# Framework for Developing Quality ITRC Technical and Regulatory Guidance Documents


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# 1. FRAMEWORK FOR QUALITY GUIDANCE DEVELOPMENT

An ITRC technical and regulatory (tech-reg) guidance document is the cornerstone product of ITRC.[1] Classroom and Internet-based training provided by ITRC are based on tech-reg guidance produced by ITRC project teams. ITRC has built a reputation for providing useful products of the highest quality for its customers. This framework was developed to help facilitate continued development of high-quality ITRC tech-reg guidance.

A tech-reg guidance document gives ITRC customers (regulators, consultants, site owners, and public and tribal stakeholders) a protocol or direction for the proper application of new or innovative environmental technologies, techniques, or approaches.

Tech-reg guidance compiles and evaluates technical and regulatory information on new or innovative technologies and approaches for managing environmental problems. ITRC provides this information to its customers to break down barriers for using new or innovative approaches and to enhance decision making for optimal environmental solutions.

## 1.1 Purpose and Goals of this Framework

The purpose of this framework is to provide direction and instruction on the process that ITRC has created for developing quality tech-reg guidance. This proven process is a consensus-driven continuum of information collection, evaluation, and presentation (Figure 1-1) with the following steps:

- Collect information on new or innovative technologies, techniques, or approaches (Section 3.1).
- Confirm and evaluate the information collected (Section 3.2).
- Incorporate results of the evaluation and conclusions into a descriptive tech-reg guidance document (Section 3.3).

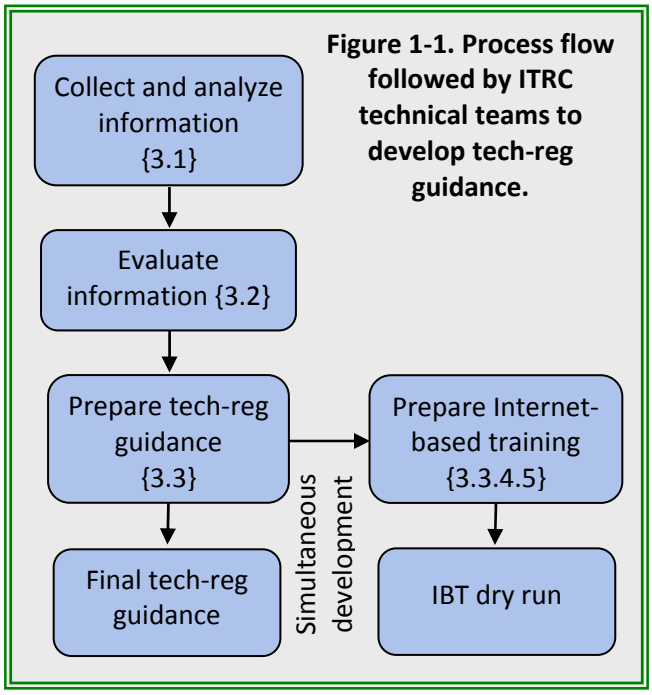


**Figure 1-1. Process flow followed by ITRC technical teams to develop tech-reg guidance.**

[1] ***Section 2. Mission and Goals.*** The mission of ITRC is to develop information resources and help break down barriers to the acceptance and use of technically sound innovative solutions to environmental challenges through an active network of diverse professionals. The goals of ITRC are to foster better decision making within state environmental agencies and to enhance the understanding of these technologies both within public communities and the environmental industry through no- or low-cost informational and training resources. Furthermore, the goal of ITRC is to not address environmental regulatory policy. The activities and decisions of the ITRC Board of Advisors support these goals.

ITRC expects that following the product development process in this framework will culminate in quality tech-reg guidance. The framework describes the investigative process for obtaining quality information to be used to substantiate the proper application of new and innovative environmental technologies or approaches. During product development, the team may generate other documents as building blocks for a tech-reg guidance document. Some examples of documents that have been produced by teams in the past include technology overviews, position papers ("white" papers), case studies, fact sheets, and web-based resources. The ITRC Team Leader (TL) may request the use of an alternate presentation approach from the ITRC Team Leader Liaison (TLL) and Board of Advisors (BOA). The request should provide the TLL and BOA with a clear understanding of the alternate approach and justify its use. The ITRC BOA will consider such recommendations and approve the finalization and publishing of such products on a case-by-case basis.

## 1.2 Application of this Framework

This framework may be used throughout the ITRC project life cycle (Figure 1-2). It encourages TLs to think through to the end of a project. The following sections contain information with specific examples of the application of this framework.

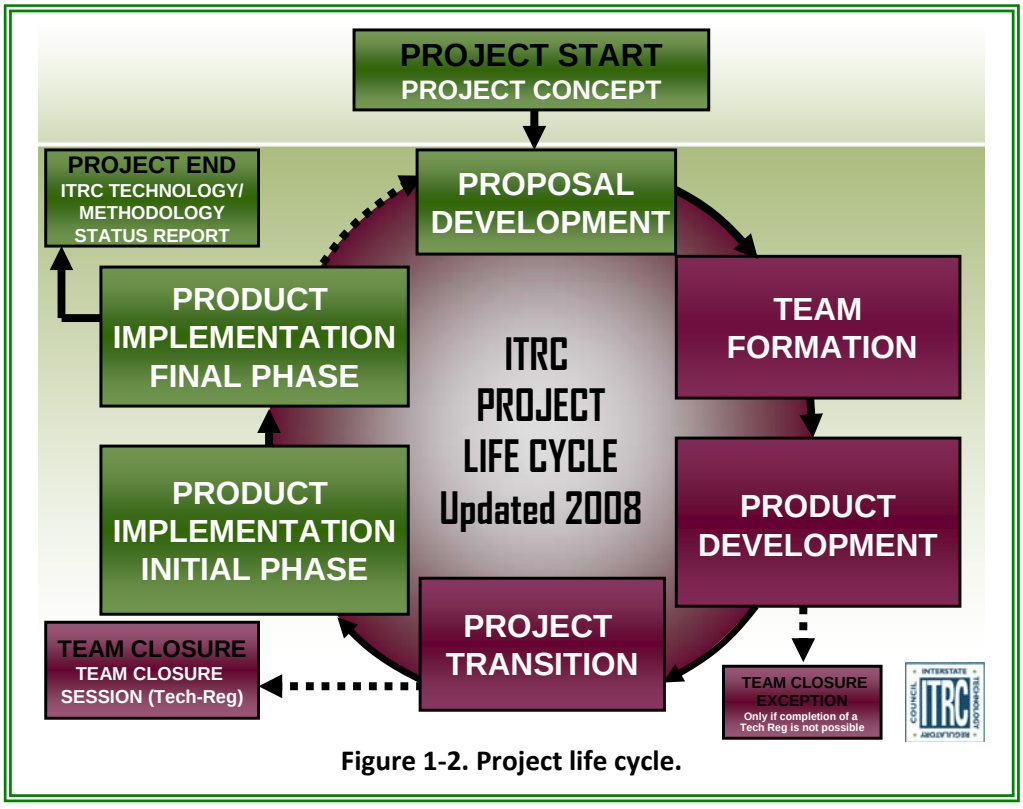


**Figure 1-2. Project life cycle.**

### 1.2.1 When to Apply this Framework

*During Proposal Development.* ITRC selects and funds new projects in accordance with the "New Project Proposal Process" (www.itrcweb.org/strategicplan.asp). New projects must have a

clearly defined problem statement and a proposed solution that may be achieved through the development of tech-reg guidance. Anyone developing a proposal may use this framework to

- determine whether or not the problem can be solved with the development of tech-reg guidance
- evaluate whether it is reasonable to collect, analyze, and evaluate all available information
- determine whether the project scope is achievable within the proposed time frame

*During Team Formation.* ITRC project teams evaluate the project to

- confirm the scope is correct to solve the problem
- validate ability to achieve objectives within proposed time frame
- ensure focus is on the development of the technical and regulatory elements of the guidance

Use this framework early in team discussions to help focus the work of the team.

