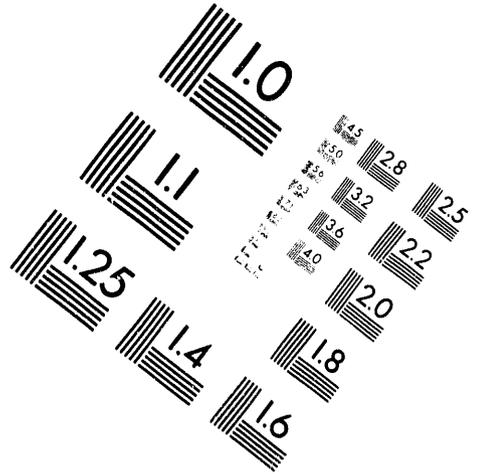
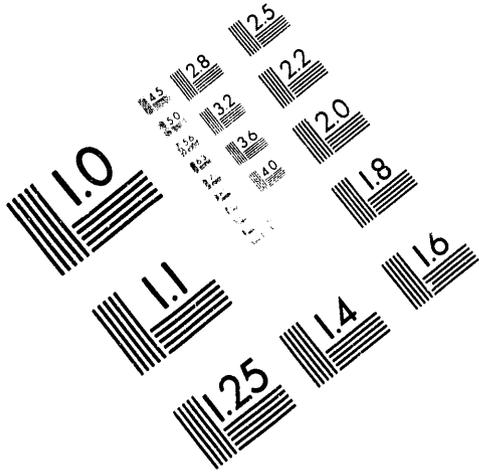




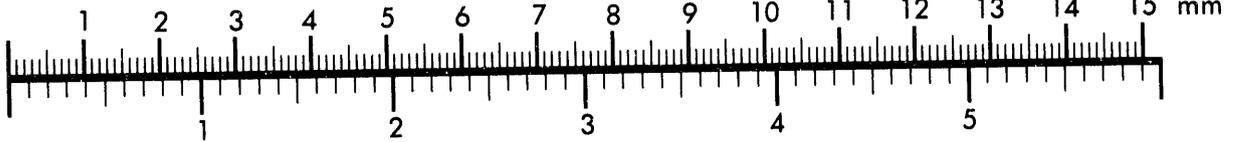
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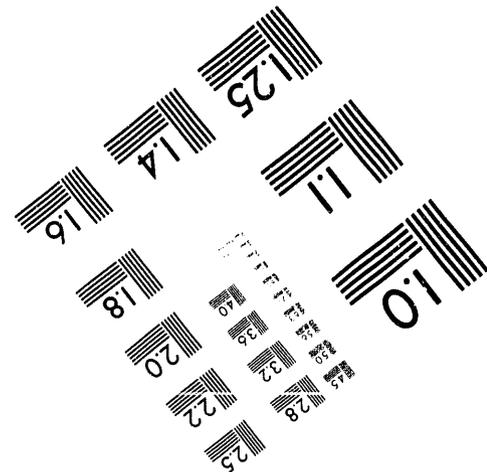
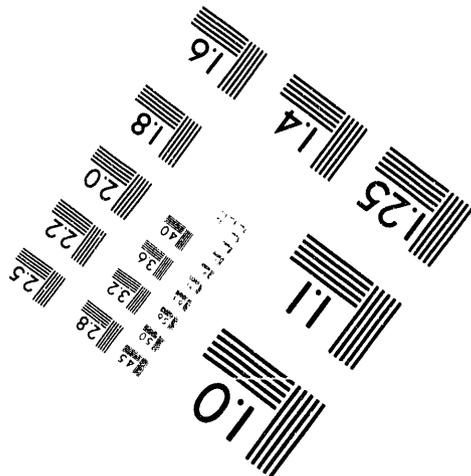
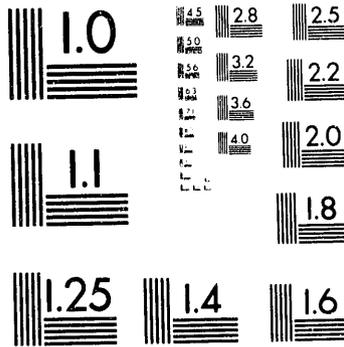
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**INVOLVING STAKEHOLDERS IN EVALUATING
ENVIRONMENTAL RESTORATION TECHNOLOGIES**

