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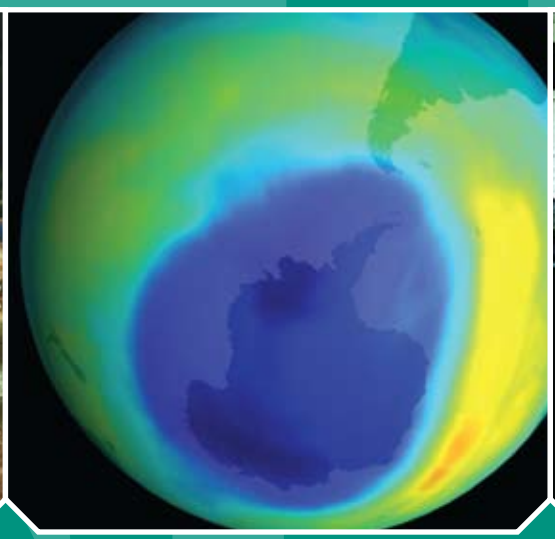
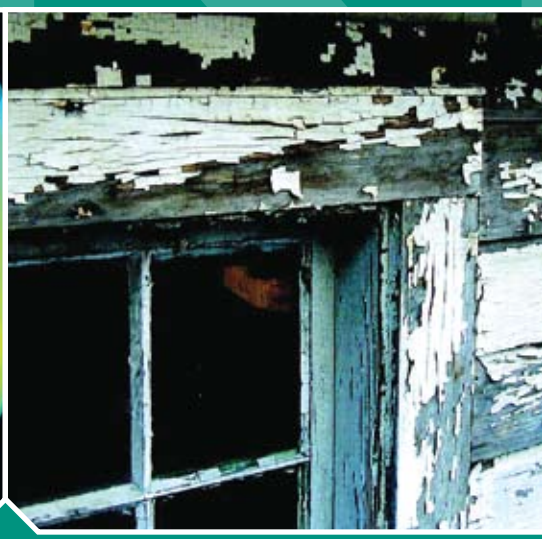
United States
Environmental Protection
Agency

Risk Communication in Action

THE RISK COMMUNICATION WORKBOOK





Office of Research and Development
National Risk Management Research Laboratory

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Risk Communication in Action:

The Risk Communication Workbook

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Notice

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Foreword

The U.S. Environmental Protection Agency (EPA) is charged by Congress with protecting the Nation's land, air, and water resources. Under a mandate of national environmental laws, the Agency strives to formulate and implement actions leading to a compatible balance between human activities and the ability of natural systems to support and nurture life. To meet this mandate, EPA's research program is providing data and technical support for solving environmental problems today and building a science knowledge base necessary to manage our ecological resources wisely, understand how pollutants affect our health, and prevent or reduce environmental risks in the future.

The National Risk Management Research Laboratory (NRMRL) is the Agency's center for investigation of technological and management approaches for preventing and reducing risks from pollution that threaten human health and the environment. The focus of the Laboratory's research program is on methods and their cost-effectiveness for prevention and control of pollution to air, land, water, and subsurface resources; protection of water quality in public water systems; remediation of contaminated sites, sediments, and ground water; prevention and control of indoor air pollution; and restoration of ecosystems. NRMRL collaborates with both public and private sector partners to foster technologies that reduce the cost of compliance and to anticipate emerging problems. NRMRL's research provides solutions to environmental problems by developing and promoting technologies that protect and improve the environment; advancing scientific and engineering information to support regulatory and policy decisions; and providing the technical support and information transfer to ensure implementation of environmental regulations and strategies at the national, state, and community levels.

This publication has been produced as part of the Laboratory's strategic long-term research plan. It is published and made available by EPA's Office of Research and Development to assist the user community and to link researchers with their clients.

Sally Gutierrez, Director
National Risk Management Research Laboratory

Abstract

Communicating information about environmental risk to the people most affected by it is one of the major challenges faced by risk managers and community decision makers. Changing human behavior is a far more complex task than designing water retention systems or managing storm water overflows. On a personal level, many people resist warnings to stop smoking or wear a seatbelt, reduce calorie intake, or practice safe sex. On a community-wide scale, people often resist programs to improve traffic flow or to preserve wetlands or limit construction in ecologically fragile areas. The purpose of this workbook is to provide a better understanding of the elements of successful risk communication to public health officials, local environmental managers and community decision makers. The workbook describes concepts of risk communication based on perceptions, value differences, persuasion and presentation of data in new ways. EPA sample documents are included to show a unique demonstration of communicating risk. Following these examples, this document provides a section on communication tools and techniques. Case studies and workbook exercises are included as well as an extensive bibliography.

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1.0 Introduction

Communicating information about environmental risk to the people most affected by it is one of the major challenges faced by risk managers and community decision makers. Changing human behavior is a far more complex task than designing water retention systems or managing storm water overflows. On a personal level, many people resist warnings to stop smoking or wear a seatbelt or reduce calorie intake or practice safe sex. On a community-wide scale, people often resist programs to improve traffic flow or to preserve wetlands or limit construction in ecologically fragile areas. The purpose of this workbook is to provide a better understanding of the elements of successful risk communication to public health officials, local environmental managers and community decision makers. The workbook describes concepts of risk communication based on perceptions, value differences, persuasion, and presentation of factual material. EPA sample documents are included to show a unique demonstration of communicating risk. Following these examples, this document provides a section on communication tools and techniques. Case studies and workbook exercises are also included.

An act or phenomenon is said to pose a hazard when it has the potential to produce harm or other undesirable consequences to some person or thing (NRC 1989).

1.1 What Is Risk Communication?

Simply stated, risk communication is the process of informing people about potential hazards to their person, property, or community. Scholars define risk communication as a science-based approach for communicating effectively in situations of high stress, high concern or controversy. From the risk manager's perspective, the purpose of risk communication is to help residents of affected communities understand the processes of risk assessment and management, to form scientifically valid perceptions of the likely hazards, and to participate in making decisions about how risk should be managed.

Risk communication tools are written, verbal, or visual statements containing information about risk. They should put a particular risk in context, possibly add comparisons with other risks, include advice about risk reduction behavior, and encourage a dialogue between the sender and receiver of the message.

The best risk communication occurs in contexts where the participants are informed, the process is fair, and the participants are free and able to solve whatever communication difficulties arise. Figure 1-1 is an example of a possible human health threat (a landfill). Ideally, risk communication is a two-way conversation in which an agency or organization informs, and is informed by, affected community members.

Figure 1-1. A landfill that could pose a risk to local citizens.

Risk messages are developed to induce behavioral change. *Ex. Mercury contamination in fish, alcohol and drug use, radon testing.

In understanding risk communication, a basic understanding of risk is necessary.

2.0 Basic Concepts of Risk

2.1 Background

The goal of environmental and public health is to reduce the risks associated with exposure to microbial, radiological and toxic agents in the environment, and also to agents of injury. In this workbook, risk is defined as judgments concerning the likelihood, severity, or importance of a threatening event or condition, such as Figure 2-1.

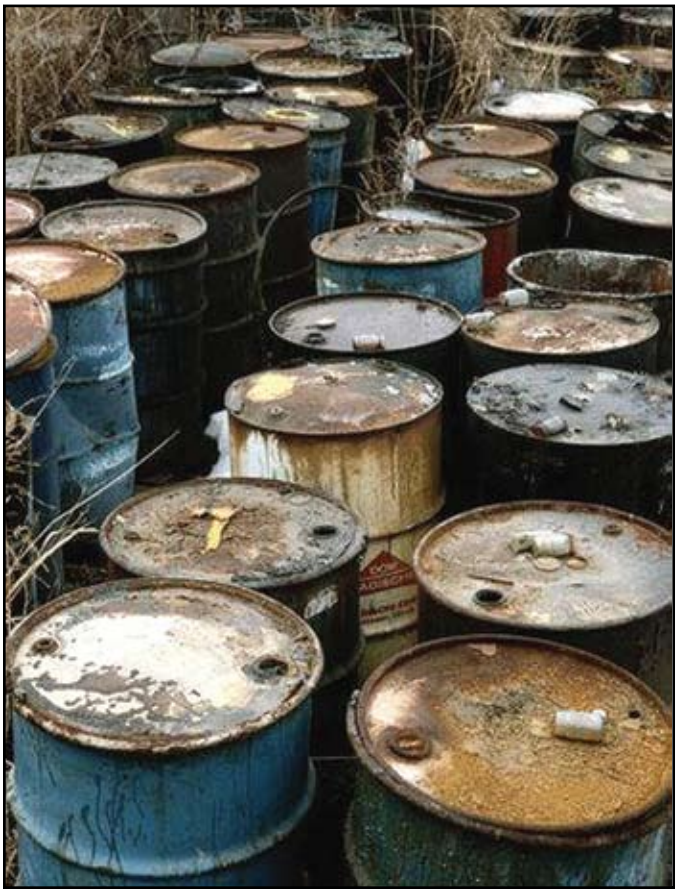

Figure 2-1. Humans can be exposed to unknown chemicals from a toxic dump site.

2.2 Three Approaches to Managing Risks

1. Control releases of the agent to the environment.
2. Control use of the agent.
3. Control exposure to the agent.

Sewage treatment systems, smokestack scrubbers, and other "end-of-pipe" control systems are examples of the first approach. The second approach is usually taken by pollution prevention (P2) and "sustainability" advocates. The third approach of using physical or behavioral barriers has been traditionally taken when the first two are impractical, such as in the case of reducing the risks of skin cancer for example, where controlling the sun has proven difficult. This handbook fosters the idea that the third approach should also be applied to all problems of risk reduction, including those traditionally managed by the first two methods.

Unlike the first two approaches mentioned previously, where technology can be used as a solution, the problem of reducing exposures often relies on influencing human behavior. The solution then is providing risk information to the public in such a compelling way as to result in reductions in the exposures to agents of morbidity, mortality, or injury.

Informing people of the risk is the first step. To be effective, modern risk education programs must transcend barriers of literacy, language, and ethnicity to ensure acceptance or understanding. This may involve the use of pictograms, color-coded icons, various indices of risk and other nonverbal methods.

The following are categories of concern related to risk: (Covello, Heartland Center 2003):

Health
Safety
Environment
Family
Community
Economic
Trust
Benefits
Control
Fairness

Respect
Accountability

Some characteristics of a risk include:

Unknown
Uncertain
Unfair
Dreaded
Dangerous to children
Catastrophic
Immoral
Uncontrollable
Involuntary
Unfamiliar

Seven Cardinal Rules of Risk Communication (Covello)

Accept and involve the public as a legitimate partner in the decision-making process.
Listen to your audience.
Be truthful, honest, frank, and open.
Coordinate, collaborate, and partner with other credible sources.
Meet the needs of the media.
Speak clearly and with compassion.
Prepare, plan carefully, and evaluate your communication performance.

Designers of risk messages must be aware that a program that addresses one source of conflict may fail to address another. Messages addressed to resolve differential knowledge might miss the mark because the issue may be different values, from one individual to another, or mistrust of certain experts.

2.3 Risk Analysis

Risk analysts seek to determine the outcomes of various risks. Figure 2-2 is a Superfund site that must be analyzed for any possible human health risks before a cleanup plan can be executed. A risk analysis includes the recognition, evaluation, and control of the risk of interest. A risk assessment is a logical approach to analyze and interpret information with the purpose of estimating likelihood (probability) and severity (magnitude) of harm to human health and/or environment under specific conditions. Risk assessments comprise the fields of toxicology, engineering, industrial hygiene, statistics, epidemiology, and economics, to name a few. Risk assessments are used for compliance (regulatory requirements), standard/regulatory promulgation, priority setting, site/location selection for hazardous industries, select intervention/management strategies and/or technology, evaluation impact or activity of product, and cost/benefit analysis.

Aside from understanding risks, various concepts of communication are described in Section 3.0.

Figure 2-2. The Clark River Superfund site in Montana.