*During Document Development.* ITRC TLs should use this framework to inform team members (TMs) of the process followed by ITRC project teams to develop quality tech-reg guidance and regularly refer back to the framework to ensure teams stay on target during the development process.

### 1.2.2 Why Use this Framework

Quality is an absolute necessity in the development of ITRC documents. Quality assurance begins with the project topic development and ends with a defensible tech-reg guidance document. Unsupportable claims should never be included as evidence to validate a technology or approach. This framework describes a process for data collection and evaluation that should be followed to support claims and statements made in tech-reg guidance.

### 1.2.3 How to Use this Framework

This document contains a descriptive process, not prescriptive elements. The basic process followed by a team is shown in Figure 1-1; Appendix A provides checklists that will help teams formulate the proper questions tech-reg guidance should answer.

## 1.3 Users of this Framework

TLs are the principal users of this framework. Others, however, also have roles in developing quality tech-reg guidance:

ITRC **Program Advisors** (PAs) and their support staff use the framework and other ITRC product guidance to

- understand the process so they can support team activities
- provide accurate advice to the TL and TMs

The **Team Leader Liaison** uses this as a framework to

- assess whether a team has developed an achievable work plan using the processes described in this framework
- train new ITRC TLs and PAs

The **ITRC Director** uses this framework to

- evaluate proposals for new projects
- assure the ITRC that products proposed, in progress, or near completion maintain consistently high quality

The ITRC **Board of Advisors** uses this framework to

- evaluate recommendations from the ITRC Director for new projects
- settle disputes resulting from uncertainty about the quality and content of an ITRC product
- describe ITRC procedures to potential funding partners that ensure quality of ITRC products

ITRC **State Points of Contact** (POCs) use this framework to

- review new ITRC proposals
- review final drafts of tech-reg guidance documents
- explain the tech-reg guidance development process within state regulatory agencies to promote state concurrence of tech-reg guidance

## 2. PRINCIPAL USERS OF ITRC TECH-REG GUIDANCE

The primary users of ITRC tech-reg guidance are state environmental regulators and equivalent Environmental Protection Agency (EPA) environmental regulators (regulators) and practitioners engaged in the process of evaluating and selecting remedial alternatives and implementing remedies at contaminated sites. Additionally, academia and public and tribal stakeholders use tech-reg guidance to more clearly understand the application of new environmental technologies and approaches.

### 2.1 State Regulators

Regulators are most often in an oversight role. They review applications, work plans, proposals, etc. which have been prepared by practitioners and submitted to the agency. Documents that contain new and unfamiliar technologies or approaches are scrutinized more than usual to ensure that the outcome will be protective of human health and the environment. This responsibility places added pressure on regulators to learn and understand the fundamentals of the technology or approach proposed in the application.

They must also contend with the enforcement of regulations that were developed without consideration of these new technologies. The development of some of the original environmental

regulations could not have taken into account the new technologies ITRC evaluates. Tech-reg guidance, along with associated Internet-based training (IBT), can be used as an educational tool to familiarize regulators with the value, usefulness, and usability of a particular technology or approach. Furthermore, new knowledge of such technologies and approaches may enable the regulator to encourage consultants and owners to consider these alternatives and use the tech-reg guidance as a tool for their application.

### 2.2 Practitioners

Practitioners (consultants) spend much of their time balancing costs and performance. The less explaining they must do, the more data collection and design they can accomplish. Practitioners use ITRC tech-reg guidance to help ensure they have addressed the unique technical and regulatory points of the innovative technology or approach that demonstrate its capability to protect human health and the environment. Practitioners also use tech-reg guidance to ensure that an approach is compatible with existing site conditions and operates within the known limitations of the technology or approach.

Many tech-reg guidance documents describe advantages and limitations to the use of the technology or approach at a given site. They also describe regulatory barriers or challenges to the use of certain innovative techniques. In many cases these barriers and limitations can be overcome during the early design phase. Well-written tech-reg guidance documents provide practitioners and regulators with a common framework for information collection and a process for decision making.

### 2.3 Academia

In some cases university professors can use ITRC tech-reg guidance in the classroom to teach practical application of environmental techniques to their students who are potential future practitioners or regulators. Academia can also use the information in ITRC tech-reg guidance documents to understand what research is needed on new environmental technologies or approaches. Tech-reg guidance documents often contain sections describing challenges, future research, missing information, and limitations that can guide future research and demonstrations.

### 2.4 Public and Tribal Stakeholders

Tech-reg guidance is valuable to stakeholders as a source of reliable and unbiased information developed by state representatives along with other TMs. Teams include membership from one or more public and tribal stakeholders. Guidance documents open a gateway for interested citizens, citizen groups, and tribal governments to understand technologies and technical approaches being proposed for use in their communities. This knowledge helps build trust and informed involvement in site-specific applications.

## 3. DEVELOPMENT PROCESS FOR TECH-REG GUIDANCE

Previously, ITRC has ascribed to three basic products: case studies, technology overviews, and tech-reg guidance. These products, aligned chronologically, equate to the investigative process leading up to a tech-reg guidance document (Figure 1-1):

1. information collection
2. evaluation
3. tech-reg guidance development

The decision to publish documents like case studies or a technology overview is based on the need to get the information or overview into the hands of the users prior to the guidance. Normally, this information should be included or summarized in the tech-reg guidance document.

The development of case studies and technology overviews are steps in the information collection and evaluation process that eventually result in the team's ability to write a comprehensive tech-reg guidance document. Unless there is an urgent need to get information into the hands of users prior to issuance of tech-reg guidance, these documents should not be published separately. Publishing these preliminary documents may result in project delays, decreased focus on tech-reg guidance development, and consumption of limited project resources. However, if the TL feels it is necessary and justifiable to publish other documents, he or she may request approval from the TLL. Publishing any document requires the full external review process outlined later in Section 3.3.5 and all ITRC formatting procedures. The following sections describe the role these products and process steps play in the preparation of tech-reg guidance.

## 3.1 Information Collection and Analysis

Collecting information is the first step in any project (Figure 3-1). The objectives of collecting information are to

- establish a common understanding among the TMs of what is being tested in the lab and the field
- establish an acceptable baseline of information and resources
- understand the status and maturity of the technology or approach

TMs share information based on their experience and perspective. A baseline of information and research must be established to balance the understanding of the topic among all TMs.

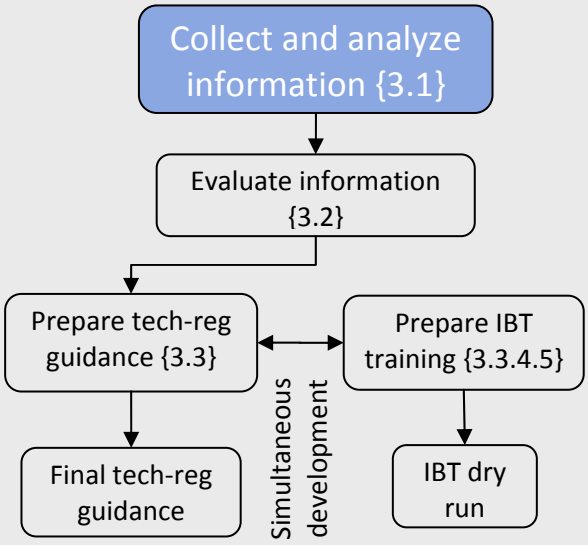


**Figure 3-1. Information collection phase.**

### 3.1.1 Methods of Collecting Information

There are various methods of collecting information. Some of the most common are as follows:

- literature searches
- surveys
- case studies
- TM data and information

#### *3.1.1.1 Literature Search*

A literature search begins with the team. Each member has a compilation of references on the subject that he or she has relied on: web-based reports, hardbound books, professional papers, research studies, government reports, etc. These should be shared with the team to quickly determine which of the reports best fill gaps in understanding of the subject. The team should identify any information has been outdated by later research or findings or not peer reviewed. Resources that the team feels are reliable and up to date should, at a minimum, be compiled and held as a possible citations within the body of the tech-reg guidance or as an insertion into the document as "other resources." This baseline of shared information begins to establish a common understanding among TMs.