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INVOLVING STAKEHOLDERS IN EVALUATING
ENVIRONMENTAL RESTORATION TECHNOLOGIES

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ABSTRACT

Involving citizens, interest groups, and regulators in environmental restoration and waste management programs is a challenge for government agencies and the organizations that support them. To be effective, such involvement activities must identify all individuals and groups who have a stake in the cleanup. Their participation must be early, substantive, and meaningful. Stakeholders must be able to see how their input was considered and used, and feel that a good-faith effort was made to reconcile conflicting objectives.

The Integrated Demonstration for Cleanup of Volatile Organic Compounds at Arid Sites (VOC-Arid ID) is a Department of Energy Office of Technology Development project located at Hanford. Along with technical evaluation of innovative cleanup technologies, the program is conducting an institutional assessment of regulatory and public acceptance of new technologies. Through a series of interviews and workshops, and use of a computerized information management tool, stakeholders are having a voice in the evaluation. Public and regulatory reaction has been positive, resulting in several conclusions.

Stakeholders were involved early, and were approached directly on their own 'turf.' Participants were able to provide extremely valuable input on what they think is important in evaluating new cleanup technologies. Input received was integrated into the technical workings of the project, and rapid, accurate feedback was given to participants about how their input was used. Program management is committed to using the information learned and feedback gained in the institutional assessment and involving stakeholders as the demonstration proceeds.

INTRODUCTION

The VOC-Arid ID is one of several Department of Energy demonstrations designed to speed up the development and deployment of new cleanup technologies. Innovative technologies are being developed because existing technologies are incapable of efficient and effective cleanup. In parallel with demonstration of the technologies, a program of institutional assessment is ongoing. The objective of the institutional assessment task, an integral part of the program, is to evaluate and ultimately enhance public and regulatory acceptance of Integrated Demonstration technologies for deployment. The primary reason for conducting this task is that technologies must be evaluated for deployment not only on their technical performance and cost, but also on the likelihood of achieving regulatory and public acceptance -- factors that could significantly hamper deployment. The key measure of success for the VOC-Arid ID, which is being conducted at Hanford, Washington, will be the transfer and wide-spread use at various DOE sites of new technologies that are a significant improvement beyond the current baseline. start

The institutional assessment task will take place in three phases. Phase I, which is reported by this paper, involves early stakeholder involvement in development of alternative technology evaluation criteria. Phase II will include actual application of those criteria to alternative technologies, and Phase III will apply the lessons learned to evaluate the acceptability of deploying the VOC-Arid ID technologies at other DOE facilities nationwide.

METHODOLOGY

Figure 1 on the following page illustrates the methodology used in Phase I of the stakeholder involvement process. As shown, a broad-based list of potential stakeholders was sent letters inviting their participation. Potential stakeholders were identified from a list of over 300 individuals and groups that have shown an interest in Hanford cleanup. There was general acceptance by participants that "all the right people" had been identified, and that a good cross section of interests was represented in the potential stakeholder list. All potential stakeholders received an invitation to participate in this activity, and the approximately 40 selected for direct interaction represented the following categories:

- o Regulatory agencies
- o Federal, state and local governments
- o Native American Tribes
- o Interest groups
- o Business and labor groups
- o Agriculture
- o Education
- o Industry
- o DOE site contractors
- o Hanford retirees

This group represented a knowledgeable set of stakeholders, well aware of the issues, activities, and goals of the Hanford cleanup. In many ways, however, they represented the general public, in that the input received reflected their personal, value-influenced perspectives on technologies for cleanup.

To gather information from the identified stakeholders, the program conducted personal interviews during the period from July through September 1992. The interviews focused on gaining the views of those stakeholders about what is important to them if they are to be comfortable with seeing a given cleanup technology used in their "backyard."

