made up 27% of the respondents (21 out of 79). The regulatory community conveyed similar concerns stated by the consultants on the implementation and use of flexible work plans. Of the 21 respondents, 67% (14) have implemented a flexible work plan with 4 regulatory staff experiencing some form of barrier.



The validation and defensibility of analytical data remain two of the more prevalent perceived barriers to implementation of flexible work plans. Regulators assert that the absence of lab data and reliance on field-based analytical results raises the level of uncertainty. New York has a well established lab certification program and lab-based data is utilized. States would need to use chemists to conclude if the field-based analytical work meets QA/AC documentation requirements.

Regulatory agencies also question the level of expertise of field-based personnel. Flexible work plans require knowledgeable, competent decision-makers and analysts. Regulators assert that this is not always the case. State licensed professionals such as in Massachusetts and Connecticut should take the lead role in making the on-site decisions. Another concern is the issue of costs to implement a flexible work plan. Similar to the issue raised by consultants, the regulatory community believes that under a flexible work plan, estimating budget costs is extremely difficult.

Some of the representative comments addressing the barriers to flexible work plans implementation include:

- “Data reduction - making sense out of a cloud of data points in a timely fashion. This includes mapping, plotting in cross section or 3D and statistical analysis of "messy" data sets.”
- “Some concerns over not using lab since there is a lab certification program in NYS. Screening would be good, but some concern over just using on-site methods. Would need chemists' review to see if it meets QA/QC documentation.”
- “Conservative approach is usually emphasized.”
- “Require knowledgeable field personnel, which is not always the case... decisions in the field should be directed by LSP.”
- “Not an exact budget. Budgets are necessary with NYS contracts.”
- “It is more difficult to generate a cost estimate prior to initiation of work.”

### **2.1(a) Recommendations**

Similar to the consulting community, regulatory agencies cite the lack of regulatory guidelines and protocols as one of the major obstacles. Regulators look towards federal regulatory agencies to take the lead in providing guidance and promoting the use of the Triad Approach. Regulators suggest the development of guidance documents and/or websites specifically tailored towards consultants with specific information, case studies, and regulations/policies to site characterizations. Other regulatory staff recommended that the agencies develop guidelines to determine the level and type of decision-making tools necessary for regulatory approval. In order to gain acceptance and effectuate change, the regulatory personnel state that promotional efforts for flexible work plans should begin from within. Efforts should be made within the agencies to educate all levels of regulatory decision-makers on the benefits and advantages of a flexible work plan.

Some of representative comments addressing how to make flexible work plans common included:

- “Most regulators are conservative and to feel comfortable with it, the higher ups should make it an official option.”
- “Regulators need to clarify ahead of time what level of decision-making in field requires regulatory input/approval.”
- “Keep getting the word out on the benefits... This workshop helps.”
- “Guidance on a "good" dynamic work plan. Structure, what should be covered by plan, etc.”
- “Improve the pre-planning and get regulatory approval to increase comfort level.”
- “Approval and/or support of regulatory agencies. More dependable field screening technologies and a way to get that information out to the industry.”
- “Need to Work from within DEP.”
- “Ideally, regulator website would be set up specifically for RPs/consultants with specified information/regulations/policies to waste-site cleanups.”