3.0 Basic Concepts of Communication

When communicating any form of communication, it is important to note the content of the message. The following points should be understood when one is communicating a message:

- Messages are usually designed for non-specialists.
- Simplify complex information.
- What does the audience know?
- What can the audience be expected to understand?
- What is the action or response the sender wants?
- Message content involves what you want to say.
- Message medium is how (in what format) you want to say it.
- Message target is the person(s) you are trying to influence.

3.1 How and What to Communicate to the Public

This section considers how and what types of data to communicate to the community. This is designed to help you develop an approach for communicating pertinent information to people in your community, or more specifically, your target audience. Provided below is information to develop an outreach plan, and also resources for presenting to the public.

Developing an Outreach Plan

Your outreach program will be most effective if you ask yourself the following questions:

- Who do you want to reach? (i.e., Who is your target audience?)
- What information do you want to distribute or communicate?
- What are the most effective mechanisms to reach your target audience?

Developing an outreach plan ensures that you have considered all important elements of an outreach project before you begin. The plan itself provides a blueprint for action. An outreach plan does not have to be lengthy or complicated.

Figure 3-1. Dutch Boy Paint ads were deceptively targeted towards children, who are most affected by lead-poisoning.

Your outreach plan will be most effective if you involve a variety of people in its development. Where possible, consider involving:

- A communications specialist or someone who has experience developing and implementing an outreach plan.

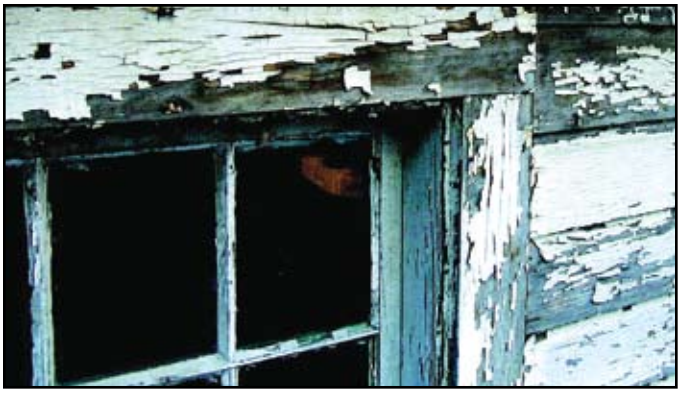

Figure 3-2. Chipping lead paint, which is a particular hazard to children when small particles are ingested.

Figure 3-3. X-ray fluorescence detector assists the cleanup of lead paint.

- Technical experts in the subject matter (both scientific and policy).
- Someone who represents the target audience (i.e., the people or groups you want to reach).
- Key individuals who will be involved in implementing the outreach plan.

As you develop your outreach plan, consider whether you would like to invite any organizations to partner with you in planning or implementing the outreach effort. Potential partners might include: local businesses, environmental organizations, schools, associations, local health departments, local planning and zoning authorities, and other local or state agencies. Partners can participate in planning, product development and review, and distribution. Partnerships can be valuable mechanisms for leveraging resources while enhancing the quality, credibility, and success of outreach efforts. Developing an outreach plan is a creative and iterative process involving a number of interrelated steps, as described below. As you move through each of these steps, you might want to revisit and refine the decisions you made in earlier steps until you have an integrated, comprehensive, and achievable plan.

What Are Your Outreach Goals?

Defining your outreach goals is the initial step in developing an outreach plan. Outreach goals should be clear, simple, action-oriented statements about what you hope to accomplish through outreach. Once you have established your goals, every other element of the plan should relate to those goals.

Identifying Your Audience(s)

The next step in developing an outreach plan is to clearly identify the target audience or audiences for your outreach effort. You might want to refine and add to your goals after you have defined your target audience(s).

Target audiences for an outreach program might include, for example, the general public, local decision makers, educators and students (high school and college), and special interest groups (e.g., homeowner associations). Some audiences, such as educators and special interest groups, might serve as conduits to help disseminate information to other audiences you have identified, such as the general public.

Consider whether you should divide the public into two or more audience categories. For example: Will you be providing different information to certain groups, such as citizens and businesses? Does a significant portion of the public you are trying to reach have a different cultural or linguistic background from other members? If so, it likely will be most effective to consider these groups as separate audience categories.

Profiling Your Audience(s)

Once you have identified your audiences, the next step is to develop a profile of their situations, interests, and concerns. Outreach will be most effective if the type, content, and distribution of outreach products are specifically tailored to the characteristics of your target audiences. Developing a profile will help you identify the most effective ways of reaching the audience. For each target audience, consider:

- What is their current level of knowledge about the risk?
- What do you want them to know about the risk? What actions would you like them to take regarding the risk?
- What information is likely to be of greatest interest to the audience? What information will they probably want to know once they develop some awareness of the risk?
- How much time are they likely to give to receiving and assimilating the information?
- How does this group generally receive information?
- In what professional, recreational, and domestic activities does this group typically engage that might provide avenues for distributing outreach products?
- Are there any organizations or centers that represent or serve the audience and might be avenues for disseminating your outreach products?

Profiling an audience essentially involves putting yourself "in your audience's shoes." Ways to do this include consulting with individuals or organizations that represent or are members of the audience, consulting with colleagues who have successfully developed other outreach products for the audience, and using your imagination.

Message Content: What Do You Want to Communicate?

The next step in planning an outreach program is to think about the contents you want to communicate. In particular at this stage, think about the key points, or "messages," you want to communicate. Messages are the "bottom line" information you want your audience to take away, even if they forget the details.

A message is usually phrased as a brief (often one-sentence) statement. For example:

- The freshwater diversion this week had an effect on Lake Salvador.
- Salinity levels at the sampling station in Lake Salvador dropped below ppt.
- The Hydrowatch site allows you to track daily changes on Lake Salvador.

Outreach products will often have multiple related messages. Consider what messages you want to send to each target audience. You may have different messages for different audiences.

Figure 3-4. Recycle sign as an outreach tool.

Message Medium: What Outreach Products Will You Develop?

The next step in developing an outreach plan is to consider what types of outreach products will be most effective for reaching each target audience. Figure 3-4 demonstrates a public sign to demonstrate outreach to an audience. There are many different types of outreach: print, audiovisual, electronic, events, and novelty items. Table 3-1 provides some examples of each type of outreach product.

A communications professional can provide valuable guidance in choosing the most appropriate products to meet your goals within your resource and time constraints. Questions to consider when selecting products include:

- How much information does your audience really need?
- How much does your audience need to know now? A simple, effective, straightforward product generally is most effective. The table below demonstrates various outreach products.
- How easy and cost-effective will the product be to distribute or, in the case of an event, organize?
- How many people is this product likely to reach? For an event, how many people are likely to attend?
- What time frame is needed to develop and distribute the product?
- How much will it cost to develop the product? Do you have access to the talent and resources needed for development?
- What other related products are already available? Can you build on existing products?
- When will the material be out of date? (You probably will want to spend fewer resources on products with shorter lifetimes.)
- Would it be effective to have distinct phases of products over time? For example, an initial phase of products designed to raise awareness, followed by later phases of products to increase understanding.
- How newsworthy is the information? Information with inherent news value is more likely to be rapidly and widely disseminated by the media.

Table 3-1. Outreach Products for Risk Communication

Print	Audiovisual	Electronic	Events	Novelty Items
Brochures	Cable television programs	E-mail messages	Briefings	Banners
Educational curricula	Exhibits	Web pages	Fairs and festivals	Buttons
Newsletters	Kiosks	Subscriber list servers	One-on-one meetings	Floating key chains for boaters
Posters	Public service announcements (radio)		Public meetings	Magnets
Question-and-answer sheets	Videos		Community days	Bumper stickers
Editorials			Media interviews	Coloring books
Fact sheets			Press conferences	Frisbee discs
Newspaper and magazine articles			Speeches	Mouse pads
Press releases				Golf tees
Utility bill inserts or stuffers				

How Will Your Products Reach Your Audience?

Effective distribution is essential to the success of an outreach strategy. There are many avenues for distribution. Some examples are:

- Your mailing list
- Partner mailing lists
- Phone/Fax
- E-mail
- Internet
- TV
- Radio
- Print media
- Hotline that distributes products upon request
- Journals or newsletters of partner organizations
- Meetings, events, or locations (e.g., libraries, schools, marinas, public beaches, tackle shops, and sailing clubs) where products are made available

You need to consider how each product will be distributed and determine who will be responsible for distribution. For some products, your organization might manage distribution. For others, you might rely on intermediaries (such as the media or educators) or organizational partners who are willing to participate in the outreach effort. Consult with an experienced communications professional to obtain information about the resources and time required for the various distribution options. Some points to consider in selecting distribution channels include:

- How does the audience typically receive information?
- What distribution mechanisms has your organization used in the past for this audience? Were these mechanisms effective?
- Can you identify any partner organizations that might be willing to assist in the distribution?
- Can the media play a role in distribution?
- Will the mechanism you are considering really reach the intended audience? For example, the Internet can be an effective distribution mechanism, but certain groups might have limited access to it.
- How many people is the product likely to reach through the distribution mechanism you are considering?
- Are sufficient resources available to fund and implement distribution via the mechanisms of interest?

What Follow-up Mechanisms Will You Establish?

Successful outreach may cause people to contact you with requests for more information or expressing concern about issues you have addressed. Consider whether and how you will handle this interest. The following questions can help you develop this part of your strategy:

- What types of reactions or concerns are audience members likely to have in response to the outreach information?
- Who will handle requests for additional information?
- Do you want to indicate on the outreach product where people can go for further information (e.g., provide a contact name, number, or address, or establish a hotline)?

What Is the Schedule for Implementation?

Once you have decided on your goals, audiences, messages, products, and distribution channels, you will need to develop an implementation schedule. For each product, consider how much time will be needed for development and distribution. Be sure to factor in sufficient time for product review. Wherever possible, build in time for testing and evaluation by members or representatives of the target audience in focus groups or individual sessions so that you can get feedback on whether you have effectively targeted your material for your audience.

Resources for Presenting to the Public

As you develop your various forms of communication materials and begin to implement your outreach plan, you will want to make sure that these materials present your information as clearly and accurately as possible. There are resources on the Internet to help you develop your outreach materials.

How Do You Present Technical Information to the Public?

Environmental topics are often technical in nature and full of jargon. Nonetheless, technical information can be conveyed in simple, clear terms to those in the general public not familiar with water quality. The following principles should be used when conveying technical information to the public:

- Avoid using jargon.
- Translate technical terms (e.g., reflectance) into everyday language the public can easily understand.
- Use active voice.
- Write short sentences.
- Use headings and other formatting techniques to provide a clear and organized structure.

The following sites provide guidance regarding how to write clearly and effectively for a general audience:

- The National Partnership for Reinventing Government has a guidance document, *Writing User-Friendly Documents*, that can be found on the Web at http://www.plainlanguage.gov.
- The American Bar Association has a site that provides links to online writing labs (http://www.abanet.org/Ipm/bparticle11463_front.html). The site discusses topics such as handouts and grammar.

As you develop communication materials for your audience, remember to tailor your information to consider what they are already likely to know, what else you want them to know, and what they are likely to understand. The most effective approach is to provide information that is valuable and interesting to the target audience. For example, the local fishers in the Lake Salvador area, Louisiana, are concerned about some of the potential effects (e.g., changes in salinity and algae blooms) of the Davis Pond freshwater diversion. Also when developing outreach products, be sure to consider special needs of the target audience. For example, ask yourself if your target audience has a large number of people who speak little or no English. If so, you should prepare communication materials in their native language.

Now that you have been provided with an understanding of risk and communication, the basic concepts of successful risk communication follows. This risk communication combines both science and communicating.

4.0 Basic Concepts of Successful Risk Communication

Risk communication can be a simple statement like "look-out!" but in our context risk communication usually has a goal. The goal may be instrumental, that is, transmission of information by the sender so as to affect attitudes of behavior of the receiver. Another goal of risk communication is relational, that is, to build and reinforce a climate of mutual trust and acceptance between sender and receiver relative to the potentially threatening event of condition. The relational goal is important in that it influences the likelihood of meeting the instrumental goal.