FIGURE 1. PHASE I STAKEHOLDER INVOLVEMENT PROCESS

Activities

Products

Invitations to participate
sent to potential stakeholders

← Fact sheet
← Follow-up calls

Interviews Conducted
Regulatory Agencies
Federal, State, Local Governments
Native American Tribes
Interest Groups
Business/Labor
Agriculture
Education
Industry
DOE Site Contractors
Hanford Retirees

← Draft technology
evaluation criteria
← Pro Tech computerized
information system
← Interviewee review
of results

Suggested technology evaluation criteria
for use in workshops

← Report sent to
workshop participants

Kennewick
stakeholder workshop

Seattle
stakeholder workshop

Suggested technology evaluation
criteria for application in Phase II

← Phase I involvement
report

An important tool in the interview process, and in the overall public and regulatory consultation approach, was a computerized, interactive information system about the VOC-Arid ID technologies. This system -- the Prospective Technology Communication System (ProTech) -- was developed by Battelle to describe the innovative environmental cleanup technologies under consideration. The system provides text and graphic background information on the technologies being demonstrated at Hanford. It also allows the user to select technologies and evaluation criteria and perform a comparison between those technologies and with the established baseline technologies in use today. ProTech is a prototype system that will be used nationally to track the technologies being demonstrated at a number of DOE sites under the Office of Technology Development's sponsorship.

Interview discussions were open-ended, encouraging wide-ranging input on technology evaluation criteria and values. Interviewers stressed that the information gained is to be used at DOE facilities nationwide. It emphasized the program's commitment to providing feedback to public and regulatory participants on how their input is used. It outlined the technology evaluation process, indicating that their input was being sought at the very earliest stage.

Once the interviewee gave his or her suggestions of technology evaluation criteria that should be considered, he or she was shown a preliminary list of criteria developed by Battelle to further the discussion. This list, which is shown in Figure 2, is based on U.S. Environmental Protection Agency CERCLA cleanup criteria. Discussions with interviewees resulted in input about changes to the preliminary list, additions of new criteria, and further interpretation of the criteria presented. The overall result was a set of comments that resulted in a more meaningful, detailed set of evaluation criteria. The preliminary list was found overall to be valid. The criteria were, however, augmented with suggested sub-criteria and information needed to interpret and measure each criterion.

After the interviews were complete, interviewees were given an opportunity to review the results of their interviews and provide additional information if desired. This rapid, detailed feedback step was very well perceived, and interviewee expressed appreciation for the

Figure 2. Preliminary List of Technology Evaluation Criteria

Public Acceptability ¹

- Awareness
- Acceptability

Regulatory Acceptability ²

- Regulatory Status
- Permitting Time
- Historical Record

Technical Effectiveness ³

Impacts ⁴

- Public Health & Safety
- Work Health & Safety
- Environmental

Residuals ⁵

- Treatment Requirements
- Status of Residual
 - mobility
 - volume
 - toxicity
 - recyclability

Time to Achieve Objective ⁶

Cost ⁷

- Capital
- O & M

Implementability ⁸

- Flexibility
- Reliability
- Ease of Use
- Infrastructure Status (e.g. availability of support services equipment and facilities)

personalized attention. The institutional assessment team, in concert with technical program staff, then consolidated and used the input received to develop a revised set of suggested technology evaluation criteria and definitions for these criteria. These revised criteria and their definitions were intended for use at stakeholder workshops. Stakeholder perspectives and input were invaluable in creating the revised set of draft technology evaluation criteria that were used as the basis for stakeholder workshops.