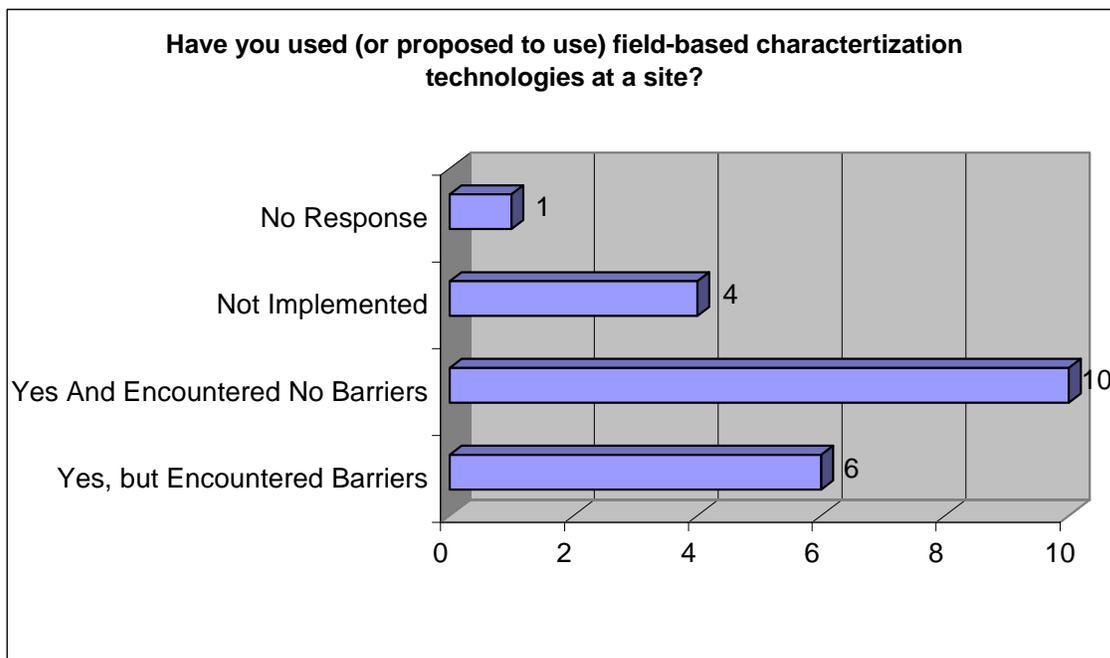
### **2.2 Barriers to the Field-based Analytics**

Of the regulatory personnel who responded, 76% (16) reported using a field-based site characterization technology on-site. XRFs, direct push, and Immunoassay were the most

commonly mentioned in the responses. The following is chart provides a breakdown of the technologies most commonly used by regulators. Please note that the technology types listed are those written in on the survey by the respondents, and therefore the technology used is sometimes not clear.

Field-based Technology	Responses	Type of Contaminant(s)
XRFs	6	Pb, As, Cd, Metals
Direct Push	5	VOCs
Immunoassay	4	PCBs, BTEX,
Field GC	2	
On-site Lab	2	DRO/GRO
Down Hole Gamma	1	
Hydropunch	1	
Petroflag Test Kits	1	

Approximately 38% (6) of the respondents who used a field-based technology experienced some form of an obstacle. Similar to the issues raised regarding the implementation of flexible work plans, there is high level of uncertainty surrounding the use of field-based analytical technologies and methods in site characterization. Potential false positives, improper calibration of equipment, and technologies not performing as advertised are among the issues cited by regulators which affect the reliability and defensibility of on-site data. Another issue of concern raised by the regulatory community is the costs associated with field-based technologies. Regulators state that some of the field-based technologies are often too expensive to implement given the size of the site and the needs/concerns of the client. Consultants are hesitant to learn about new technologies and methods due perceived time/budget constraints.



Some of the representative comments regarding the use of field-based analytics include:

- “Potential false positives. Too high detection limits.”
- “Improper calibration of equipment. Must/should be utilized in conjunction with lab data for use in making remedial decisions.”
- “Client was reluctant due to actual or perceived margin of error of instrument or samples that will be used in decisions that will reflect human health.”
- “PetroFlag does not perform as advertised. The inductively coupled terrainie conductivity...vendor said it would work in a swamp.”
- “Problems getting the XRF - expensive to rent it... did not work well with Cd.”
- “Must not use where technology does not readily support or it there is state/customer concerns.”
- “Some sites seem too small to be cost effective for on-site analysis.”
- “Seems not all consultants, especially small firms, are familiar with these.”