#### *3.1.1.2 Surveys*

Surveys are a useful method to collect information. Prior to developing questions for the survey, the team must determine the following:

- Goals: What are the expectations of the survey?
- Respondents: Who should complete the survey?
- Rationale/benefit: Why should the survey be completed?
- Outcome: How the information collected from the survey will be used?

The ITRC process for developing, testing, and requesting a survey response is contained in the ITRC "Technical Team Survey Development Planning Information, Guidance, and Request Template" (www.itrcweb.org/filecabinets_subfolder.asp?FCFID=294).

Surveys may collect information regarding environmental rules or regulations applied to a specific environmental technology or approach or information from laboratory or field tests (case studies). They can further document the full-scale use of the technology or approach. It is strongly recommended that new TLs consult with other or former TLs who have previously conducted surveys.

Response collection: Collecting and displaying responses allow the team to review individual responses. Depending on the number of responses and the length of each response, the team can become familiar with the information on the technology or approach, analyze the content, and evaluate the completeness of each response. If the response is incomplete, someone from the team (this can include the PA or TL) should contact the respondent and obtain a clarification.

Response analysis: Survey responses should be summarized or graphically compiled to display trends or relative populations.

Response validation: The responses need to be attributable to an individual, an organization, a citation, or other available data. To maintain quality, it is important for a reader to be able to confirm the conclusion of the team by using the survey responses, verify the source of the information contained in each response, and validate the credibility of the information from the respondent. When the survey results are compiled and the meaning of the results is understood, the team can incorporate the survey facts into the next step in the process—evaluation.

### *3.1.1.3 Case Studies*

Case studies offer data on the application, design, performance, and monitoring of the environmental technology or approach. Table 3-1 presents a checklist for elements that may be contained in a case study. Data and field experience from case studies can ground truth claims that the team makes within the evaluation of the technology or approach. Case studies can be obtained in a variety of ways:

- surveys
- existing databases
- team members
- industry peers

| Table 3-1. Important elements that may be presented in a case study | |
|---|---|
| | Site name |
| | Site location |
| | Contact name for follow-up |
| | Site description |
| | Affected media |
| | Contaminants of potential concern |
| | Length of application relevant to the case study |
| | Regulatory program applicable to the site (if field demonstration, pilot test, or full scale) |
| | Required monitoring |
| | Performance |
| | Success |
| | Regulatory acceptance |
| | Challenges |
| | Lessons learned |

Case studies are descriptions of a field application of the technology or approach at various levels, including the following:

- bench-scale test: laboratory testing using actual field media or surrogates of field media to determine whether the technology or approach can perform under controlled conditions
- field study: field test on all or a part of the technology or approach
- pilot test: limited-scale test in real field conditions
- full scale: fully deployed remediation technology or approach

### *3.1.1.4 Team Member Data and Information*

Data and information from the TMs—who may be vendors of the technology or practitioners of the approach that is not collected during the literature search (Section 3.1.1.1), surveys (Section 3.1.1.2), or case studies (Section 3.1.1.3)—must be scrutinized to the same standard. Claims of a vendor, even though a member of an ITRC team, must be substantiated to the full satisfaction of the team. It is the team's responsibility that the interpretation(s) drawn from the information

collected are reasonable and supportable and do not go into unsubstantiated concepts. All the information collected should be used to support the guidance.

If the team determines the data and information collected need to be published by ITRC as a printed document or posted on a publicly accessible web page, the external review procedures in Section 3.3.5 and ITRC document formatting procedures in Section 3.3.5.6 must be followed.

## 3.2 Technology Evaluation

The second step in developing tech-reg guidance is evaluating the performance of the technology or approach (Figure 3-2). The team has to evaluate and document through examples (e.g., case studies) and testing that the technology or approach will perform according to the claims made by the vendors, practitioners, researchers, or investigation teams. Criteria used to conduct and document this evaluation vary and should be developed early in the evaluation process by the team. These parameters should be used to formulate many of the questions in the survey and should form the basis for the literature search described in the previous section.

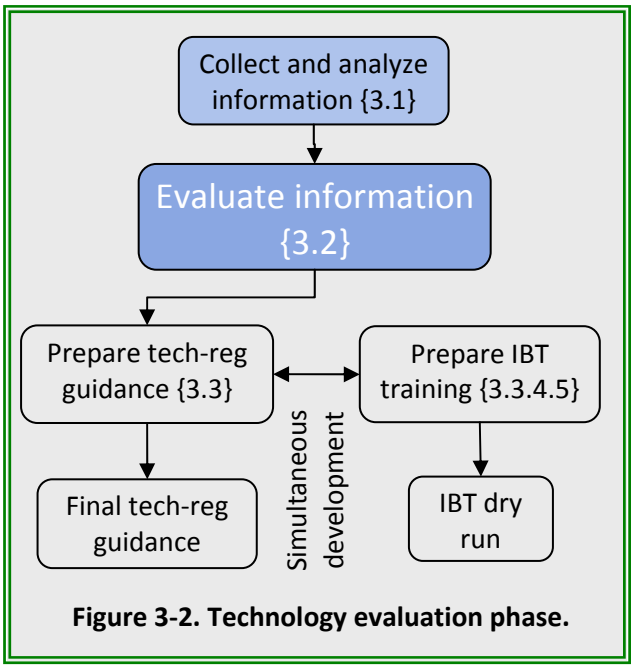


**Figure 3-2. Technology evaluation phase.**

### 3.2.1 Purpose

The purpose of the evaluation is to

- substantiate claims that the technology or approach performs as expected
- identify advantages that it may have over existing or more conventional techniques
- draw boundaries around its application

### 3.2.2 Identify Criteria for Evaluating Performance

Criteria used to evaluate performance should describe how a technology treats or controls contaminants in particular media or how an approach enables better decisions. Examples include the following (see "Guidance Documents" on www.itrcweb.org):

- treat lead in soil (approach): SMART-1, 2003
- collect contaminant samples in groundwater using passive sampler devices (technology): DSP-4, 2006
- evaluate the performance of post-closure care at a municipal waste landfill (approach): ALT-4, 2006

Criteria contained in these tech-reg guidance documents are very specific to the technology or approach being evaluated and should demonstrate the advantages, reliability, effectiveness, range of application, and limitations to the application.

### 3.2.3 Identify Advantages and Limitations

Innovation results from limitations of conventional technologies. New technologies or approaches typically emerge from the identification of advantages over conventional technologies. Likewise, new techniques have their own limitations. Limitations can be qualified by documenting research or testing to further define the range of the application in varying conditions. Such testing should be documented, but suggestions should not be made based on anticipated results of future testing. Innovative technologies commonly involve some uncertainties. These uncertainties are generally the topic of continued investigation.

### 3.2.4 Validate Performance

The team has the role of reviewing the literature, reviewing the case studies, and discussing issues and concepts with their TM counterparts. In the process they develop a valid confidence in the available data and information about the technology or approach. The specific purpose is to document the validity of the new techniques and describe their appropriate use.