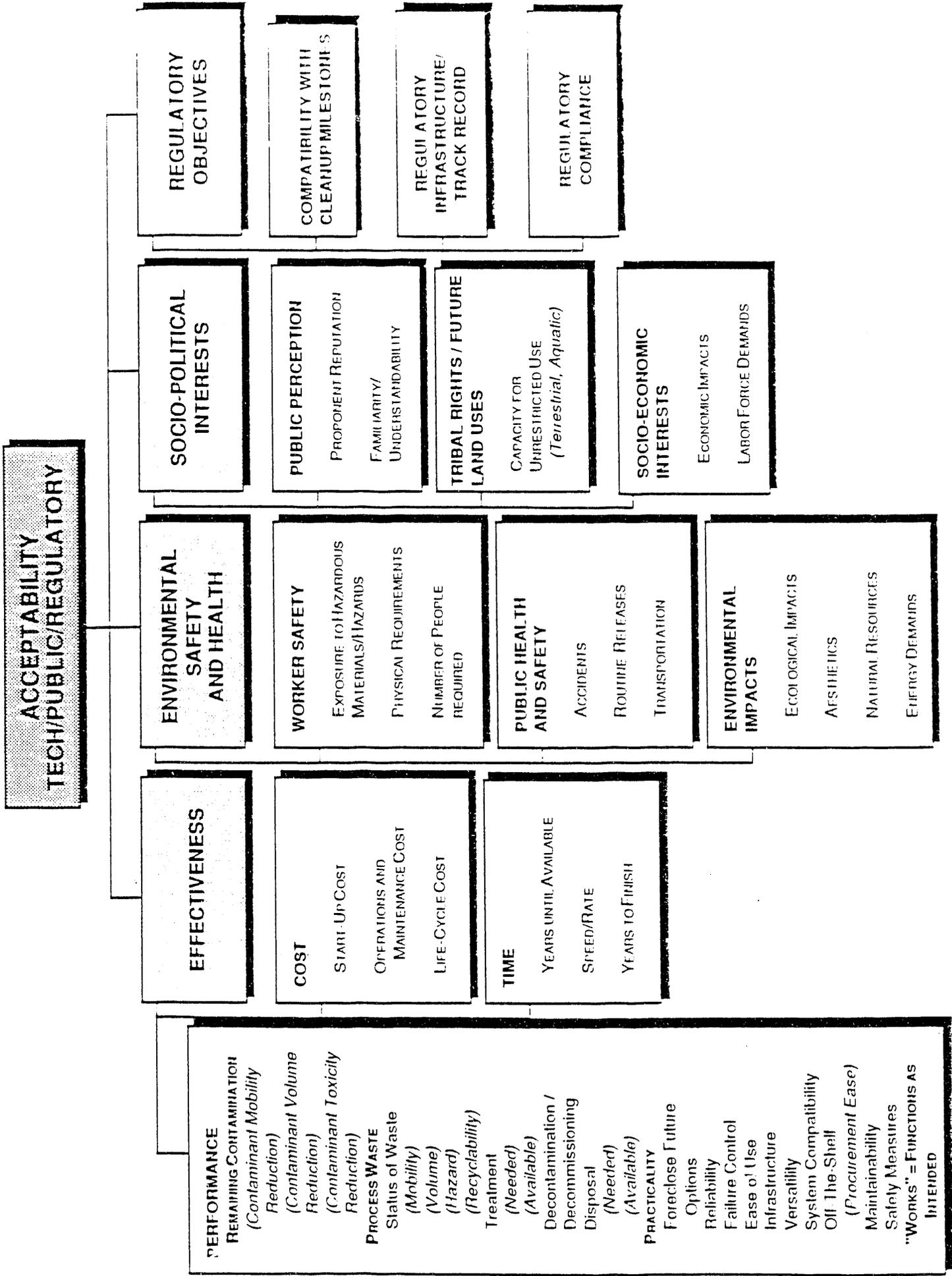
Based on the results of the stakeholder interviews, the team held "focus group" style workshops that consolidated the information received about technology evaluation criteria. The workshops discussed ways to compare new technologies with the way cleanup is currently conducted. They also provided opportunities to assign relative importance to the criteria through an exercise of assigning differential weighting scores to each criterion category and, within each category, to each criterion.

Participation in two stakeholder workshops held in October 1992 was enthusiastic, and represented a cross section of Hanford stakeholders in terms of interests and geography. Many comments were received about the suggested criteria and the overall approach to incorporating public and regulatory acceptability into the Integrated Demonstration program.

Comments were received about all categories of evaluation criteria, and were used to develop the set of revised evaluation criteria illustrated in Figure 3.