### **2.2(a) Recommendations**

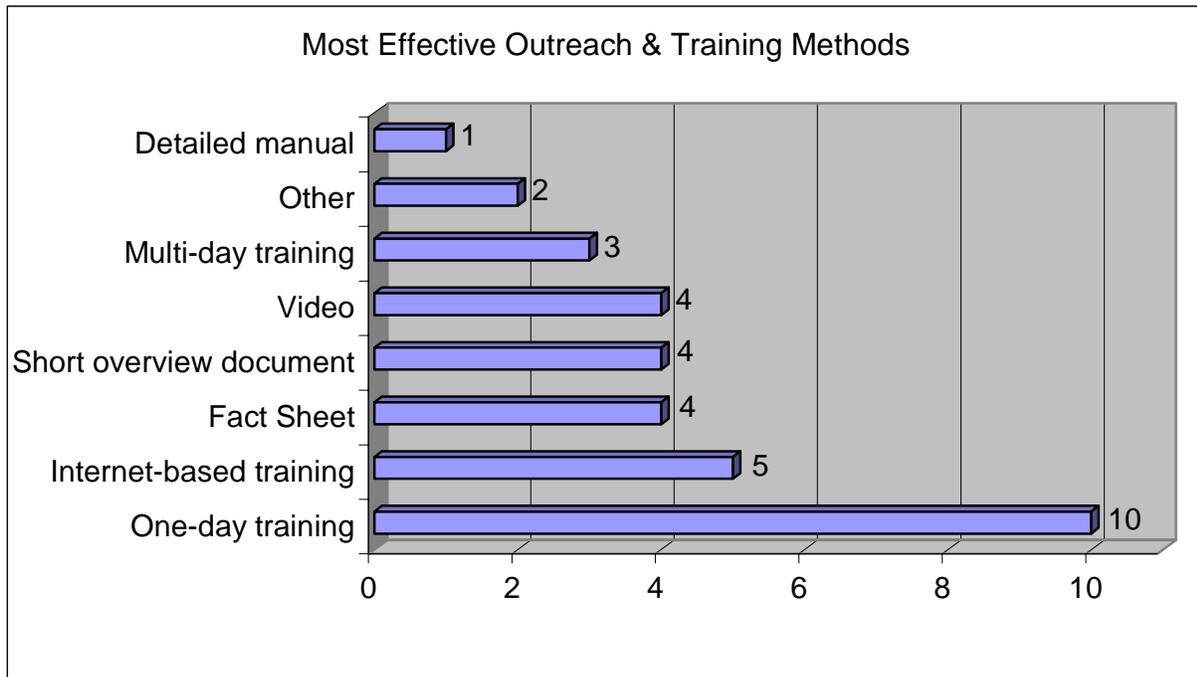
Regulators acknowledge the need for established guidelines and protocols regarding the use field-based analytical approaches and the level and type of data required for approval. Many of the suggestions involve agencies publishing a series of guidance documents and case studies explaining the circumstances under which the States endorse the use of field-based analytical approaches and technologies. Regulators also emphasize the need for continuing education and training for staff, management, and consultants through seminars/conferences in order to promote the use and emphasize the benefits of these methods.

Some of more prevalent comments addressing how to make field-based characterization more common included:

- “Better guidance published by regulatory Agencies.”
- “Need to provide something in writing from states and EPA indicating how it will/can be used and commit to accepting such data.”
- “Propose/suggest procedure to regulatory agency with work plan.”
- “Established upfront in work plan how field data will be used and how it will be supported by lab data.”
- “Educate staff, management and consultants on use and case studies to reduce resistance.”
- “As was suggested during the conference by others, training for both state staff and consultants would be helpful, as would SOPs or other written materials from the State explaining under what circumstances the State endorses their use.”

### **2.3 Recommendations for Outreach & Training Products**

Of the 21 responses, 10 regulatory personnel deemed the one-day of training the most efficient and effective means of outreach following by internet-based training with 5.



Suggested topics widely varied, but the more predominant suggestions (and the suggested target audience(s)) included:

One-day Training

- Triad Approach. (Regulators, Consultants)
- Innovative site assessment technologies. (Regulators, Consultants)
- Field-screening process. (Regulators, Consultants)
- Calibration techniques. (Field Personnel)
- Computer Software. (Engineers, Scientists)
- QA/QC and Sampling Techniques and Geophysics. (Engineers, Scientists)

Internet-based Training

- Specific methods for data analysis in the field.
- Direct push. (Field Personnel)
- Innovative technology. (Regulators, Consultants, RPs)
- DNAPL remediation/characterization. (Regulators, Consultants)

Fact Sheet/Short Overview Document

- Developing SOP. (Regulators)
- Innovative site assessment technologies. (Regulators, Consultants, RPs)
- The development of dynamic work plans. (Regulators, Consultants)