ITRC project teams convey a certain confidence resulting from past performance, but part of that confidence relies on the teams' ability to communicate valid points supportable by verifiable information. Section 3.1.1 describes the information sources acceptable to a team. More specifically, peer-reviewed professional papers, case studies containing site data or linked to site data, TM studies, and academic or industry research are all useful and normally acceptable sources of information for ITRC tech-reg guidance. Vendor claims and vendor-supplied data that are not supportable through peer-reviewed literature or through team review are not normally acceptable.

### 3.2.5 Identify Barriers or Flexibility

New technologies and approaches that ITRC investigates were not available when most current environmental rules were created. Consequently, during application, some operational elements of a new technology or approach may not strictly comply with existing rules. They may, however, comply with the "intent" of the rules.

Not every technology or methodology investigated by ITRC encounters a valid regulatory or technical barrier. In the regulatory sense, some reluctance to approve applications containing new or innovative technologies may be more a function of unfamiliarity than valid barriers. State regulatory staff often have too many cases, have limited training opportunities, and are required to rely on on-the-job self-training when an application is received that contains new or innovative technologies or approaches. The information provided in ITRC tech-reg guidance enables regulators to act in a timely manner to applications in spite of uncertainty that may exist.

### 3.2.6 Key Elements to Highlight in Tech-Reg Guidance

Beneficial characteristics of the technology or approach, especially those characteristics that are unique, are important contributions to tech-reg guidance. Those unique technology characteristics may be the questions that regulators and practitioners alike should highlight in any application. Table 3-2 shows the general elements of a technology that should be included in tech-reg guidance. This example is not necessarily a standard template, but can be used to engage TMs in a discussion about appropriate elements for the evaluation of a technology or approach.

**Table 3-2. Important information from a technology or approach overview to be included in tech-reg guidance**

| | |
|---|---|
| | Description of the technology or approach |
| | Advantages and limitations |
| | Typical technology application |
| | Performance of the technology |
| | Case study citations |
| | Regulatory challenges (if any) and acceptance |
| | Availability (including commercial availability) |

Upon completion of the evaluation of the technology or approach, the team should ask, "Does this technology or approach have a valid role to play in environmental remediation?" Since TMs and ITRC are investing a great deal of time and resources in assessing the technology or approach, justification for moving forward is important to document at this step.

If the team determines a technology overview should be separately published by ITRC as a printed document or posted on a publicly accessible web page, the external quality review procedures in Section 3.3.5 and ITRC document formatting procedures in Section 3.3.5.6 must be followed.

## 3.3 Tech-Reg Guidance

A tech-reg guidance document details the information from the information collection and technology evaluation phases (Figure 3-3). Tech-reg guidance describes the proper questions and criteria required to make decisions when developing or reviewing applications for deployment of an innovative technology. There are always key points that affect the applicability or operability of a technology or approach that might not be obvious to a new user. Tech-reg guidance provides the user with tools to make better decisions.

### 3.3.1 What Guidance is Needed?

Answering this question, "What guidance is needed?" requires consideration of the users of the tech-reg guidance—what users need and the challenges they face. This may be a practitioner confronted with a contaminated site or a regulator who has just received an application

It is important when answering this question to think about what users of tech-reg guidance need and the challenges they face.

proposing an unfamiliar technology. Both need to "begin at the beginning."

*3.3.1.1 Technical Guidance*

Following the evaluation of the performance data of the technology or approach and the case studies where these technologies have been tested or applied, the team describes limitations of the technology. These limitations may prevent its use or make its use impractical. The team also describes the advantages that encourage the use of this technology or make the plan to control the exposure at the site less expensive, more sustainable, or more acceptable to the surrounding community.

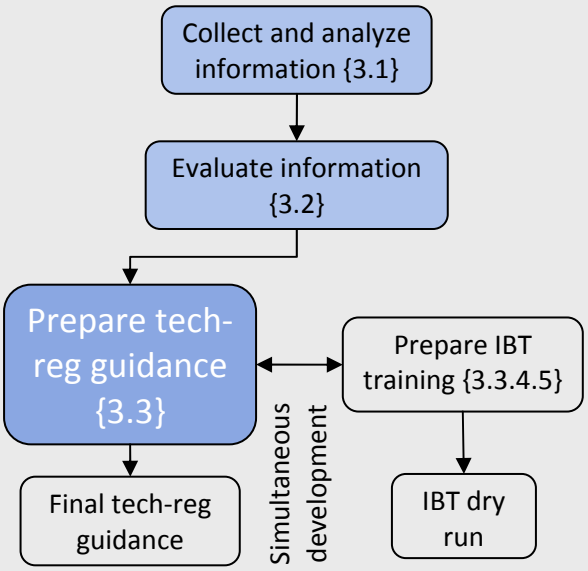


**Figure 3-3. Tech-reg guidance development phase.**

Tech-reg guidance should recognize how regulators and practitioners normally prepare their plans or reviews and add the unique features of a new or emerging technology or approach into the tech-reg guidance (see examples in Section 3.3.2) to evaluate the efficacy of the technology against the site characteristics. Practitioners can use tech-reg guidance to make sure they include the correct data to defend the use of the new technology. Regulators can use tech-reg guidance to ask the "correct" questions regarding the technology's ability to protect human health and the environment.

*3.3.1.2 Regulatory Guidance*

Regulators are familiar with their regulatory programs and must often consider new techniques in the context of regulations written well before the techniques became available. In many cases the regulations do NOT prohibit the use of innovative techniques. When this is the case, it should be clearly pointed out in the tech-reg guidance. However, there may be regulatory barriers that prevent the use of innovative technologies or approaches without some regulatory flexibility. It may be useful to identify and compare flexibilities during deployment from several states. The aspects considered by one state may be used by another state in determining what flexibilities can be allowed within its existing regulatory framework.

ITRC teams cannot expect regulatory flexibility, clarification, or change simply because they identify a barrier or a challenge. The teams are best positioned to analyze the advantages and consequences of allowing some regulatory flexibility that will allow the use of the technology or methodology. A recommendation for regulatory flexibility should be justified based on the technology's or approach's advantages and not simply on a desire to do something different. Teams can expect their state regulator members to scrutinize the suggested flexibility until they are assured that the application will protect human health and the environment. This discussion should occur within the team, and a justification should be provided in the tech-reg guidance.

### 3.3.2 Methods

Much of the content required for tech-reg guidance should have been collected during the information collection (see Section 3.1) and technology evaluation (see Section 3.2) phases. Several methods are used to describe decision points or decision-making processes in existing ITRC tech-reg guidance (see Table 3-3). The objective is to provide the user a guide describing the proper questions and criteria required to make defensible decisions for deployment of a new technology or approach. Two or more of these methods may be used in combination in a single tech-reg guidance document. All of the examples may be found in the "Guidance Documents" section of the ITRC website.

**Table 3-3. Examples of existing tech-reg guidance**

| | |
|---|---|
| Decision tree(s) | • ALT-2, *Technical and Regulatory Guidance for Design, Installation, and Monitoring of Alternative Final Landfill Covers* (2003)<br>• PHYTO-3, *Phytotechnology Technical and Regulatory Guidance and Decision Trees, Revised* (2009) |
| Flow diagram(s) | • ALT-4, *Evaluating, Optimizing, or Ending Post-Closure Care at MSW Landfills Based on Site-Specific Data Evaluation* (2006)<br>• ECO-2, *Planning and Promoting Ecological Land Reuse of Remediated Sites* (2006)<br>• SMART-1, *Characterization and Remediation of Soils at Closed Small Arms Firing Ranges* (2003) |
| Protocol(s) | • DSP-5, *Protocol for Use of Five Passive Samplers to Sample for a Variety of Contaminants in Groundwater* (2007) |
| Checklist(s) | • WTLND-1, *Technical and Regulatory Guide for Constructed Treatment Wetlands* (2003) |
| Web-based | • MINE-1, *Technical and Regulatory Guidance for Selecting Treatment Technologies for Mine-Impacted Water and Mine Solid Wastes* (to be completed in 2010)<br>• SEDS-1, *Contaminated Sediments* (to be completed in 2011) |
| Narrative guidance | • PBW-1, *Regulatory Guidance for Permeable Reactive Barriers Designed to Remediate Chlorinated Solvents* (1999)<br>• PRB-3, *Regulatory Guidance for Permeable Reactive Barriers Designed to Remediate Inorganic and Radionuclide Contamination* (1999) |

The balance between not enough detail and too much detail is difficult. Tech-reg guidance documents are not design documents; they are decision documents describing appropriate application criteria, regulatory barriers, deployment parameters, and performance expectations of new environmental techniques.