4.1 Successful Risk Communication

- Raises the level of understanding of relevant issues or actions.
- Satisfies those involved that they are adequately informed within the limits of available knowledge.
- Success is defined in terms of the information available to the decision makers rather than in terms of the quality of decisions.
- Successful risk communication does not always lead to better decisions because risk communication is only part of risk management.
- Successful risk communication need not result in consensus about controversial issues or in uniform personal behavior.
- Recipient must be able to achieve as complete an understanding of the information as he or she desires.
- Messages about expert knowledge are necessary to the risk communication process. They are not sufficient, however, for the process to be successful.

Risk theorists have proposed four theories of risk communication (Covello, Heartland Center 2003):

Mental Noise Theory
When people are upset, angry, fearful, outraged, under high stress, involved in conflict, or feel high concern, they often have difficulty processing information.

Trust Determination Theory
When people are upset, angry, fearful, outraged, under high stress, involved in conflict, or feel high concern, they often become distrustful.

Negative Dominance Theory
When people are upset, angry, fearful, outraged, under high stress, involved in conflict, or feel high concern, they often give greater weight to negative information than to positive information.

Risk Perception Theory
Perception equals reality. There is virtually no correlation between public perceptions of risk and scientific or technical experts. What matters most in determining risk perceptions and public outrage are factors such as trust, benefits, familiarity, voluntariness, control, dread, uncertainty, memorability, fairness, and accountability.

According to Vincent Covello and the Heartland Center, effective risk communication encompasses:

- Enhance knowledge and understanding of subject.
- Build trust and credibility.
- Encourage constructive dialogue.
- Produce appropriate levels of concern.
- Provide guidance on protective behavior and actions.

Goal

The goal of risk communication is to produce an informed public. The personal nature of risk issues and the uncertainty associated with estimating risk can provoke considerable anxiety for the public. Citizens' fears, questions, and concerns must be managed on their terms, not yours. You can best deliver the risk message by selecting appropriate communication tools, addressing communication barriers, and managing difficult situations. Your agency/organization can be involved in at least three roles to ensure quality risk communication and community involvement: 1) Project Team Coordinator; 2) Risk Translator; and 3) Community Involvement Liaison. Well-managed communication efforts will help ensure that risk messages are successfully formulated, communicated, and received, and that they result in meaningful actions. Involve the media, and ensure that they have sufficient information to portray the situation fairly. Plan carefully, track your progress, and evaluate your efforts. It is important to understand the factors which influence audience response to a message: technical expertise and credibility.

Set Realistic Goals

Set a realistic review of the political and legal context of the communication effort and the risk management decision to which it relates. Clarify motives for risk communication: one- or two-way communication?

Analyze

Analyze the audience. Identify residents near the site who have not received risk communication. Analyze what they want to know and how they view the risks. Consider what information will enable understanding and participation and what communication tools will be most effective. Earn trust and establish credibility. **Listen** to community fears; identify knowledge gaps; provide consistent information; consider community proposals; and acknowledge mistakes and problems. Be patient, honest, compassionate, and empathetic.

Identify previous community involvement and communication activities. Review the Community Involvement Plan and meet with interested community stakeholders to determine the level of trust and credibility that has been established. Assess the results and the public's perceptions of previous activities. How did the media report on the situation? Did organized citizen groups form? Then, classify the situation. Has the audience been hostile, apathetic, and interactive in response to the communication?

Strategy

Incorporate risk communication into your Communication Strategy. The risk communication strategy should be developed around one overarching risk communication goal or message; pipeline-specific interim messages will be developed and delivered to help achieve that goal. Each risk message should not contain more than five points. The strategy should function as a simple and dynamic guide that can be frequently revisited and modified. Set realistic goals and measures of success for risk communication. The goals will be influenced by activities that are mandated by applicable laws and regulations. A basic template for developing the overall strategy should follow the questions outlined in the Rutgers's University Center for Environmental Communication document, "Ten Questions Environmental Managers Should Ask." The ten questions are summarized below:

- Why are we communicating?
- How will we listen?
- Who are our target audiences?
- How will we respond?
- What do our audiences want to know?
- Who will carry out the plans?
- When?
- What do we want to get across?
- What problems have we considered?
- How will we communicate?
- Have we succeeded?

Table 4-1 provides information on do's and don'ts for local public health officials communicating risks.

The Old Concept of Risk Communication

- Defines success of risk communication from the point of view of senders.
- If the message "gets across," the communication was a success.
- Experts are considered to be enlightening or persuading the uninformed public.

Table 4-1. Checklist of Do's and Don'ts for Spokespersons Communicating Risks (Covello, Heartland Center 2003)

Category	Do	Don't
Truthfulness	Tell the truth.	Lie or cloud the truth.
Absolutes	Avoid absolutes.	Never say never, always, or anything absolute or equivalent without qualification.
Jargon	Define all technical terms and acronyms.	Use language that may not be understood by a significant portion of your audience.
Humor	Use cautiously, use sparingly, pretest, and direct it at yourself.	Use in public settings, especially in relation to sensitive or controversial topics.
Allegations	Refute the allegation without repeating it.	Repeat the allegation.
Negative words and phrases	Use positive or neutral terms.	Repeat or offer negative words with strong negative connotations or negative imagery.
Reliance on words	Use visuals to emphasize key points.	Rely entirely on words.
Temper	Remain calm and bridge to key messages.	Let your feelings interfere with your ability to communicate politely and positively.
Clarity	Ask whether you have made yourself clear.	Assume that you have been understood.
Abstractions	Use examples, stories, narratives, metaphors, and analogies to aid understanding and to establish a strong emotive, effective impression.	Speak theoretically with little clarifying information.
Dress/Grooming	Dress as your audience would expect you to dress at your place of work or slightly less formal.	Wear clothing or accessories that are distracting or that carry negative meaning to the audience.
Attacks	Attack the issue.	Attack the person or the organization they represent, especially if they have higher credibility than you do.
Promises	Promise only what you can deliver; set realistic deadlines for follow up.	Make promises that you can't keep or you can't follow up on.

(*Continued*)

Table 4-1. (*Continued*)

Category	Do	Don't
Guarantees	Emphasize achievements that you have made and your ongoing efforts.	Offer guarantees or state that there are "no guarantees in life."
Speculation	Provide information on what is being done and what you know.	Speculate recklessly about extreme worst cases, about what could have been done, or about unintended possible outcomes.
Money	Acknowledge the priority that you assign to protecting public health and safety.	Refer to the amount of money being spent on an issue at the same time that you are talking about the importance of saving lives or avoiding injury or harm.
Organizational identity	Use plural and personal pronouns ("we," "us," "our," "I").	Speak impersonally.
Blame	Take responsibility for your share of the problem.	Shift blame or responsibility to others.
"Off the record"	Assume everything you say and do is part of the public record.	Make side comments, "confidential" remarks, or assume that microphones, recording equipment, or cameras are turned off.
Risk/Benefit/Cost comparisons	Discuss risks and benefits in separate communications.	Discuss your costs along with your discussion of risk levels.
Risk comparisons	Use tested comparison messages to help put risks in perspective; cite credible third parties as their source.	Compare unrelated risks or offer comparisons that violate basic principles of risk perception.
Risk numbers	Recognize that how numbers are framed will determine how they are perceived.	Expect the lay public to readily understand unfamiliar risk numbers.
Negative numbers	Emphasize performance, trends, and achievements.	Mention or repeat large negative numbers.
Technical details and debates	Be short, concise, and focused.	Provide excessive detail or take part in protracted technical debates.
Yes/No questions	Respond to the underlying concern of yes/no questions.	Feel required to say yes or no if you feel that it will result in an inaccurate or misleading response.
Length of answers and briefings in public presentations	Limit answers to questions in public presentations to less than 2 minutes; limit briefings in public presentations to no more than 15-20 minutes; limit key messages to no more than three or four messages that are stated briefly, concisely, and clearly.	Exceed people's attention spans.

Problems with the Earlier Concept of Risk Communication

- The costs and benefits are not equally distributed across society.
- Some people may bear more than a proportionate share of the costs.
- Risk communicators want to convince others that a particular alternative is unfair to them.
- People do not agree about which harms should be avoided.
- Values need to be debated and weighed.
- People in a democratic society want to participate in debates about controversial issues.

Make Risk Communication Understandable

Guidelines for providing and explaining risk:

- Acknowledge and state the company's stake in the issue.
- Acknowledge why you are making comparisons.
- Don't expect to be trusted.
- Point out that there are other people to get information from.
- The risk communicator needs to present information in language and concepts that recipients already understand.
- Use magnitudes that are common in ordinary experience.
- Be sensitive to the psychological needs of recipients.

Risk Communication Versus Risk Education

Risk communication differs from risk education in that risk communicators attempt to understand and manage the value systems of the people from whom a behavioral change is desired. This inherently assumes that the risk message is not being received in a vacuum, that there already exists, correctly or not, some estimation of the risk by the public. The problem is that the risk assigned by the public to a certain agent of morbidity, mortality, or injury may be unrealistically clouded by uncertainty unrelated to the magnitude of the risk. It is useful to distinguish two risk frameworks, one used largely by the scientific community and one largely used by the public, that we'll call objective and subjective risk systems.

Current Problems of Risk Communication

While risk communication has come a long way, there is still need for improvement to effectively reach the target audience. Areas of concern when communicating risks include the following:

Risk Message Research Gaps

- Little to no research on how community or other typical recipient groups can express concern to government agencies or corporations.

Problems of Risk Communication

- What can't we change?

Institutions and the political system.

- What can we change?

Problems of risk communicators and recipients.

Additional Problems with Messages

- Self-serving framing of messages.
- Contradictory messages from other sources.
- Actual or perceived professional incompetence and impropriety.

Community Boundaries

It is important to know these boundaries when dealing with a risk. According to the EPA's publication "Community Culture and the Environment," there are various community boundaries in which we are all encompassed. In each of these boundaries there are risks. Community boundaries are the natural, physical, administrative, social and economic characteristics that separate one community from another (Community Culture and the Environment: A Guide to Understanding a Sense of Place):

Natural Boundaries: might include geologic features (e.g., watershed, mountain range) and landscape features (e.g., estuary, river, plains, foothills).

Physical Boundaries: might include those which are created by humans (e.g., major transportation corridors, bridges, plazas) and are characterized by location or use (e.g., downtown, uptown, the waterfront, rural, urban).

Administrative Boundaries: are those created by government entities for political jurisdiction (e.g., congressional districts, town lines, school districts) and for providing public services (e.g., waste disposal, drinking water supply).

Social Boundaries: refer to the ethnic complexion of a certain place (e.g., Little Italy, Chinatown), and organized social relationships around a place (e.g., civic associations, Boy/Girl Scouts).

Economic Boundaries: refer to economic class (e.g., upper class, working class).

These boundaries coexist at different scales; therefore, various risks can overlap between the boundaries. It is important to know about community boundaries in relation to risk understanding where various risks lie.

Evaluation

The effectiveness of risk communication can best be measured by observed or noted changes in behavior. Where this might involve the purchase of a product, like sunscreen to prevent skin cancer, this evaluation is straightforward. In more difficult cases, other assessment tools will be needed. These include stakeholder interviews, focus groups, panel surveys (where the same people are interviewed at several different times to assess changes through time). It will be important in assessment to address both relational and instrumental aspects of the risk communication process. Behavioral change will depend on both how compelling the message is, and also how trusting the relationship is.

4.2 Constraints

Be honest about the constraints your agency/organization faces on the project. Examples of such constraints are listed below.

Regulatory Requirements: Your agency/organization may have limited authority to address a situation. In cases such as this, your agency/organization should try to partner with other agencies or organizations to address the situation.

Organizational Requirements: The amount or type of data available to the public can be restricted. Do not promise to release restricted information.