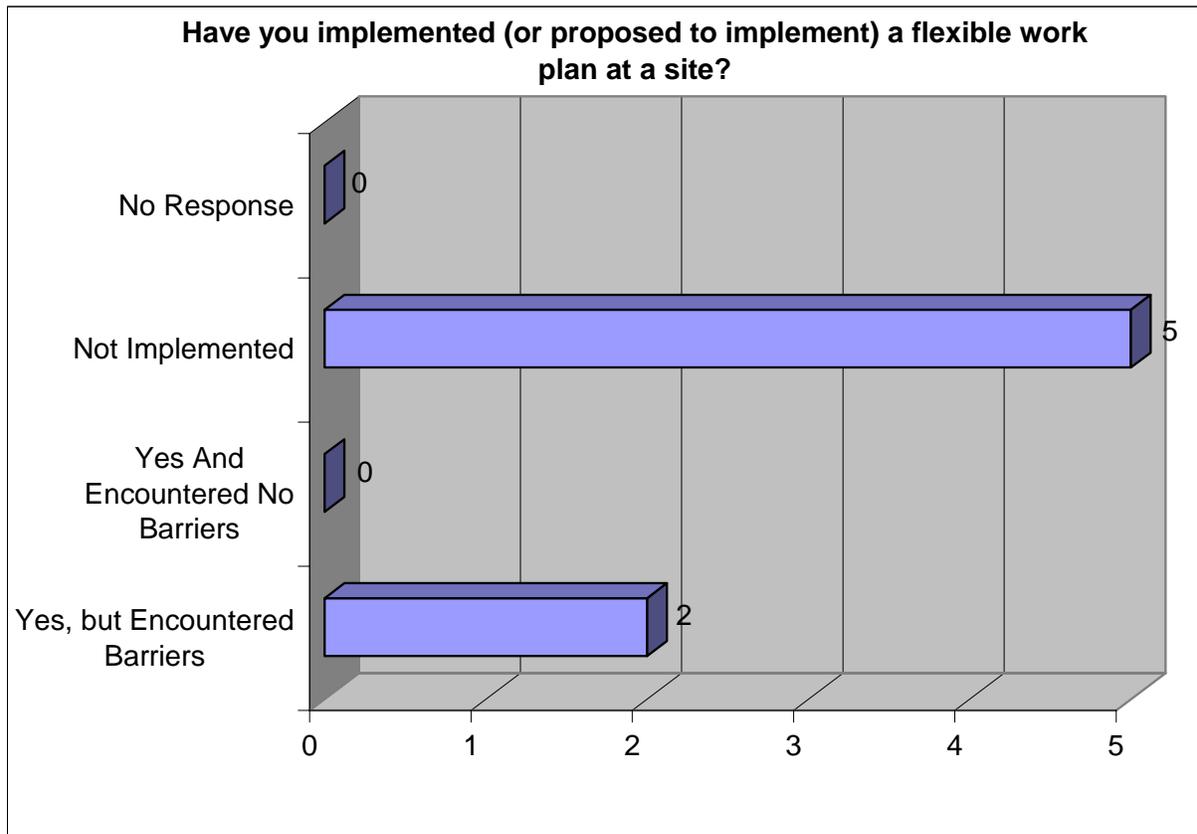
Video

- Field screening products. (Regulators, Consultants, RPs)
- Sample selection for field screening. (Regulators, Consultants)

### 3.0 Facility/PRP Responses

#### 3.1 Barriers to the Flexible Work Plans

The regulatory agency staff made up 9% of the respondents (7 out of 79). Of the 7 respondents, 2 implemented a flexible work plan and both experienced some form of barrier.



The facility/PRP community expressed concerns over the regulatory acceptance of flexible work plans and the reliability of regulators on more traditional methods. Although respondents asserted that flexible work plans have been utilized for many years within the industry, the absence of regulatory guidelines and specificity results the ambiguity in determining acceptable methods of site characterization.

Similar to other stakeholders, the facility/PRP community questions the quality of on-site personnel and budgetary requirements. Flexible work plans require knowledgeable, competent decision-makers and analysts. Respondents assert that this is not always the case and that more effort is needed to train these individuals. Facility personnel believe that budgets and funding for site characterization requires a defined or fixed scope and that budgeting for a flexible workplan is difficult.