The more the tech-reg guidance educates and the less it reeducates, the better. For example, all applications of a new technology or approach are likely to require site characterization. The question should be asked, "Does the particular technology or methodology require any unique elements during the site characterization process?" If the answer is no, the team should not spend excessive time preparing information on the site characterization. However, site characterization may need to be included in the overall process (for instance, in a flow diagram or decision tree) to place the decisions in their proper perspective or sequence.

As tech-reg guidance is developed, teams should retain as much of the process practitioners and regulators are accustomed to as possible and explain the extraordinary points about the new technology or approach relative to the conventional process. When a decision should be made or when a question should be asked is as important as the decision or question itself. Some of the general questions that should be asked include the following:

- How does the user accommodate or overcome technical limitations?
- How does the user accommodate or overcome regulatory barriers?
- How does the user accommodate or overcome regulator acceptability issues?
- How does the user accommodate or overcome public stakeholder acceptability issues?
- How should decisions be made, and what criteria should form the basis of those decisions?

Appendix A contains checklists that provide more specific questions that should be addressed in tech-reg guidance designed around new technologies and problem areas. These questions should not be viewed as all-inclusive. Each problem ITRC defines seems to have unique features, which must be considered in the design of the tech-reg guidance.

### 3.3.3 Responsibilities

TLs, TMs, PAs, State POCs, federal agency partners, the Industry Affiliates Program (IAP), and public and tribal stakeholders all play a role in developing and assuring quality, value, usability, and usefulness in tech-reg guidance. Each group brings a different perspective to the process.

#### *3.3.3.1 Direction*

With input from the TMs, the TL sets the direction of the team by defining the scope of the project using the original problem statement contained in the proposal. This includes the structure, the level of detail, and organization of the guidance; the team makeup, communication, and participation of the TMs; and the Project Work Plan (see "Project Work Plan Template").

#### *3.3.3.2 Authorship*

The team works together to write and review the tech-reg guidance document and any team product preceding it. The ITRC-required mix of TMs should be used to its greatest advantage during the writing of the tech-reg guidance:

- State and federal regulators are best qualified to understand the applicable regulations.
- Practitioners (industry consultants) are best positioned to understand the application of a technology or methodology.
- Site owners are best positioned to understand the cost of acceptability and uncertainty.
- Academia can contribute or be familiar with the latest research concerning the subject technology or approach.
- Public and tribal stakeholders are best positioned to identify and help address issues and concerns held by affected communities and the general public. They also provide a critical voice within the team to make sure the claims are challenged and verified in a collegial and professional manner.

Specific authorship can be conducted in a variety of ways:

- subcommittee topical assignments
- subcommittee section assignments
- individual volunteers for specific sections
- individual assignments made by the TL

Regardless of how the tech-reg guidance development workload is organized into manageable segments, separate assignments should be made for preparation and review tasks. Optimally, segments prepared by a state regulator should be reviewed from a practitioner or other perspective, and sections prepared by a practitioner should be reviewed from a regulator or other perspective. This process causes "give and take" among the authors and reviewers and encourages acceptability among the perspectives represented on the team and, ideally, acceptability among the multiple users of the tech-reg guidance.

#### *3.3.3.3 Compilation, Formatting, Style, and Document Control*

PAs support all the functions of the team during the development process. PAs are not necessarily technical experts in any one field but require a fundamental understanding of science, engineering, and the regulatory environment. This allows PAs to engage in the team's work; understand the applicability of the content being prepared; and evaluate the value, usefulness, and usability of the tech-reg guidance. The PA is then able to provide appropriate advice to the TL and the team.

As material is being prepared and reviewed, the PA compiles the information into a format and style useful to the team for review. PAs may conduct technical editing (according to their level of understanding); prepare and format charts, graphs, tables, and figures; accumulate reference material for citations used in the text; and act as the keeper of the latest information. PAs should be prompt in distributing updated drafts of the tech-reg guidance to the team and assist TMs in maintaining the necessary momentum and progress according to their work plan. The methods for identifying or labeling revisions, distribution, and collecting newly prepared and revised information require agreement among the TMs and TL.

#### *3.3.3.4 Technical Editing*

Peers from the team and in the professional field need to review and evaluate the content as it is being prepared. Since particular sections of the tech-reg guidance may be prepared by an individual, another TM should review the material to ensure technical accuracy.

#### *3.3.3.5 Team Consensus*

ITRC strives for consensus among TMs prior to issuing tech-reg guidance—all TMs living with and supporting the product even if the direction is not their first choice. If this is not achievable, it is important for the TL to ensure that everything in a tech-reg guidance document is supportable and defensible. There must be a pathway a user can follow to understand statements

and the rational of the guidance within the tech-reg guidance. This pathway includes the investigation results and the experience of the TL and TMs listed in a document appendix.

Some team disagreements can be resolved by acknowledging the differing views in the document. For instance, if a disagreement is based on a policy position of a state which a state TM has to accommodate, this can become a "challenge" listed within a discrete section of the document. Knowing the challenge exists is a valuable step to a practitioner preparing a remediation work plan or application. Regardless of any disagreements, when the tech-reg guidance document is complete, the team should support it, and each TM should fully support the statements and information in the guidance. State concurrence can accommodate regulatory or policy conflicts within the concurrence levels established by ITRC.

It is the responsibility of the TL to resolve disagreements and continue on with the project. The TL is responsible to obtain agreement or determine there is not enough information to make a determination.

As a cautionary note, it is not uncommon that new technologies being investigated and evaluated by ITRC are the products of individuals or individual companies. These same individuals and companies can be expected to be ITRC TMs. ITRC and ITRC teams must strive to evaluate these technologies objectively—exclusive of the owners, vendors, or proponents—and scrutinize the test and operational data thoroughly to objectively present a consensus-based description of the technology or methodology. The internal and external review (described in the following section) and the multiple testing of the IBT is integral to maintaining this objectivity.

### 3.3.4 Internal Review

Once a first full draft of the tech-reg guidance is compiled, multiple internal team reviews are required to determine the following:

- accurate titles of the tech-reg guidance and associated IBT
- proper flow of the guidance
- the completeness of the guidance
- the accuracy, supportability, and defensibility of the guidance
- the usability, usefulness, and value of the guidance

Internal team reviews intend to establish a general consensus by the team on the content of the document. TMs should feel comfortable recommending the final product for use to their peers.

#### *3.3.4.1 Flow*

The flow or logic of the guidance makes the tech-reg guidance a usable tool for decision-making. Users can be assured that the team has weighed the evidence and formulated recommendations or decision parameters that as a rule will be acceptable. The flow should also appear logical and sequential, where each subsequent section builds upon the previous section.

#### *3.3.4.2 Completeness*

Tech-reg guidance should display the complete process yet focus on the unique features of the technology or methodology that require thought and influence decisions. Descriptions should be complete to the extent they are known from the information available and reviewed by the team (see Section 3.1). Uncertain or speculative information should be avoided or clearly qualified as such.