Audience Requirements: Certain audience characteristics affect which communication tools can be used. Explain the risk assessment process. Background information can facilitate the community's understanding of risks. Risk assessment estimates the "baseline risks" to human health and the environment present at a site; it estimates the current and possible future risks or risks if no action were taken at the site. It is important to explain the inherent uncertainties associated with assessing actual site risks. When presenting risk assessment numbers, provide adequate background to put the risk in perspective. Some important considerations are listed below.

- Explain the risk assessment process before presenting the numbers. Consider holding a risk assessment workshop to explain the process before the risk assessment is started. Explain and graphically illustrate the routes of exposure. The key to this issue is not whether a dangerous substance exists in relatively high quantities, but whether routes of exposure put people at risk. Put the data in perspective. Avoid the tendency to see risks as "safe" or "dangerous." Instead, explain risk numbers in ranges: 1–10 ppb as "low risk," for example. Show the relationship to similar data and provide a context for reference, such as the regulatory action level and the levels found in other communities.
- Explain conservative assumptions in risk assessments and standard setting. People are often not aware of the extent to which buffers are built into the risk assessments to ensure that they err on the side of caution.
- Explain the Reasonable Maximum Exposure (RME), the highest exposure that is reasonably expected to occur at a site, to demonstrate the "conservative" nature of the assessment. This technique also helps ensure that the most sensitive, vulnerable individuals in society—children, pregnant and nursing women, immune compromised individuals, and the elderly—are protected.

4.3 Perceptions

A risk perception is an influence of human values on risk. There are various qualitative factors which affect risk perception. Along with this, there are also conditions associated with increased or decreased public concern.

Qualitative Factors Influencing Risk Perception

- Voluntary more accepted than imposed.
- Within your control vs. not within your control.
- Familiar risks vs. unfamiliar.
- Risk well distributed vs. unevenly distributed.
- Risk periodic or catastrophic.

- Natural vs. man-made.
- Risks perceived to be generated by a trusted source more acceptable than non-trustworthy source.
- Risks that affect adults vs. those risks that affect children.

Questions Associated with Increased or Decreased Public Concern
- It is the safest of times.
- It is the riskiest of times.
- Understanding the difference.

It Is the Safest of Times
- Proponents of this view use average life expectancy to buttress arguments.
- Dramatic increases in life expectancy even though there are more chemical hazards. (Increases high for men, women, blacks, and whites.)
- Declining infant mortality.

It Is the Riskiest of Times
- Proponents of this view see modern technology as generating new threats to society.
- Life expectancy has slowed since 1950 and expectancy would be greater with less risks.
- Long-term biological and ecological effects are still unknown.
- Chemicals may be source of risk but some may reduce overall risk.
- Chlorinated hydrocarbons may cause cancer in animals and man but these compounds are less flammable than non-halogenated solvents.
- Water chlorination—more carcinogens but less typhoid causing bacteria.

4.4 Value Differences

Understanding the Conflict

Each side has some valid viewpoints.

Conflict is not about evidence but about the kinds of risks people want most to avoid, the kind of lives they want to lead, and the relationship between humanity and nature.

Implications of Conflict for Communication

Differential Knowledge

Conflicts arising from differential information can be resolved by sharing information.

Conflicts that are based on other factors—this won't help.

Vested Interests

When conflict has arisen from vested interests, communication should clarify what different groups' interests are and how options would affect them.

Values Differences

Identify values at stake.

Arguments about which values deserve most weight.

Analysis of how each option would affect different values.

Messages addressed to resolve differential knowledge might miss the mark because the issue may be different values or mistrust of certain experts.

4.5 Objective Risks vs. Subjective Risks

There are two basic "frameworks" used in the understanding of risk. Here, we'll use the term "objective-risk" to define the health risk of a toxic agent based upon peer-reviewed scientific analysis of risks determined by interpolation of a dose-response curve of the toxic agent in laboratory animals, or observed in human populations through epidemiological methods. We'll use the term "subjective-risk" to refer to a less technical approach that incorporates anecdotal information, non-peer reviewed journals such as the *National Enquirer,* and personal preferences. Communicating at the neighborhood level often involves other concerns besides the chemical risk. The number of other issues often revolves around differences between objective risk and subjective risk.

> Objective risk is the risk calculated by a scientist by extrapolating from a dose-response curve. Subjective risk is the risk the public perceives about a hazard, and it takes much more into account. This may be the most important aspect to address, resolve or explain an issue, as seen below.

Table 4-2 lists factors leading to large differences between objective and subjective risk. In general, when the disparity is high, someone is mad. If the objective risk is higher, it will be you who is mad. Conversely, if the subjective risk is higher, then it will be the public that's outraged.

Table 4-2. Factors in Subjective Risk

Lower Subjective Risk	Higher Subjective Risk
Voluntary	Involuntary
Natural	Man-made
Familiar	Exotic
Moral	Immoral
Fair	Unfair

These factors can lead to subjective overestimates or underestimates of risk. Since, for example, smoking is voluntary; subjective risk frameworks often underestimate its risk while air-toxics (since you can't choose not to breathe the air, and thus breathing is involuntary) are overestimated by subjective risk frameworks.

Subjective Risks: Perceived risk is used here as a term to denote the cumulative risk that the public attaches to a hazard, whether it be a risk to morbidity, mortality, or injury. This risk estimate is influenced by everything they have seen, heard or read about the hazard, including reputable sources of scientific information such as the *National Enquirer* and their Uncle Bob. Unlike most scientists and engineers, the public at large is unlikely to recall where a fact was presented, and will be unable to recall whether the *National Enquirer* or the proceedings of the National Academy of Sciences presented the fact they recall. As a result, equal weight will be given to data presented by each of these sources, when perhaps one should be given more trust than the other.

Differences Between Objective and Subjective Risks: Differences between how scientists and non-scientists rank risk is one of the prime battlegrounds of risk communicators. In general, if scientists and non-scientists are asked to rank a series of health

risks, the rank orders of the lists are considerably different. At best, there is a correlation coefficient of 0.3, which means that about 10% of the variance in the differences can be ascribed to science. Unfortunately, the pragmatic point of view, where the greatest health benefits would be gained by spending the most money on the greatest risks, is unrealized because national health research spending correlates better with perceived risks than scientifically supported risks.

The most important message of this section is that subjective risks are just as manageable as objective risks. The methods are educational and motivational rather than engineering based, and this requires different skill-sets among health risk management personnel in the future. Risk communication can be a simple awareness-related informational statement like "speed kills," but in our context risk communication usually has a goal.

Figure 4-1. The terrorist attack on the World Trade Center was an example of a low objective risk, but a very high subjective risk.

4.6 Comparative Risk

Risk Comparisons

- Comparing different risks can help people compare the magnitude of risks.
- Risk comparisons can't be used to determine acceptable levels of risk and minimize exposure.
- Comparison with other risks can't necessarily establish acceptable levels of risk in question.

Best Risk Comparison Approaches

- Comparison of same risk at two different times.
- Comparison with a standard.
- Comparison with different estimates of the same risk.

Changes in the Nature of Hazards

- There is constant change of knowledge about the nature of hazards.
- Increased understanding of human influence on hazards.
- Awareness of man's influence on risks and benefits and life and death issues.

Changing Portfolio of Hazards

- Hazards used to be short term: infectious agents.
- Modern hazards have latency periods: cancer.
- More knowledge about hazards that people have little control over.
- Uncertainty causes concerns to persist.

4.7 Indexing

According to Webster's dictionary, indexing is defined as a device (as the pointer on a scale or the gnomon of a sundial) that serves to indicate a value or quantity. There are several benefits to indexing. Indexing provides a powerful tool to communicate complex information. Some real life examples include the consumer price index and the stock market indices. At the EPA, there are water-quality indices, a fish-quality index, an urban-sprawl risk index, a heat index, and others.

Exposure Category	UVI Range
Low	< 2
Moderate	3 to 5
High	6 to 7
Very high	8 to 10
Extreme	11+

Figure 4-2. The UVI index is a helpful tool for risk communicators as UV exposure is a definite human health risk.

The exercise section in Chapter 8 provides an indexing example with an in-depth description of the five steps to indexing. A quick overview of the steps include:

- Identify the subject (the variable) of the risk or benefit or benefit metric. This could also be a risk/benefit ratio.
- Measure the potential range of the metric.
- If using multiple metrics, decide weighting factors.
- Assign risk (benefit) ranges.
- Assign color-codes, icons.

The air quality index is a commonly referenced to source. The percentage of the EPA Air Quality Standard was chosen as the metric, so 100% of the regulatory standard is 100, double the standard is 200, and half the standard is 50. For example, the limit for ozone is 80ppm, so a 40ppm reading would be 50%, for an index score of 50. Appendix 10.1 shows the air quality index indicator. Appendix 10.2 indicates the air quality index of selected cities for November 4, 2003.

Risk communication's essential components include: constraints, perceptions, value differences, comparisons, and indexing. Upon an understanding of risk communication, one may effectively interact with the public. In interacting with the public, it is also important to understand risk prevention behaviors.

5.0 Adoption of Risk Prevention Behaviors

There are varieties of process models that become useful in thinking about promoting lower risk behaviors. The question of how to get people to choose healthy behaviors: wearing a seatbelt, a hardhat, a condom, a PFT in boats, sunscreens, getting blood pressure checked, etc., is very much a sales and marketing job, and economics will be part of the story.

Several factors influence the rate of adoption of any healthy behavior. Here we describe the who, what, when, where, and why people choose a new behavior. You can think of this change in behavior as an "innovation" because it's new to them. One well-established framework for understanding the process by which the adoption of a new behavior "diffuses" through a population is found in the "diffusion of innovations" (Rogers 1995). That book defines diffusion as a process by which an innovation is communicated through certain channels over time among members of the social system. It presents a framework with four main elements: 1) characteristics of the innovation, 2) communication channels, 3) time, and 4) the concept of critical mass.

5.1 Reason for Innovation (why)

People choose a change in behavior or purchase a product because of a perceived or subjective benefit (opposite of perceived or subjective risk). If the risk (or benefit) is poorly understood, there will be little adoption of this innovation.

5.2 Diffusion of Innovation (what)

An adoption of innovation, whether it's technology or behaviors, is the "what." Studies on the adoption of innovations in many case studies have revealed a stunning similarity. They all differ on the speed or "when" adoption of the technology or behavior is implemented, but the pattern is clear. Figure 5-1 illustrates the pattern, which incorporates the following features: 1) It follows an S-shaped curve, 2) an inflexion point is achieved, 3) the time frame is dependent on perceived benefit, and 4) advertising (risk communication) is very important to information up to critical mass.

5.3 Process of Innovation (how)

There are several steps in the adoption of innovation that can be described as the "how." First, there is knowledge or awareness of a problem or a product; then, the formation of favorable opinion; followed by decision; then implementation; and finally continuation. All of these can occur in distinct time frames, and information targeting one phase is common in advertising or in risk communication processes. For example, the knowledge or awareness phase is addressed with short messages of the sort you'd find on billboards, refrigerator magnets, pens, and pencils. Short messages like "speed kills" or "just say no" are examples of messages targeting the awareness phase. Messages designed to form a favorable impression can rank products or offer testimonials. Examples might include a message like "favored three to one by physicians" or "ranked number 1 in consumer reports."

5.4 Speed of Innovation (when)

The factors important to shape the adoption curve include the relative advantage (benefit). This is the most important factor that affects the rate of adoption. Preventative innovations (risks averted) are adopted more slowly than benefits. Another factor is compatibility (familiarity), which is the ease of transition from old to new behavior. This is the second most important factor. An example of compatibility in easing the adoption of new technology is a personal computer keyboard. Since the interface (the keyboard) looked the same as the typewriter it was replacing, the transition became less difficult (for some). Other factors that can be important include crises, which can often make the relative advantage of a new alternative stark compared to old, or complexity (complicatedness), e.g.,: VCR timers which always seem to be blinking 12:00. Another factor is observability, which means the benefit must be apparent or perceived to be apparent. The last factor is reinventability, which is how technology or the user can reshape behavior to fit new situations or new uses.