Some of the representative comments addressing the barriers to flexible work plans implementation include:

- “Regulators looking for ‘traditional’ workplan.”
- “Regulators don’t seem flexible... too much command and control.”
- “Flexible work plan utilized more with radioactive constituents.”
- “After the benefits were explained... gained management interest.”
- “It is what consultants have been doing or trying to do for years. Why has it taken regulators so long to catch on?”
- “Budgeting/Funding requires defined/fixed scope. Additional efforts required to document what's planned/what's been done.”
- “Scope tends to get larger and larger w/o clear definition and specificity.”
- “Field personnel must be well qualified. Lead must be excellent at complex sites.”

**3.1(a) Recommendations**

Similar to the consulting community and regulatory agencies, facility personnel cite the lack of regulatory guidelines and protocols as one of the major obstacles. Facility personnel look towards federal regulatory agencies to take the lead in providing guidance and promoting the use of the Triad Approach. Respondents also suggest the additional effort to educate the regulatory and consulting communities on acceptable site characterization methods and data.

Some of the representative comments addressing how to make flexible work plans common included:

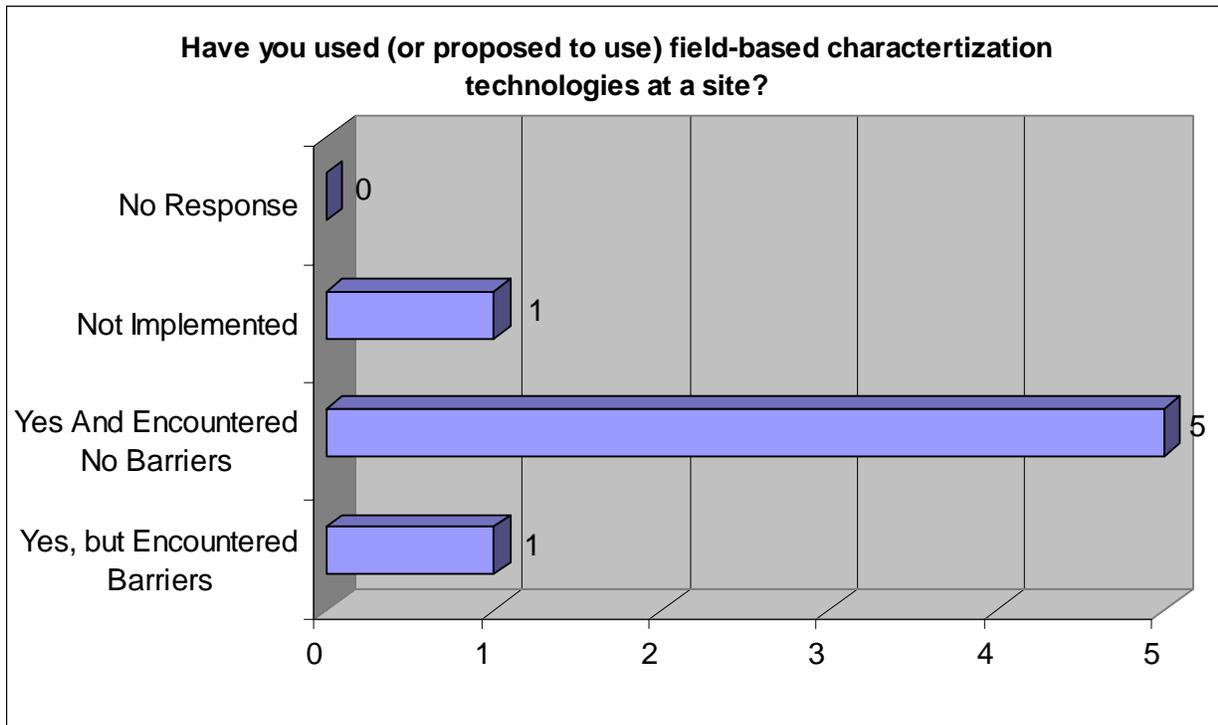
- “Educate regulators and tell consultants what they will now be accepted.”
- “Make available guidance on use/content/acceptability.”
- “Define how far the work plan must be expanded up front before it is developed.”
- “Keep training efforts up.”