#### *3.3.4.3 Accuracy, Supportability, and Defensibility*

The parameters and the range of values associated with the parameters need to be accurate, and any uncertainty should be qualified. The values included in tech-reg guidance should be supportable by the information obtained during the information-gathering process (Section 3.1), and the team should be able to defend the results interpreted from that information. It is understood that soon after publication, additional information may become available to support, enhance, or dispute previous information. ITRC has a process at the end of the implementation phase of a project that requires an evaluation of the accuracy of all tech-reg guidance (see Project Life Cycle).

#### *3.3.4.4 Usability, Usefulness, and Value*

ITRC expects tech-reg guidance to have the following qualities:

The TL, TMs, and PA are responsible for seeing that tech-reg guidance is usable and useful and adds value.

- Usable—A user can use the document as a tool to make decisions knowing that the ITRC project team has taken into account various perspectives during its development. The document also provides guidance to users and includes the essential questions pertinent specifically to the innovative technology or approach, but within the context of known investigative and planning principles.

- Useful—The user can derive essential information from the tech-reg guidance knowing that a team is focused on identifying the unique features of the technology or approach and clearly describing the advantages and the limitations to be expected when properly applying the technology or approach.

- Value—The user can save time and, consequently, money by using and relying on the tech-reg guidance as a decision-making tool. The greatest value is derived when practitioners and their counterpart environmental regulators both use the tech-reg guidance.

Before, during, and after the TM internal review, the PA should recheck the full draft for edits, flow, and style changes and should resolve any conflicts among the TM reviews. Each author will choose sentence structure and wording slightly or dramatically different from those of another TM. Bullets should be checked for consistency. Tables, charts, graphs, figures, and section heading and subheads should be formatted according to standard ITRC formatting. Subsections should consist of more than single sentences, and headings should contain summary descriptions of subsequent subheadings. Bullets should be used to present discrete but related points, and numbering should signify sequence. The table of contents should coincide with the

document headings, and appendices should be incorporated, referenced, and formatted properly. TMs should be listed in the appropriate appendix of the tech-reg guidance.

As the team is nearing completion of the final draft guidance, external peer reviewers should be solicited to check the validity of the interpretations that TMs may have made. Following completion of the internal review, the TL is responsible for releasing the document for external review. Professional peer review involves members of the profession that are believed to be reliable and experienced experts in the topic. However, before external review is completed, the IBT development process begins.

### *3.3.4.5 Internet-Based Training Development*

IBT is to be included in a technical team's annual work schedule for all tech-reg guidance work plans. IBT development and delivery (Figure 3-4) is required for all tech-reg guidance. IBT is developed concurrently with the team's final reviews and preparation of the associated document. For complete guidance for development of IBT, see www.itrcweb.org/teamprivatepage_main.asp?TID=65. The typical schedule for IBT curriculum development occurs in parallel with the last six months (minimum) of document development, facilitating a comparison process between the tech-reg guidance and the IBT curriculum. This process ensures consistency of the written narrative of the guidance with the training instruction. Each IBT training session lasts approximately 2–2¼ hours. IBT is developed for nonguidance documents and emerging issues ONLY on a case-by-case basis upon written request to the Training Program Liaison and approval of the ITRC Director (or his or her representative). Caution should be exercised when designing IBT on a nonguidance document. The time an audience can be expected to be attentive is limited to 2–2¼ hours. It has been demonstrated to be difficult, if not impossible, to deliver the entirety of the technical content during this period. Consequently, IBT courses are designed to train on the tech-reg guidance document, not the technical substance of the topic.

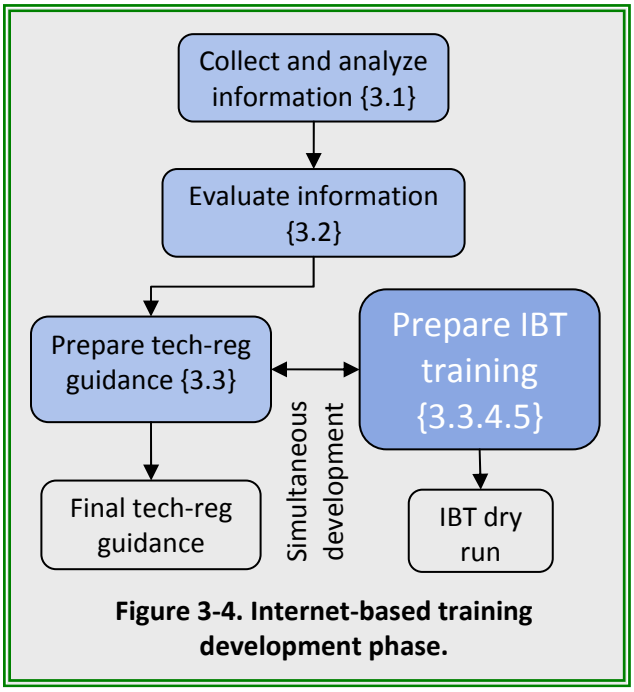


**Figure 3-4. Internet-based training development phase.**

### 3.3.5 External Review

External review must be conducted on every document ITRC prints or posts on a publicly accessible web page. External review allows a fresh and unbiased review of the draft tech-reg guidance and continues the process that ensures it

- clearly defines the user of the document
- flows well for the user of the guidance

- offers a complete picture of the guidance
- is accurate, supportable, and defensible
- is usable, useful, and valuable

An external review draft of the tech-reg guidance is delivered to the ITRC

- State POCs
- federal partners
- Industrial Affiliates Program
- public and tribal stakeholders

#### *3.3.5.1 ITRC State POCs (Required)*

POC review involves a six-week review by ITRC states, coordinated by the State POCs. The TL and PA prepare the State POCs for the scheduled review (see Project Work Plan template at www.itrcweb.org/filecabinets_subfolder.asp?FCFID=288) during a POC/TL monthly conference call scheduled the month prior to release of the external review draft of the tech-reg guidance. The PA and TL prepare the review request according to the document review template and process described at www.itrcweb.org/filecabinets_subfolder.asp?FCFID=294.

An extension to the six-week review schedule is the decision of the TL; however, extensions to the review period may impact the schedule for completions of the tech-reg guidance and the scheduled IBT dry run. All expected adjustments to the work plan schedule should be considered before allowing an extension. To avoid extension requests and obtain a representative cross section of the states supporting the guidance, review reminders should be sent at least three weeks into the review period.

The state external review is an effort to identify required changes and conflicts states may face during the formal ITRC concurrence process. Every tech-reg guidance document should have input from at least 20% of states (i.e., 10 states). This can be considered the sum total of state TMs plus the states commenting on the tech-reg guidance. Not receiving a response from a state should not be considered as part of the 20%; however, a response that says “no comments to the final draft” should be considered part of the total percentage of commenting states.

#### *3.3.5.2 Federal Partner Review (Required)*

The beginning of the federal partner (Department of Defense [DOD], Department of Energy, and EPA) review should coincide with the beginning of the State POC review. The duration of the review is the same with one exception: DOD is granted a 90-calendar-day review period according to an agreement between ITRC and DOD. The document review template and process is located at www.itrcweb.org/filecabinets_subfolder.asp?FCFID=294.

The Federal Agency Liaisons are listed at www.itrcweb.org/conbod.asp. Each federal partner should be notified with a review request specific to the respective agency. DOD review is coordinated through the Office of the Secretary of Defense liaison rather issuing separate requests to each DOD liaison.

#### *3.3.5.3 Public and Tribal Stakeholders Review (optional until formally developed)*

The beginning of the public and tribal stakeholders review should coincide with the beginning of the State POC review and be completed within six weeks. The same review request template may be used; however, it should be adjusted to focus the review on public and tribal stakeholder group. The review request should be sent directly to the Public and Tribal Stakeholder Representative on the BOA (see http://www.itrcweb.org/conbod.asp) for distribution throughout the stakeholder organization.