5.5 Characteristics of Innovators (who)

People can be separated into five groups based upon the rate of adoption of new technology or behaviors. The first group can be called the "innovators." They are a small part of the general population (2 1/2%). These people have excess money, they like to be first, they are risk takers, investors, they read national papers, travel, are cosmopolitan in scope, and are self learners. They know before you do. Note that since they read national papers (like the *New York Times*) telemarketers and their ilk can identify these people (by buying mailing lists) and target them for their particular messages. The next group is called "early adopters" and comprises about 13 1/2% of the population. These people adopt technology or behaviors next; they are opinion leaders; they and the innovators represent the critical mass. The next group is the "early majority," followed by the "late majority," followed by the "lasts." The last group includes the luddites, holdouts, and other skeptics. (See graph below.)

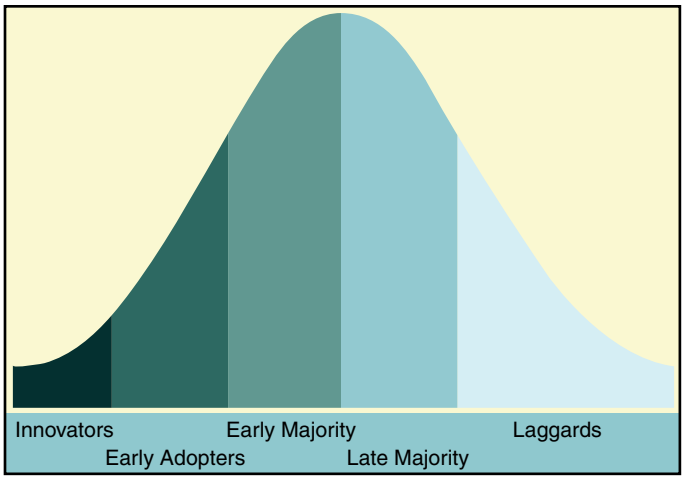

Figure 5-1. Rate of adoption of new technology or behaviors.

5.6 Spatial Distributions of Innovators (where)

Mass marketers can tell you what census tracts the innovators live in, also the early adopters, etc. Since many of the characteristics of the highly sought after early adopters are revealed by what magazines they subscribe to, or what newspapers they read, or what mail-order catalogs they get, this list of individuals can be bought from mailing lists. Zip code or other geographic feature can calculate the various percentages. If the zip code 90210, for example, seems to have three times the usual number of early adopters compared to the population as a whole, then this area would be a good place to target a message about new products. The same information can be used to target your message to reach different target groups during different phases of the education campaign; i.e., you target innovators with knowledge and awareness in early phases of your public information campaign, then move to more a sales (opinion-based) focus in different neighborhoods in a later phase.

5.7 Group Movements (organizations)

When large organizations (a company, school, governmental unit, or group) adopt a new technology or behavior rather than the individuals that make it up, things only change a little. In organizations, typically the group adopts all at once. A few topics become more important. First, crises are much more important in leading the curve out of the inflexion point in large organizations. Another important component is "champions" within the organization. These innovators and early adopters within the organization are important drivers in demonstrating the benefits to the organization as a whole.

The above paragraph has given meaning to the various risk prevention behaviors. The information in Section 6.0 provides examples of documents produced to inform the public of risks.

6.0 Risk Communication in Action

The following publications are examples of outreach tools designed to educate individuals with an awareness of various risks.

6.1 Community-Based UV Risk Education: The SunWise Program Handbook

Community-Based UV Risk Education: The SunWise Program Handbook is a user-friendly how-to guide on providing information on how the SunWise project: 1) increased understanding of the importance of ultraviolet light as a carcinogenic agent and an agent of skin aging, 2) disseminated time-relevant information on when (times of day, weather effects, etc.) UV exposure should be minimized, and how this can be accomplished using the UV Index as a risk communication tool, and 3) provided the general public and specific target audiences with information about risks of ultraviolet light and human health issues. In addition, the handbook contains descriptions of the SunWise Project public outreach efforts, specifically addressing step-by-step how to raise awareness in the community.

6.2 Risk Communication in Action: The EMPACT Handbook

This handbook discusses a variety of data visualization and data interpretation tools that municipal, state, and federal government agencies and others have successfully used in environmental risk communication programs. The handbook presents a variety of tools used by several different EPA Environmental Monitoring for Public Access and Community Tracking (EMPACT) projects, including maps, color-coding, icons, graphs, simulations, indexes, and publications. The handbook also provides guidance for using these tools and presents detailed case studies.

Each case study includes a project history, effective methods used, and lessons learned. The information provided can help municipalities, states, and others to effectively use visualization and interpretation tools as they develop or expand their own risk communication programs.

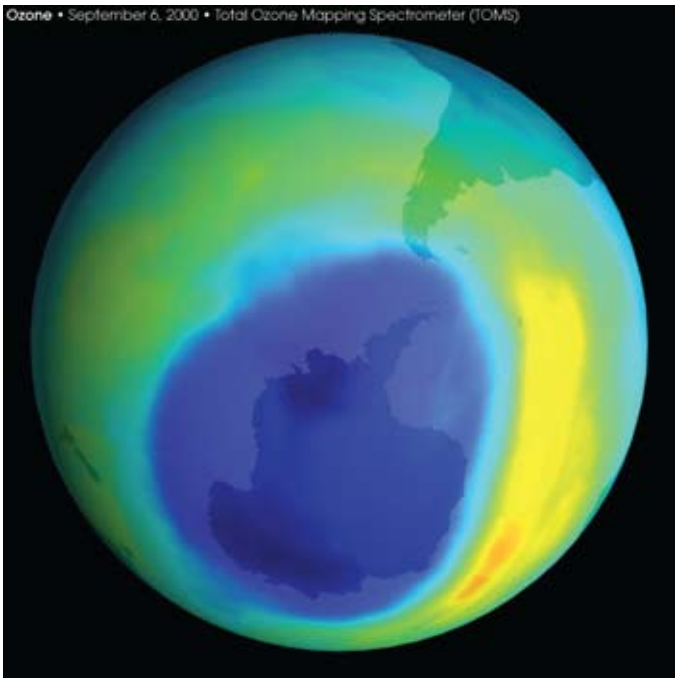

Figure 6-1. A picture of the Earth's ozone hole which allows higher UV penetration to the Earth's surface.

6.3 Delivering Timely Water Quality Information to Your Community: Lake Access, Minneapolis Project

This technology transfer handbook (in print and CD-ROM formats) demonstrates how to plan and implement a real-time water quality monitoring, assessment, data visualization and outreach program for residential communities. The handbook will provide guidance on 1) water-quality monitoring, 2) collecting, transferring, and managing time-relevant water quality data, 3) depicting time-relevant water-quality data, 4) communication of time-relevant water-quality information, and 5) appendices for technical information. The technology transfer handbook will showcase the water-quality monitoring, data visualization tools, and outreach programs developed for the EPA EMPACT (Envi

ronmental Monitoring for Public Access and Community Tracking) Lake Access Project. The Lake Access Project, originally piloted in the Minneapolis, Minnesota area, assists water-quality management by providing education, water-quality data, interpretation, and assistance in application of low-cost intervention and risk reduction measures. This project was conceived as a primary educational and intervention effort to reduce the risk of further eutrophication in suburban lakes.

6.4 Delivering Timely Water Quality Data to Your Community: The Boulder Area Sustainability Information Network (BASIN) Project

The Technology Transfer and Support Division of the EPA Office of Research and Development (ORD), National Risk Management Research Laboratory, in conjunction with the Boulder Area Sustainability Information Network (BASIN), has developed a "how-to" handbook to allow other community organizations to plan and implement a project similar to BASIN. The handbook provides instructions on how to:

- Establish partnerships with potential data providers.
- Collect and analyze water samples.
- Present timely and spatial environmental data on a Web site using (Practical Extraction Report Language) PERL programming.
- Develop an outreach plan to communicate timely environmental information to the public.

This handbook was developed for EPA's Environmental Monitoring for Public Access and Community Tracking (EMPACT) program. EMPACT is working with the 150 largest metropolitan areas of the country to help communities in these areas:

- Collect, manage, and distribute timely environmental information.
- Provide their residents with easy-to-understand information they can use in making informed, day-to-day decisions.

6.5 Environmental Curricula Handbook: Tools in Your Schools (CD-ROM)

This handbook is designed to provide teachers and other educators with guidance on how to teach students about environmental issues related to air, water, and soil quality (see Figure 6-2). It provides information to help educators incorporate environmental education into the classroom. Environmental education is a learning process that increases people's knowledge and awareness about the environment and associated challenges, develops the necessary skills and expertise to address the challenges, and fosters attitudes, motivations, and commitments to make informed decisions and take responsible action.

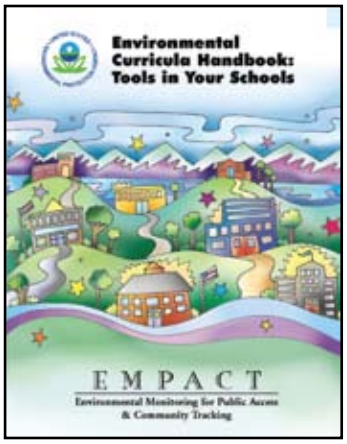

Figure 6-2. Environmental Curricula Handbook: Tools in Your Schools.

This handbook can assist educators in designing lesson plans and activities to teach the principles of environmental science. It highlights a host of EMPACT projects that have developed or are developing curricula or other classroom materials to foster student learning. The highlighted projects cover a variety of grade levels (see Appendix C of the EMPACT book, Activities by Grade Level). Therefore, any teacher, from kindergarten through grade 12, can use this handbook.

In addition, college-level materials have been developed for some projects. Moreover, in most cases, the activities and lessons geared towards one particular grade can easily be adapted for others. Teachers and educators can review the project descriptions and read about the activities, lesson plans, and tools they employ to develop ideas for their own classrooms. In addition, the handbook includes resources and contact information and in some cases a Web site where lesson plans and activities can be accessed directly.

The unstated goal of risk communication is to manage the subjective risk of the population. A variety of educational tools lend themselves to this task.

7.0 Public Participation Tools and Techniques for Risk

The following tools are useful when communicating risks to the public. Some of these examples can fall under multiple categories depending on their use; however, each tool is mentioned only in one category.

7.1 Awareness Tools

Data Visualization

What Is Data Visualization?

Data visualization is the process of converting raw data to images or graphs so that the data are easier to comprehend and understand. A common example of data visualization can be seen when you watch the weather report on television. The electronic pictures of cloud cover over an area or the location and path of an impending hurricane are examples of satellite data that have been visualized with computer software. Displaying data visually enables you to communicate results to a broader audience, such as residents in your community. A variety of software tools can be used to convert data to images. Figure 7-1 demonstrates data visualization.

Such tools range from standard spreadsheet and statistical software to more advanced analytical tools such as:

- Satellite imaging software products
- Geographic Information Systems (GIS)
- Computer models
- Statistical techniques

By applying such tools to data, you can help residents in your community gain a better understanding of factors affecting the risk of interest. Once you begin using satellite data visualization tools, you will be impressed with their ability to model and analyze your data. You can then use the visualized data for a variety of purposes such as:

- Exploring trends in lake elevation, chlorophyll concentration, pH, dissolved oxygen concentration, salinity, specific conductance, turbidity, and water temperature.
- Studying spatial patterns of sea-surface temperature.
- Studying spatial patterns of near-surface reflectance.
- Making resource management decisions.
- Supporting public outreach and education programs.