**3.2 Barriers to the Field-based Analytics**

Of the facility/PRP personnel who responded, 86% (6) reported using a field-based site characterization technology on-site. PID/FID was the most commonly mentioned in the responses. The following is chart provides a breakdown of the technologies most commonly used by the facility/PRP personnel. Please note that the technology types listed are those written in on the survey by the respondents, and therefore the technology used is sometimes not clear.

Field-based Technology	Responses	Type of Contaminant(s)
PID/FID	4	
Alpha Spectroscopy	1	
GPR	1	
Spill Gas Screening	1	
Field GC	1	
Immunoassay	1	PCBs

Of the six respondents who used a field-based technology, only one experienced some form of an obstacle. Similar to the issues raised regarding the implementation of flexible work plans, there is high level of uncertainty surrounding the use of field-based analytical technologies and methods in site characterization. Respondents state that sampling protocols are needed to accurately determine the extent of contamination and the number of samples.



Some of the representative comments regarding the use of field-based analytics include:

- “Must ensure sampling protocols are valid and truly represent extent of contamination determinations.”
- “Needed to do large number of confirmatory sampling.”
- “They are pretty well accepted by now.”
- 

### **3.2(a) Recommendations**

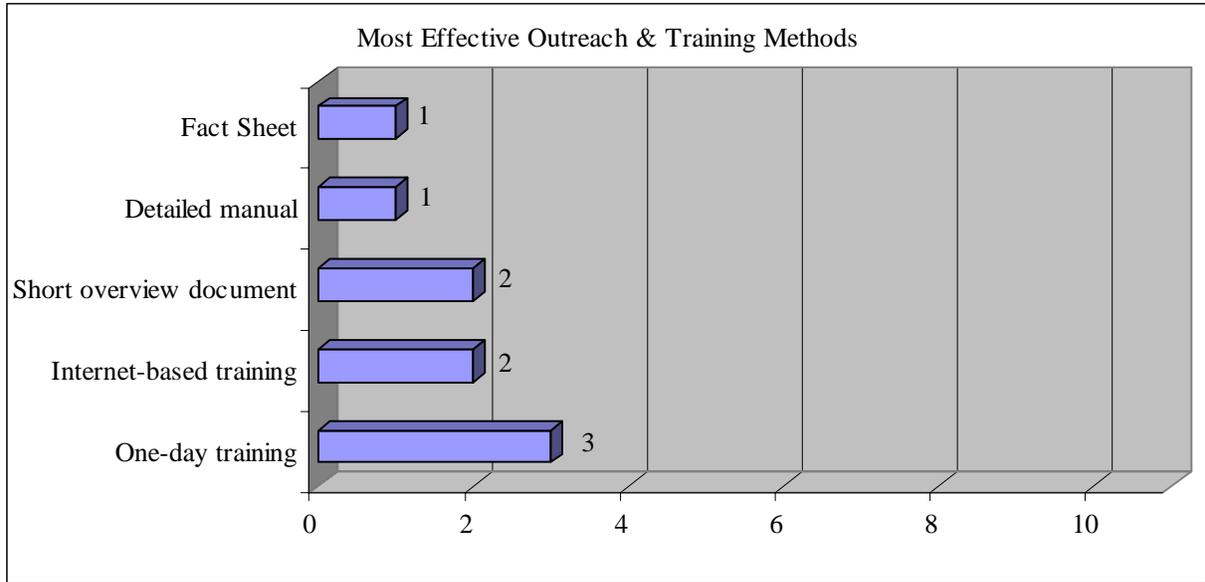
Facility/PRP personnel acknowledge the need for additional support and acceptance by regulatory agencies. They suggest efforts aimed at educating the regulatory staff on acceptable methods and technologies used for site characterization.

Some of more prevalent comments addressing how to make field-based characterization more common included:

- “Educate regulators.”
- “Regulator support.”

### **3.3 Recommendations for Outreach & Training Products**

Of the 7 responses, 3 regulatory personnel deemed the one-day of training the most efficient and effective means of outreach following by internet-based training and a short overview document both with 2.



No suggestions were provided on what subjects would be of most interest.