Participants were asked to provide their perceptions of the relative importance of the technology evaluation criteria by first distributing 100 points among the four criterion categories. Participants were able to accomplish this easily. The numerical means for the category rankings varied between the two workshops, but the criterion categories were similarly ordered. Of the four categories offered, technology effectiveness was ranked as most important, followed by safety and health, regulatory objectives, and socio-political factors.

FIGURE 3. SUGGESTED TECHNOLOGY EVALUATION CRITERIA FOR APPLICATION IN PHASE II



The workshop participants were then also asked to give their perceptions of the relative importance of the subcriteria within each criterion category. This was accomplished by distributing 100 points among the subcriteria for each category. Relative importance trends for the subcriteria, based on the exercise results, were less clear. This is attributed to the fact that slight changes were made in the subcriteria between workshops, and there were some differences in the way that participants completed the subcriteria exercise. One of the Phase II objectives will be to focus on design and implementation of a more analytically robust approach to gauging stakeholders' perceptions of relative importance.

FINDINGS OF THE PUBLIC INVOLVEMENT PROCESS

Several findings resulted from the public involvement efforts described above. They are described below:

Improved Evaluation Criteria

A major finding of these early activities was improved information for better decision making. Workshop participants and interviewees recognized, however, the difficulty of developing a set of measurable, precise criteria at this stage. It is recognized that the set of criteria shown in Figure 3 include some that are relatively easy to measure and define. One such example is the relative energy demands made by a particular technology, which should be definable fairly early in the process. Other criteria, however, may be very difficult to measure or use as discriminators. For example, projected accidental releases of materials that affect public health and safety will have little data available. There are also numerous linkages between and among the criteria, and they may not be unique and independent.

A great deal of useful input was received on the draft criteria. They are now judged to be complete, incorporating all of the significant values and judgements made by the range of public and regulatory participants. What remains to be done is to refine the list of criteria so that it remains complete, while it is designed such that each criterion is independent, explicitly measurable, and can serve a formal decision analysis function.

At the same time, there is recognition that all of the elements discussed are important considerations in evaluating alternative technologies. With substantial agreement on the evaluation criteria and process, the program in Phase II will work with stakeholders to apply those criteria to the actual technologies supported under the VOC-Arid ID. Where it may not be possible to use every criterion per se, the values that underlie the suggested criteria will be incorporated in the definitions of the criteria and in the supporting documentation. It is probable that Phase II will result in a further refined version of the criteria based on experience in applying them to the technologies.

Feedback gained from involving stakeholders in applying the draft criteria will be considered by the Integrated Demonstration team, along with technical performance data, to modify technical design and selection such that ~~the~~ deployability is enhanced. The overall goal in this process is to enhance the likelihood and decrease the time necessary for having a technology deployable in the future. Phase III, which is occurring in parallel with Phase II, will focus on mirroring the activities conducted in Phases I and II at other DOE facilities throughout the country. Information learned about these other site stakeholders' concerns will be fed back to technology developers to further enhance technology deployability across all sites.

DOE Public Involvement Commitment

In addition to providing the program team with valuable input and a source of continuing involvement, the Phase I activities have illustrated DOE's commitment to new ways of involving stakeholders. Reactions have been very positive. One prominent activist who follows Hanford cleanup with keen interest and great skepticism asked that a direct message be taken to DOE that this is the type of early and substantive involvement that interest groups mean when they demand involvement in federal facility decision making. The stakeholders who were involved are eager to continue to participate, as long as their participation is meaningful and substantive.

This program is demonstrating to technical managers and decision-makers as well, who have typically had less than optimal relationships with "the public," that there are effective ways of creating dialogue and gaining input. The sharing of information, values, and preferences creates increased understanding about the common goals and objectives of all Hanford stakeholders, including those who work on facility cleanup as their livelihood.

DOE's commitment to implement similar programs for integrated technology demonstrations across the country is expected to result in some of the same results, but new issues, values, and stakeholder attitudes may arise. Integral to the program will be an ongoing evaluation of how effective the stakeholder involvement activities are, and more importantly, how the input received is used in making better cleanup technology decisions.

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