#### *3.3.5.4 Industry Affiliates Program (optional until formally developed)*

The beginning of the IAP review should coincide with the beginning of the State POC review and be completed within six weeks. The same review request template may be used; however, the template should be adjusted to focus the review on industry perspectives. See www.itrcweb.org/iap.asp for a list of industry members within ITRC who may be asked to review tech-reg guidance. The review request should be sent directly to the IAP Representative on the BOA for distribution among the IAP organization.

#### *3.3.5.5 Response to Comments*

Comments received during the external review will cover the range of possibilities. It is appropriate to respond to comments received to ensure reviewers know that their input was received and considered. Based on the comments received, a team may need to

- make text changes (e.g., add content)
- add detail and clarifications
- change organization of document
- dismiss out-of-scope comments

Those who provided comments should receive a written explanation of the disposition of their comment. This response to comments does not need to be overwhelming but is necessary to demonstrate that careful consideration has been made to each comment.

Conversations between the team and a commenter for clarification are at the discretion of the TL. All commenters will be identified by agency and the agencies listed in the work plan according to the work plan update schedule. A response to comments package will be sent to commenters following completion of the tech-reg guidance. Optional methods of managing the response to comments include

- inserting relevant comments into an appendix
- posting relevant comments on the team public page
- posting relevant response to comments on a team password-protected page

The PA compiles the comments in a fashion that allows the team to review the comments, prepare responses, and make necessary modifications to the tech-reg guidance. The PA should make the necessary editorial changes to the document without team input unless a question of substance is involved. Editorial comments need not be included in the response to comments.

The PA should prepare a package the team can refer to that identifies the comment (multiple comments on the same point can be grouped and categorized if necessary) and the section of the tech-reg guidance in question and where possible, prepare a draft response the team can react to. Certainly some responses will be left completely to the team. In these instances the PA and the TL should identify the proper TM to prepare the draft response before the team review. Having a draft response prepared streamlines the team review process. There is currently no template for ITRC response to comments.

#### *3.3.5.6 Final Review and Posting*

The PA is responsible for making the necessary adjustments to the tech-reg guidance from the external review. Changes should be confirmed by the team using the best available methods (e.g., conference calls, interactive conference calls using videoconferencing or team meetings). After completing all of the changes resulting from the external review, the team should be given another opportunity to review the final guidance.

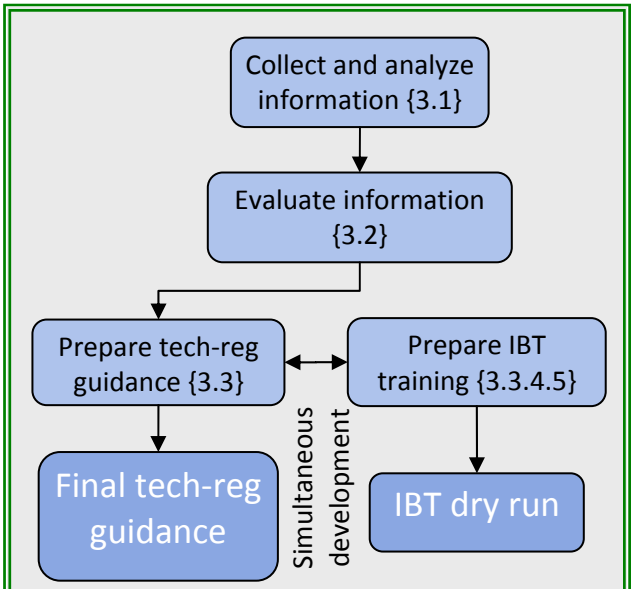


**Figure 3-5. Completion phase.**

The PA is responsible for seeing that the document meets the following standards:

- A graphic for the front cover is prepared or in preparation on a schedule that will not delay posting.
- All formatting is in accord with the current ITRC template:
  - The type of document is designated and appropriate.
  - The disclaimer on the inside front cover is current.
  - Headings are styled per the template and such that the table of contents automatically generates completely, in correct format, and without extraneous entries.
  - Lists of tables, figures, and appendices agree precisely with the actual captions and titles.
  - Headers and footers are correct and suit the page orientation.
  - Text is correct in spelling, punctuation, and grammar and formatted in accord with the template.
  - Tables and figures are called out in the text and placed as closely as possible thereafter.
  - Tables and table and figure captions are formatted in accord with the template.
  - All references cited in the text are listed in the bibliography, which is complete and formatted in accord with the template.
- Figures are of adequate resolution to support clear printing. The use of color is either unnecessary or affordable to print.
- Appendices are incorporated in the document or are available to the editor (e.g., in PDF).
- The next-to-last appendix is an alphabetical team list with appropriate contact information.
- The last appendix lists and defines all acronyms used in the document.

The decision to send the tech-reg guidance document for final editorial review (Communications Support for ITRC) and preparation for printing is made by the TL in consultation with the PA and team. Revisions and questions resulting from the final editorial review are to be resolved by the PA and the editor unless the PA determines the need for assistance from the TL or the team.

Following the final editorial review, the PA and TL should perform a final review of the document to assess the quality of the final changes and edits. Ultimately, the published document is the responsibility of the TL. The finished tech-reg guidance document must be posted to the web a minimum of two weeks prior to the IBT dry run (see Figure 3-5).

## 4. TECH-REG GUIDANCE VALIDATION

ITRC's main objective for this framework is to ensure that high-quality tech-reg guidance documents will continue to be developed for state and federal regulators, practitioners, and the broader environmental community. Without this framework, TLs and PAs may struggle with the content and construction of a tech-reg guidance document. To act as a sounding board for teams, the ITRC Framework Review Committee, led by the ITRC TLL, will compare the proposed tech-reg guidance project scope to this framework and provide input and recommendations to the team. The Framework Review Committee will consist of the following:

- ITRC TLL
- an experienced TL from a current or past team
- an experienced PA from another team
- an experienced state TM from another team
- an experienced industry TM from another team
- an experienced federal TM from another team
- an experienced public or tribal stakeholder TM from another team
- an ITRC State POC

Members of the Framework Review Committee will change often to avoid any apparent conflicts of interest.

### 4.1 Role of the Framework Review Committee

The Framework Review Committee has the following responsibilities:

- Acts primarily as a resource to the TL and PA. The committee will listen to the TL's proposed approach to the problem, the process for collecting the content, and the structure of the ITRC tech-reg guidance (e.g., decision tree, written protocol, flow diagram, frequently asked questions).

- Queries the TL and PA on potentially missing considerations.

- Confirms that the proposed tech-reg guidance is appropriate and achievable in the planned time frame.

## 4.2 Team Leader Liaison

The TLL is responsible to the BOA for ensuring that all teams are producing products within the scope of the ITRC. The TLL is also responsible for scheduling the review, selecting the Framework Review Committee members, coordinating their discussions and comments, and clearly communicating with TLs. If a disagreement occurs between the TLL and a TL, the TLL may consult with the BOA on any appropriate action.

## 4.3 When to Validate

When the team is formed and the scope of the problem, investigative process, solution, and design of the tech-reg guidance are reviewed, there may be changes. The Framework Review Committee can assure the TL that the team is producing a tech-reg guidance document and its approach will lead to a quality product. Within six months of beginning of the project, the TL should request review of the project summary and work plan by the Framework Review Committee. It will review the description of the tech-reg guidance and information collection and evaluation processes leading to the tech-reg guidance and provide feedback to the TL through the TLL.

During product development, the investigation may reveal unexpected results that may cause a change in the description or the intent of the tech-reg guidance. It is in the best interest of the team to request external input from the Framework Review Committee to assure the team that the changes still meet the ITRC intent of tech-reg guidance. Also, if reviews or other information arise that causes question as to whether or not tech-reg guidance is still feasible, the Framework Review Committee may be called on to review draft documents.