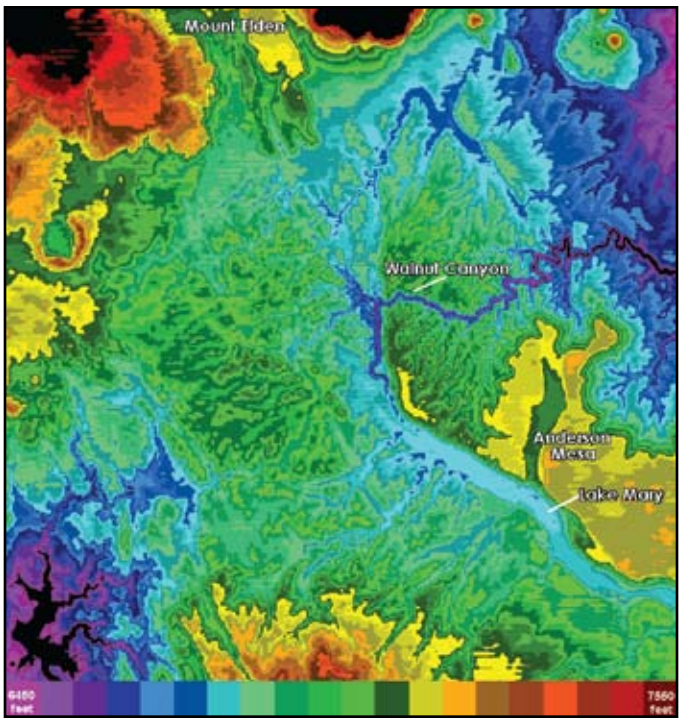

Figure 7-1. An example of data visualization: the elevation in a lake color-coded by feature.

There are a number of commercially available data visualization tools that allow you to graphically represent real-time satellite data (see Table 7-1).

Many computer users are familiar with Microsoft Access (a database software) and Excel (a spreadsheet software).

Videos

Description

Videotape is an influential medium that increases the comprehension of a particular story, action, or message. Videos can be used in several ways: as part of a presentation; to promote understanding among the community; to record risk assessment activities; to demonstrate products or ideas; or to share professional ideas informally among other risk communicators in your agency/organization.

Table 7-1. Software Tools to Visualize Satellite Data

Tool Group	Tools	Primary Uses
SeaSpace's TeraScan™ Software Suite http://www.seaspace.com	TeraCapCon	Enables the user to program the system for automatic capture, archiving, and processing of the satellite data.
	TeraTrack	Reports the information related to a satellite pass capture; reports information that can be used for diagnosing reception problems; insures quality control performance.
	TeraMaster	Views, creates, or modifies a data set that defines an area of the earth's surface in terms of map projection (shape), extends, and pixel resolution.
	TeraScan™ Product Generation System (TeraPGS)	Automatically generates and distributes products according to user specifications.
	TeraVision	Displays and manipulates data images and overlays.
Database and Spreadsheet Software	Microsoft Access	Displays raw data (parameters) from Lake Salvador in tables.
	Microsoft Excel	Creates 1- to 7-day summary hydrographs of various Lake Salvador data. Allows you to investigate correlations or trends in water-quality variables.

When and How to Use

Videos focus attention on important information, and they can increase an audience's comprehension and retention of messages. Video is extremely effective in situations in which you need to deliver a comparison, consistent message, or overview because it can deliver that message repeatedly in exactly the same way. Videos can be used when you need an icebreaker, difficult technical topics need to be explained, or a particular situation or experience visualized. Videos also can be used to deliver a sincere message from a person who cannot appear personally, and they can be shown at multiple events. Video is less effective when you only have a short period of time to conduct your presentation and want to spend it directly with your audience, or when the room is not set up for a video presentation. Often it is more appropriate to establish credibility and respect by acting one-on-one with your audience and answering specific questions rather than relying on a visual aid. Videos should be used to enhance a presentation, not replace it. Videos of no more than 15 to 20 minutes generally work best. Sustain credibility with your audience by making sure the video is relevant to your presentation and by responding to any issues or questions raised by the video. Do not use a video that says more than you do, that has poor image or sound quality, that gives your agency/organization an unprofessional appearance, or is too long or too complicated for the audience's level of understanding. Do not use a video when the room or the audience is too large or the lighting is too poor for effective viewing. While a video made professionally is impressive, informal "homemade" videos can be effective too, at a fraction of the cost. It is important to understand when to use each, and to always keep the financial and image aspects of each clearly in mind.

Videos as Part of a Presentation

To enhance your community presentation using video, you should know your audience's concerns and informational needs. Decide whether an existing video will meet those concerns and needs. Balance the video presentation with enough time for specifics and questions and ensure that the room set up will be conducive to showing a video. In addition, you need to determine if you have access to appropriate video equipment. If your audience is made up of 25 people or fewer, one television should be enough. However, if the group is in the hundreds, you should use a big screen or a projection device; otherwise, using a video is probably not the best visual aid. Work with other people in your agency/organization to start a library of existing videos—each of you can contribute the titles of videos you have on hand, with capsule descriptions of each, their running times, and other relevant information, such as ideas for use.

Possible Topics

Creating a new video usually involves a lot of expense. Start by researching what already exists. If you decide there is a need for a video on your topic, try to script it so it will be useful in a variety of situations and usable by people in your agency/organization. Sample topics might include: Opportunities for Community Decision Making and Outreach, i.e., Getting Involved.

Making Your Own Video

Do not make a documentary with a hand-held camera; professionally produced presentations are usually expected. When you are speaking for your agency/organization, you need to create an aura of technical expertise, and this is conveyed by the medium and the message. However, "home" video can work well in certain situations. Such situations might include times when you want to show residents' reactions, when you want to reassure the community about an imagined risk, or when you want to capture the proceedings at a focus group. Home videos should be used only when the presenter is able to explain, much as in a slide presentation. Also, you must ensure that individuals who appear in the video have given their permission. A home video of decent quality can be obtained by setting a video camera on tripods in good lighting. Train a few volunteers to help in this endeavor.

Getting Outside Assistance

Before you decide to work with a production house, determine the purpose of the video, the cost, the time, and other production logistics. Also, evaluate samples of their finished work. Working with a production house can be affordable, if you do the groundwork yourself. You can write the script, create the slides, devise the situations, and coach the actors. The professionals will evaluate your script, make recommendations, and shoot the video. You will have to pay to have the production company edit the piece into shape, but if you know your material well, you will be able to make quick decisions that will save time and money. One thing to keep in mind as you plan a

video is that you don't always have to use live footage. Sometimes, computer simulations, done properly, do the job just as well as live action. Computer-generated images can be revised when needed and can offer the viewer a better view than live footage of the affected community or technology in some situations (e.g., an aerial shot or a Geographical Information System map). Also, good scripting is essential—ask for a consultation from someone who knows how to organize and write scripts.

Using "Experts" on Staff

There may be video "experts" within your agency/organization who have years of experience working with video production or television, so use them as a resource. These experts can offer technical knowledge, and they can be helpful in brainstorming, laying the groundwork, and producing the video. Homemade videos may be used to share what you have learned as a site team member with your colleagues. Shoot exhibits you have built, ideas for outreach, and interviews with people who have pulled great volunteer efforts together. Then send your video to other people in your agency/organization to serve as a beta test.

It is important when making a product with photos included to adhere to any requirements such as signed waivers from the people featured in the video or getting in writing that the contents of a home video can be shared at a meeting, on a Web site, etc.

Citizen Recognition

Description

Citizen recognition is a public "thank you" to acknowledge acts of good citizenship by an individual or group. The methods of recognition can be creative, but they should be meaningful to the citizens who receive them.

Citizen recognition encourages good citizenship, demonstrates a working relationship between your agency/organization and the community, and reinforces your agency's/organization's commitment to community.

Figure 7-2. Recognition and awards are important aspects of risk communication. Here, the Peace Corps is an example of citizens who deserve recognition for their good works.

When and How to Use

It is appropriate and beneficial to recognize any citizen, group, school, or other entity that has demonstrated a high level of involvement in a helpful manner, or assisted you in achieving accomplishments.

Such recognition can be done at any appropriate time. For instance, citizen recognition can occur at a special event celebrating a significant milestone. Recognition is best achieved as part of a larger function with the individual's peer group in attendance. The actual venue for the event can be anywhere: a meeting hall, your agency's/organization's offices, or local government offices. Consider having a special event to recognize several citizens at one time. The recognition should relate to the project you are working on.

Tip: Check with an ethics officer to verify that creative recognition ideas coincide with your agency's/organization's policies.

Community Profile

Description

A community profile outlines local issues, events, and players. A community profile helps fine tune your overall communication strategy, avoid obstacles, and communicate your agency's/organization's message.

When and How to Use

Develop the community profile when you first begin work in a community, and update the profile as necessary. A community profile is effective to use in the development of your overall communication strategy. It also can be used to help understand local issues and people in diverse communities. To research the local issues and people, consider characteristics of the area and the community. Some examples are listed below:

Demographics, media contacts, ethnic backgrounds, previous cleanup activity, languages and the need for translators, popular activities and hangouts, sensitive populations—the elderly, pregnant, and children, accessible resources like computers, e-mail, and fax machines.

Local Resources and contacts (e.g., leaders, store owners, activists, and long-time residents) can provide an insider's perspective on local issues. Involve yourself in local events to meet stakeholders.

The Internet provides a mechanism to ask follow-up questions and discover other community resources. It also is a powerful research tool.

Research the area's and the community's history. Search local publications for information, as well as the local library and city hall for records and documents containing information on the area and the community.

Geographic information systems (GIS) contain demographic information regarding environmental and socio-economic characteristics. For instance, some GIS programs track population by race, population per square mile, population by age, percentage of minority households in the surrounding area, numbers of households living in poverty, and community support programs. Ask a librarian to help you find this information.

Mailing List

Description

A mailing list is a tool that contains contact information regarding interested parties. It is usually in an electronic format, such as a database, and sorted in "fields" by last name, title, organization, city, state, region, or special interest. An organized and updated mailing list that encompasses the entire community can play an important role in communicating risk.

When and How to Use

The mailing list of interested parties should be developed at the beginning of your involvement with the community. A mailing list is most effective when it is: organized in an electronic database format that allows sorting on any field; based on current, verified, and standardized information; easily updated; expandable; and able to produce mailing labels. An extensive, formal mailing list allows you to contact community residents and produce mass mailings.

You must identify whom to include on the mailing list. All people within a certain radius of the affected area may be included, but other relevant factors should also be considered. For example, you may decide to include residents whose children attend school within historical contaminant migration pathways, even if the families live outside the predetermined radius. Since the mailing list can be used as a tool to track interested parties, informational fields can be included in addition to address and telephone number.

Identify the group or groups of people that you want to reach, and determine characteristics such as zip code, school district, profession, and group memberships that could distinguish such groups. Consider adding fields to your list to track the date the mailing was sent, the date a response was received, and the method of response (e.g., mail, e-mail, telephone, fax). The following fields should be included:

> First name, telephone number, last name, fax number, title, e-mail address, organization, special interests (e.g., local officials, state), address (may require two separate fields), offices, distance from affected area), city, date of last contact, state, zip code, region, issue discussed, action items, and meetings attended.

Many resources exist to help you create mailing lists. Free mailing lists may be available from the U.S. Postal Service, the IRS, public interest groups, local governments, or other local organizations such as the Chamber of Commerce. Certain companies also specialize in renting or selling lists of names and addresses of people grouped by specific characteristics. Private sector printing and copying services and business centers operated by the U.S. Postal Service can be used to create mailing lists and produce mass mailings.

Spokesperson

Description

The spokesperson is responsible for addressing citizen concerns, answering their questions, and responding to inquiries from the media about an affected community. The spokesperson is often the lead member of a risk communication team.

When and How to Use

Establishing a spokesperson early in the process gives the public a direct link to the risk assessment events in the affected community before they get underway. The spokesperson has the opportunity to establish a strong foundation with the public early in the risk assessment process. The spokesperson also provides a source of consistent information to the public and the media. However, when an issue arises that requires more specialized information, the spokesperson should direct the audience to the most appropriate contact.