## 4.4 Validation Criteria

Table 4-1 shows some general criteria that every project should address.

| Table 4-1. Tech-reg guidance validation criteria | Yes | No |
|---|---|---|
| Are the users of the guidance clearly defined? | | |
| Is the solution to the problem scoped such that it will guide users through the unique features of the technology or approach? | | |
| Are the process and schedule for collecting quality information defined? | | |
| Are the process and schedule for evaluating information appropriate for the guidance defined? | | |
| Is the scope of the investigation defined to identify and verify advantages? | | |
| Is the scope of the investigation defined to identify and verify limitations? | | |
| Is the scope of the investigation defined to identify and verify regulatory barriers? | | |
| Is the scope of the tech-reg guidance focused and achievable? | | |
| Is the value of the tech-reg guidance apparent? | | |
| Is the usefulness of the tech-reg guidance apparent? | | |
| Is the usability of the tech-reg guidance apparent? | | |

In addition to the criteria in Table 4-1, Appendix A contains checklists focused on technology-based and problem area–based tech-reg guidance. Each of these checklists should be consulted during any review of the content of a tech-reg guidance document.

# Appendix A

# Checklists for Technology-Based and Problem Area–Based Tech-Reg Guidance

**CHECKLISTS FOR**
**TECHNOLOGY-BASED AND PROBLEM AREA–BASED**
**TECH-REG GUIDANCE**

| TECHNOLOGY-BASED | |
|---|---|
| **Information Collection** | Identify and collect the information available describing<br>✓ the treatment mechanisms<br>✓ the contaminants they treat<br>✓ the performance of the treatment<br>✓ the limits to its current application |
| | Identify the pertinent technology(ies). |
| | Are the quantity and quality of information and data supporting the technology adequate? |
| **Technology Evaluation** | Using the case study, literature, and survey information, evaluate the performance of the technology.<br>✓ What is the advantage of this technology?<br>✓ What are the limitations of this technology?<br>✓ What contaminants does the technology treat?<br>✓ What parameters are used to measure performance?<br>✓ How certain is it that the technology will scale up and mature?<br>✓ Are there technical or regulatory barriers or challenges to the use of this technology? |
| | Does this technology have a likely contribution to environmental remediation? |
| **Tech-Reg Guidance Development** | Define the logic (what are the critical questions that need to be asked about the application of this technology/approach and in what order?)<br>✓ The mechanisms that form the basis of the treatment are…<br>✓ The applications of the treatment are…<br>✓ The site parameters that limit this technology are…<br>✓ The contaminant limitations of this technology are...<br>✓ The operation, maintenance, and monitoring requirements are…<br>✓ The optimization process for this technology follows…<br>✓ The challenges or barriers to the use of this technology are… |
| | Create guidance that fits the technology into the most conventional planning process possible. The less new it appears, the less intimidating it becomes. |

<table>
<tr><th colspan="3">PROBLEM AREA–BASED</th></tr>
<tr><td>Information Collection</td><td colspan="2">✓ Identify the technologies or approaches available to treat the problem.<br>✓ Identify, locate, and collect the relevant studies for the technology(ies) or approaches included in the investigation.<br>✓ Are the quantity and quality of information and data supporting the technology or approach adequate?</td></tr>
<tr><td rowspan="3">Technology Evaluation</td><td colspan="2">Using the case study, literature, and survey information, evaluate the performance of</td></tr>
<tr><td>Technologies used to treat the problem<br>✓ What is the advantage of this technology?<br>✓ What are the limitations of this technology?<br>✓ What contaminants does this technology treat?<br>✓ What parameters are used to measure performance?<br>✓ How certain is it that the technology will scale up and mature?<br>✓ Are there technical or regulatory barriers or challenges to the use of this technology?</td><td>Approach used to address the environmental problem<br>✓ What is the advantage of this approach?<br>✓ What are the limitations of this approach?<br>✓ What contaminants does this approach treat?<br>✓ How is the success of this approach measured?<br>✓ How certain is it that this approach can be broadly used?<br>✓ Are there technical or regulatory barriers or challenges to the use of this approach?</td></tr>
<tr><td colspan="2">Does this suite of technologies or using this approach have a likely contribution to the environmental industry?</td></tr>
<tr><td rowspan="2">Tech-Reg Guidance Development</td><td colspan="2">Define the logic of applying a variety of technologies or an approach, or both, to the problem area.<br>✓ The site, regulation, or technology parameters that help minimize the uncertainties surrounding the problem area are…<br>✓ The tiered decisions that help simplify the selection process are…<br>✓ The problem area limitations that must be overcome are…<br>✓ The optimization process involves…<br>✓ The challenges or barriers to these technologies or this approach are…</td></tr>
<tr><td colspan="2">Create a guidance that fits the technologies or approach into the most conventional planning process possible. The less new it appears, the less intimidating it becomes.</td></tr>
</table>

# Appendix B

# Glossary

# GLOSSARY

| | |
|---|---|
| **bench-scale test** | Lab testing using actual field media or surrogates of field media to determine whether the technology or approach can perform under laboratory-controlled conditions. |
| **case study** | Real-life examples of use of a technology or approach, documented with field measurements and analysis (Section 3.1.1.3). |
| **ITRC Director** | Responsible for implementing all the strategic decisions and the technical program approved by the Board of Advisors and for conducting and coordinating all the day-to-day activities of ITRC. Manages and is responsible for all staff supporting ITRC within the Environmental Council of the States (ECOS) office; interacts with all components of ITRC; and is the primary liaison between ITRC and state governments, state and federal agencies, public organizations, and industry. The ITRC Director is an employee of ECOS but supports and reports to the ITRC Board of Advisors and to ECOS. |
| **field study** | Field test on all or a part of the technology or approach. |
| **framework** | A set of steps and procedures to follow to reach an expected outcome. |
| **full scale** | Fully deployed remediation technology or approach. |
| **pilot test** | Limited-scale test in real field conditions. |
| **professional peer review** | Professionals outside of the slate of team members who are qualified to review a near-final draft of the document. This should be conducted prior to the external review process. This review is a good cross check of the content that has been prepared by the team. |
| **Program Advisor** | Support personnel for project teams who provide administrative and management support to the Team Leaders. Program Advisors are contracted by ECOS to work for ITRC. |
| **regulatory barrier** | A quidance, policy, rule, or statute (state or federal) that inhibits or precludes use of a particular technology or approach. |
| **State Points of Contact** | Implementation leaders in ITRC member states who serve as the primary communication link between ITRC and states. |
| **survey** | Useful methods used to collect information. |
| **Team Leader** | State environmental agency employee who is responsible for the planning, management, and products of an individual ITRC team. |
| **Team Leader Liaison** | State Board of Advisors member responsible for managing ITRC teams from an organizational standpoint. |
| **Team Member** | State, community stakeholder, industry, and federal agency representative who has signed up for a team during a calendar year. |
| **Tech-Reg** | The ITRC technical and regulatory guidance document (Section 3.3). |
| **Technology Overview** | A summary of what a technology or approach consists of, including procedures and equipment, appropriate use, advantages and disadvantages, and acceptance by regulatory agencies (Section 3.2). |

# Appendix C

# Acronyms

## ACRONYMS

| | |
|---|---|
| **BOA** | Board of Advisors |
| **DOD** | Department of Defense |
| **ECOS** | Environmental Council of the States |
| **EPA** | Environmental Protection Agency |
| **IAP** | Industry Affiliates Program |
| **IBT** | Internet-based training |
| **ITRC** | Intestate Technology & Regulatory Council |
| **PA** | Program Advisor |
| **POC** | point of contact |
| **TL** | Team Leader |
| **TLL** | Team Leader Liaison |
| **TM** | Team Member |