A spokesperson should be personable, knowledgeable about the affected community and willing to explain cleanup policies and procedures, in tune with community concerns, and accessible to the public. Always provide complete, accurate, and respectful answers to the many frequently asked questions that will be raised. If you know that your availability to the public will be limited, have a second or even a third contact person to help field questions regarding the affected community. To ensure that incoming requests are not forgotten, the spokesperson should keep a logbook, which records citizen requests and the response to each request. After assigning a spokesperson, all agency/organization staff members and the community should be informed. Use local newspapers and radio and television stations to announce who the contact person will be.

Telephone

Description

Using the telephone for conference calls and to establish toll-free hotlines for community updates can be an effective tool for promoting community involvement in the affected area.

When and How to Use

This tool is useful throughout the entire risk communication process. Many factors will determine when this tool is used. Conference calls can be used whenever you need to communicate with or receive input from a large number of stakeholders. Conference calls should not just be reserved for your internal agency/organization meetings. The use of hotlines for updates also is useful throughout the entire process.

Ten steps to set up a pre-recorded update for activities are listed below:

1. Check with the communication strategy to find the appropriate message for the audience.
2. Get an 800 or 888 number with voicemail-type capabilities from the phone company.
3. Work with the phone company to restrict access to the number to a narrow target area.
4. Determine how frequently the citizens would like updates.
5. Determine the cost and procedure for updating your message.
6. Decide on an update frequency you can support, and work with the residents to reach an acceptable compromise. Together, decide on a deadline for completing each update, and commit to meeting that deadline.
7. Gain consensus among the members of your communications team on the contents of the message. Ensure that the information is accurate.

8. Record a clear, concise, and uncomplicated message. State the date and time at the beginning of the update.
9. Promote the new service in the affected community. Consider printing an ad or flyers.
10. Monitor the use of the hotline and use feedback to improve it. Consider involving interested community members.

Example of Telephone Use at a Superfund Site

One Community Involvement Coordinator (CIC) used the telephone to change a highly contentious site with years of controversy into a site with an uncontested Record of Decision (ROD). The CIC held regular conference calls with EPA representatives, reporters, editors, local officials, and interested residents. Twelve lines were dedicated for each call, with a set telephone number reserved for all groups taking part in the call. The date and time of the call were announced in advance, with the slots filled on a first-come, first-serve basis. The calls started out as quarterly then, as work intensified, became monthly, bi-weekly, and then weekly. The CIC also placed weekly updates on a toll-free hotline that citizens could call at their convenience. A fresh update would be in place by a set time each week. This not only informed affected residents, but also helped head off questions and saved the CIC time each week tracking down and responding to individual messages.

Message Map

A message map is a roadmap for displaying detailed information that can be used to respond to anticipated questions. According to risk communication expert Vincent Covello, there are eight goals of a message map:

- Help identify stakeholders early in the communication process.
- Help anticipate stakeholder questions and concerns before they are raised.
- Help organize our thinking.
- Encourage us to develop messages within a clear, concise, transparent, and accessible framework.
- Promote open dialogue about messages both inside and outside the organization.
- Provide user-friendly guidance to spokespersons.
- Ensure a central repository of consistent messages.
- Encourage speaking with one voice.

7.2 Knowledge Tools

Workshops

Description

Workshops are formal, participatory seminars used to explore a subject, develop or improve citizens' involvement skills, or carry out a defined project. They can be developed as mini-courses on a discrete topic relevant to an affected community. A technical expert can be invited to offer an inside perspective and to increase the effectiveness of the workshop. Workshops are powerful tools for formally educating small groups of citizens on: 1) specific issues and activities, 2) participation opportunities (community group start-up), and 3) how to become contributing participants in the risk assessment process.

When and How to Use

The educational, involvement, and empowerment values of workshops make them a key component of the community outreach and involvement process and your communication strategy. Workshops offer knowledgeable, active citizens the opportunity to gain in-depth understanding of activities, to communicate directly with you about issues, and to develop community organization and participation skills. Workshops also enable you to identify and respond to citizen concerns and suggestions. Workshops are most effective when they address specific issues; supplement public meetings, media briefings, and presentations; employ other tools such as fact sheets and videos; and are conducted before formal public hearings. Consider planning workshops to coincide with upcoming actions (e.g., the risk assessment). Workshops are unique because they provide small groups of citizens with an interactive environment from which to learn. They are more focused than open houses or public meetings and more participatory than media briefings and presentations. Consider involving citizens in the development of the workshop agenda and materials. Do not use workshops for one-way transmittals of information from you when they do not proceed from clearly defined objectives, or if participants are likely to leave without new skills or action items.

To conduct a workshop, identify the purpose and objectives. Invite guest speakers or technical experts. Establish an appropriate time and place, and consider any special needs your audience may have (e.g., primary language other than English, disability access to the facility). Advertise the workshop using local media, flyers, and brochures. Compile presentation materials and handouts for participants (e.g., fact sheets, process diagrams and time lines, maps and photos, lists of frequently asked questions). After the workshop, receive and respond to citizen feedback.

Technical Assistance

Description

Your agency/organization may provide technical assistance for communities to help citizens understand and comment about the project. In some cases, communities can benefit from the availability of independent technical advisers. Technical assistance programs help communities understand and participate in decisions affecting hazardous waste cleanup. Technical assistance also comprises hands-on help for an issue, such as that shown in Figure 7-3.

Figure 7-3. Experts perform water-sampling in a technical assistance capacity.

When and How to Use

Because each community is unique and will require different levels of education and assistance, you must tailor the technical assistance program to the community. Determine the best method of informing the community of the availability of technical assistance. Using community interviews, consult with the community to determine what type of technical assistance would be most helpful and the best way to inform the community of its availability. Let the community decide what it wants and help them to obtain it. In some communities basic outreach may suffice, while others may need workshops and technical training. Some communities may demand independent technical assistance programs.

Exhibits

Description

Visual displays are an effective way to present information because people learn more from seeing and touching than from listening. Exhibits can be colorful, three-dimensional, hands-on, interactive, and they can be created for any topic. A poster board, a series of panels, a pictorial timeline, a freestanding booth, or interactive computer games can be effective exhibits.

Figure 7-4. Exhibits at conferences can be good risk communication tools. One example is The International Conference on Energy and Environmental Materials shown here.

When and How to Use

An exhibit or information bulletin board is an excellent way to attract a new audience, create an additional presence within a community, and present complex technical information in a simplified, graphic manner. An exhibit also can provide additional information during meetings or presentations, provide a presence at an event when you are not able to attend, and allow you to gather feedback from community members. An exhibit is effective in a variety of settings. Some examples are listed below:

1. Educational: to introduce and explain a topic (maps, posters, interactive games).
2. Accomplishments: to highlight success stories (awards/certificates, banners, quotes and personal testimony, newspaper articles).
3. Historical: timeline with photographs.
4. Thematic: to convey a message, such as a vision statement (a video of a speech).
5. Promotional: to increase public access to your agency's/organization's services (banners, photographs).

The topic or the audience is usually the starting point for an exhibit. Regardless of the audience, the exhibit must be accessible. Consider the space available, the level of interaction you will have with people, and any special needs of the audience (children, bilingual, etc.). There may be some locations where you might always want to have an exhibit, such as the local library. Exhibits should include your agency's/organization's logo and feature a "Words You Should Understand" piece. It is often useful to design an exhibit that can stand alone. Unstaffed exhibits should include a contact phone number.

Resources are an important consideration because developing and testing an exhibit can be expensive. Consider how much time is needed, the cost, access to materials, and volunteer help. You can optimize exhibits and information bulletin boards when you plan to reuse the display or create a portable display for public meetings or public availabilities. In addition to exhibits, informal activities provide knowledge in communicating a risk.

Informal Activities

Description

Informal activities are unstructured visits to the community, which allow residents to get to know you and discuss the issues of concern in a relaxed atmosphere. Such activities demonstrate concern for community members and their issues. Informal meetings with small groups of people, especially when held in someone's home, can help foster an honest dialogue that may be lost in a forum such as a public meeting. Informal community visits have five main purposes:

- Inform local residents about an affected area.
- Inform you about the cultural behaviors of the affected community.
- Involve community members in the process.
- Provide access to your agency's/organization's personnel.
- Provide your agency/organization with feedback about community activities and opinion.

When and How to Use

Use small group sessions to keep in touch with the community, not just to put out fires. Hold small group meetings frequently to develop relationships and stay abreast of developing issues. Informal meetings are useful if different factions within the community have different opinions about an issue. By holding informal chats with small groups, you can elucidate each group's position without the arguments that can occur at large public meetings. Informal activities also are used when an aspect of risk is only relevant to a portion of the site community. You can speak directly to affected community members without alarming those who are not affected. For example, if there are a small number of residences whose water must be tested, or whose property may be disrupted by work by state or federal agencies, consider asking one of them to invite the others into

their home for a meeting of affected individuals. You should be involved continually in the community from the beginning of the risk assessment process because it is difficult to foster a sense of community involvement and ownership once the assessment has progressed; local residents may feel alienated. Periodic visits or small group sessions allow residents to have continued access to risk information and your agency/organization's personnel.

Regardless of the session's informality, always develop a message for the audience. Know the residents' issues, and be prepared to discuss all aspects; if the issues are technical, consider bringing in someone who could answer those kinds of questions. Inform residents of additional information sources or contacts. Be clear about what your agency/organization can and cannot do, and do not make promises that your agency/organization cannot keep. If there is a resident who is especially interested in the affected area, ask him or her to host a small meeting for neighbors, either to present your information, or to answer questions. There are many informal activities that a creative person can do; try to think of things outside the realm of formal, structured activities. To gain insight into local opinions and attitudes, risk communicators have been known to play on community softball teams, have regular lunches at a local diner, visit key opinion leaders to keep them up to date, and visit key local officials. During all informal activities, always conduct yourself in a professional manner.

Along with informal activities, an information library, known as an information repository, provides folks with an opportunity to get further education on a specific topic.

Information Repository

Description

An information repository is a record storage area that contains general information and all correspondence, reports, and documents pertaining to a project. At an information repository, people can research the project, learn how they can participate in the process, and copy any of the repository's information.

When and How to Use

Your agency/organization should inform the public of the establishment of the information repository through the publication of a public notice in a local newspaper of general circulation. Your agency/organization also should publicize the repository's location and hours of operation by notifying local government officials, citizen groups, and the media.

Your agency/organization arranges for the locations of the information repositories. The number of repositories established depends on the distance of the project to surrounding communities. The repository should be easily accessible during business hours, and photocopying equipment should be available: a copy machine may be purchased with site funds. Some common locations are public libraries, city halls, and public health offices. Specific locations are often determined during community interviews. Documents are placed in the repository by your agency/organization. Pertinent materials are mailed to the repository with instructions on indexing and placement. Multiple copies should be made to compensate for misplaced documents. The documents should be organized, indexed, and updated regularly. A custodian, who is responsible for maintaining the repository, must be assigned when soliciting the facility's cooperation. Your agency/organization should visit the repository regularly to ensure that all necessary materials are accessible and that documents clearly indicate a method for individual comment. Site teams also must publicize the repository's location and hours of operation by notifying local government officials, citizen groups, and the media. Ensure that materials are in the repository before the public is advised to access them. Electronic versions of the information repository are in development. When operational, they will be located with traditional repositories at standard repository sites. Information will be accessible on personal computers via CD-ROM, diskettes, and the Internet. Tip: The facility housing the repository must meet the requirements of the Americans with Disabilities Act (ADA).

Information repositories can also be found on the Internet. Below provides a description of how the Internet serves as an effective knowledge tool.

Internet

Description

The Internet is an electronic gateway to a variety of multimedia (audio, video, photographic), database, and textual resources for searching and posting information. The Internet's powerful, intuitive search technologies can help you find specific information quickly, communicate with the public, and recommend information resources to others. Note, however, that community access to the Internet varies; it is recommended that you take note of the affected community's access to this information source during your initial research on the community. You should be familiar with your agency/organization's legal requirements for sending electronic mail (e-mail) to the public.

When and How to Use

The World Wide Web, "the Web," is a rapidly growing subset of the Internet used for distributing interactive multimedia documents. Because the Web is graphics-based and easy to use, individuals, schools, companies, and other organizations are setting up Web pages. The Internet can help you accomplish the following tasks:

1. Research a specific topic: The Internet can lead you to sources of information from private, public, and academic sectors about specific topics, such as community demographics.
2. Obtain information quickly from a variety of sources.
3. Obtain current information: Web site information is often more current than hard copy information because it may be updated easily.
4. Communicate with others: By using the attachment feature you can send and receive drafts with other people. You can share information with risk communicators.
5. Disseminate information: You can arrange to have pertinent files and general risk information made available to the public through the Internet or electronic bulletin boards in accordance with your agency's/organization's publishing procedures for Internet use. The Internet should not be used in the following situations:

- You are unsure what type of information to look for—you need to be able to narrow your search criteria to find the most relevant information. A "clean," comprehensive copy of a document is needed—not all Internet versions of documents include the layout and graphics seen in the original paper copy, which are often critical in the comprehension and readability of a document provided to the public.
- A presentation tool is needed: The Internet is best used as a research tool rather than as a presentation tool; there are specific software programs designed for presentations.
- Check that the information you should expect to access, actually comes up in a search.

Internet home pages have been used to post fact sheets, news releases, pictures, and even video footage to help community members understand risk. Advertise the Web address on all hard copy documents, and announce the Web address at meetings. Do not depend entirely on the Internet. You should provide alternative forms of communication, such as paper copies, to individuals who lack easy access to computers. You should encourage people without computers to use the Internet at a local library. The Department of Housing and Urban Development's Network Neighborhoods program provides Internet access to selected communities. You should verify information retrieved from the Internet because there are no safeguards on the accuracy of such information. Contacting the primary source of the information is one way to ensure the accuracy and timeliness of the information. Search engines identify Web sites that relate to your chosen topic. To use a search engine, go to the search engine's home page. When you find a useful site, you may bookmark it for quick use next time. Numerous Web sites are available for you to use as primary sources of data. The following are some ways to use the Internet as an educational source.

Posting Information on the Internet

To start the publishing process, determine if the Internet is the appropriate distribution vehicle for your document. You also should consider the following factors before publishing:

1. Potential audience: Consider the size of your audience and how many individuals in that audience have easy access to the Internet. It may be more cost-effective to distribute large documents to an extremely small audience by some means other than the Internet.
2. Preparation cost: In general, publishing documents on the Internet is inexpensive. However, costs can vary depending on the time involved in preparing and formatting the document. For example, reformatting documents with numerous tables, charts, or graphics can be time-consuming, and expensive.
3. Size of document: Distributing extremely large files (greater than 1.4 megabytes, the capacity of a 3.5-inch floppy) via the Internet can be a problem. Avoid large graphics unless they are absolutely necessary. A Web page should take no more than 80K of memory.
4. Graphics: Documents that require a lot of graphics can take a long time to download. Files posted on the Internet can be in several formats: Hypertext Markup Language (HTML); Portable Document Format (PDF); or word processing applications. Consider which format will be best for your audience. HTML and PDF formats are generally recommended for most needs because they are the most user-friendly and secure versions available.

Creating Web Site Files

HTML: HTML files are the cornerstones of Internet home pages. They allow information to be read by any Internet browser software, such as Netscape Navigator or Microsoft Explorer. They also allow the user to link to other Web sites. HTML documents may contain text only or text and graphics. Providing both versions is helpful to your audience because users with slow computers generally prefer to view documents without graphics. If you create a "text only" version, you may want to place critical information from the graphics in text format.

PDF: PDF allows a file to appear exactly as it does on paper, including complicated formatting, such as color, graphics, and columns. Since it is a "read only" format, no other user can alter the file. A user must download the PDF file to view it through an application called Acrobat Reader, which is available for downloading free from the Internet at http:/www.adobe.com.

Word Processing Applications: Files may be posted in their original software format, such as Word Perfect or Microsoft Word. Users can download the document onto a hard drive and alter it in the appropriate word processing application.

Who to Contact About the Internet

Your agency/organization should have at least one Internet contact who can help you with specific Internet policies or guidelines. Internet contacts also can help you set up home pages, post information, and find information. Your local area network (LAN) administrator can help you avoid computer viruses.

Tip: Follow your agency/organization procedures for uploading, maintaining, and downloading information on Web pages.

The above provided a way to effectively utilize the Internet. The following is an understanding of maps and aerial photographs.

Maps and Aerial Photographs

Description

Maps and aerial photographs are visual aids that facilitate the communication of complex issues, such as contamination and risk factors. They can be used at community involvement activities, such as public meetings and public availabilities/poster sessions.

When and How to Use

Maps and aerial photographs can be used throughout the risk communication process to communicate with the public and to enhance your knowledge of the affected area and the community. Some suggested uses are listed below:

1. Display current contamination and predict paths of migration.
2. Indicate where residences, schools, playgrounds, and hospitals are located.
3. Show how many citizens may be at risk.
4. Illustrate environmental receptors and natural resource damage.
5. Plan where to conduct interviews or determine whom to include on a mailing list.

6. Predict community concern about an affected area by locating nearby schools, residences, and farmland.

Decide which type of map and scale is most appropriate for each activity. For presentations, ensure that the map is large enough to be read by people in the back of the room. Label all areas that you will refer to in your presentation, and include clearly labeled out of area reference points. Try to use overlays. For a base map that shows the affected area and community, overlays could show nearby habitats, wetlands, or watersheds.

Consult with any state or federal agencies involved for information on the affected area and for the most recent and complete maps and aerial photographs. To obtain additional information, consult the Internet (see below).

Additional Internet Resources

The Environmental Protection Agency's Maps on Demand (MOD) home page (http://www.epa.gov/enviro/html) lists World Wide Web-based mapping applications that generate maps displaying environmental information for the entire United States.

There are three different applications:

1. Site Info creates reports and map displays of EPA management concerns, regulated sources, human health, and ecosystem information.
2. Basin Info allows users to map watersheds and select certain criteria to display on the map. Information about EPA-regulated facilities within the hydrogeologic unit is provided in a text report.
3. Facility Density Mapper allows users to map and assess the concentration of EPA-regulated facilities identified by a valid EPA Facility Indexing System (FINDS) identification number.

As photographs reach a vast audience, the media has the capability of catching an even larger audience.

Media

Description

The media is a tool used to reach a large audience quickly, but only the media decides what it will cover and how unless the message is submitted in a paid advertisement. You can influence the media's decisions by fostering a relationship with media representatives and by using carefully defined messages that are delivered consistently and repeatedly to the media.

When and How to Use

In general, you should deliver initial messages directly to the target audiences. The media can be used to publicize, distribute, and reinforce information about upcoming meetings or changes in schedule. In emergency situations, however, you should contact the media immediately to enlist their help in alerting the community. It is best to use a combination of the following two approaches to media coverage:

1. Paid media: You purchase space or time from a media outlet. This is advertising, and it is the only way to guarantee total control of your message.
2. Unpaid media: The media wants you to provide information about a crisis or a story that directly or indirectly relates to the affected community. You have no control over which of your quotes are used. Your two main tools for working with the media will be your news release and your media log. Meet with the environmental reporter for each media outlet and use each media outlet's "community bulletin board" to access lists of community events. Involve your public affairs specialists if your agency/organization has them.

When you want the media to distribute information for you, the news release is considered a publicity release, not news. By definition, "news" is something that is different, dangerous, unexpected, or controversial. In addition to providing publicity, expect the media to cover events in the hopes of developing news (i.e., public reaction or controversy). When you provide information to the media for a news story, understand that news is rarely objective. Learn how the news is gathered and presented in each medium, and customize your news releases. Anticipate questions and repeat carefully designed messages to present your angle. Always be aware of the media's deadlines.

You will be most effective if you are an accessible source of timely, reliable, and verifiable information, regardless of whether the news is good or bad. By dealing candidly and immediately with bad news, you can minimize the coverage it receives. Do not be evasive or refuse to comment. Instead, explain why you cannot comment. Focus on positive messages instead of long explanations. Do not be afraid of working with the media, but do not let your guard down. Remember that a reporter is never off duty. Do not offer exclusives for news events, do not make off-the-record comments, and never lie to reporters.

The role of the media is to:

1. Draw attention to issues.
2. Set public agendas.
3. Influence public opinion.
4. Deliver core messages.
5. Report messages as they were stated.

Some background questions to ask to the media when being interviewed include (Covello, Heartland Center 2003):

1. Who is the reporter and what is their affiliation?
2. What is the reporter's telephone number or e-mail address?
3. What stories has the reporter covered?
4. Who does the reporter work for?
5. Who is the audience for the publication or program?

Some logistical questions to ask the reporter include (Covello, Heartland Center 2003):

1. When and where will the story appear?
2. What is the reporter's deadline for the story?
3. Where will the interview take place?

4. How long will the interview take?
5. How long will the story be?
6. Does the reporter verify the accuracy of specific quotes?
7. What is the format for the interview?

Topical questions to ask the media include (Covello, Heartland Center 2003):

1. What is the theme or focus of the study?
2. What topics or subjects does the reporter expect to cover?
3. What types of questions will be asked?
4. Has the reporter done any background research?
5. Would the reporter like background material?
6. Who else has been interviewed and what did they say?
7. Who else will be interviewed?
8. Would the reporter like suggestions about others to interview?
9. How will your point of view fit into the story?
10. Are you the right person to interview or should others be suggested?

Tips: Your agency/organization should have guidelines for working with the media. It is recommended that you review those guidelines before you begin and/or coordinate with your agency's/organization's Public Affairs/Press Office working with the media.

In addition to media, presentations are a significant education tool.

Presentations

Description

A presentation is an organized oral communication to an audience. Presentations can be enhanced with visual aids and question-answer sessions.

When and How to Use

The timing of the presentation is critical. For example, holding a briefing for the media prior to a controversial decision is far more effective than having one after the fact. Presentations are most effective when they are planned around major events or decision points and are supported with visual aids. Use this tool to make a formal announcement or to keep the community up to date about activities or milestones. Presentations also can be used to prepare the community for significant events or decisions. Presentations should be scheduled at a convenient time and an accessible location.

Below are ways to create a sound presentation.

Choosing a Format

Presentations can take a variety of formats. A few examples are listed below:

1. Stand-up speech at a podium
2. Panel discussion
3. Presentation at a technical meeting
4. Informal session

Preparing

Decide on the purpose of the presentation and identify the key messages and audiences; only address three messages per presentation. Research material for the presentation, anticipate frequently asked questions, and consider using visual aids (e.g., handouts, charts, exhibits, photographs). Choose a primary speaker and rehearse the presentation. Promote the event with flyers, ads, and articles. Personalize the event by greeting people at the door, handing out nametags, or making a sign-in sheet. Before the presentation, ask the audience if there are specific topics that should be addressed.

Delivering the Presentation

Focus on the key messages: tell them what you are going to tell them; tell them; then tell them what you told them. Establish a positive, knowledgeable tone, and avoid sounding defensive or condescending. Keep the presentation brief—20 minutes for delivery and five minutes for questions. Repeat questions to ensure that the entire audience hears them. Limit the time per question, and provide short and direct answers. Defuse hostile questions by expressing genuine empathy before providing an answer. If you do not know an answer, be honest and follow up.

Following Up

Ask the audience to fill out an evaluation about the effectiveness of the presentation, and ask for their suggestions. Hold a de-briefing with the entire presentation team to review the session and make improvements. Use the sign-in sheet to add to a mailing list. Also, provide copies of presentation materials to the media, including speeches.

Tips: The location should meet the requirements of the Americans with Disabilities Act (ADA). Sign-in sheets for public meetings are not proprietary and must be released if requested.

In addition to presentations, public availabilities and poster sessions provide two-way communication.

Public Availabilities/Poster Sessions

Description

Poster sessions and public availabilities are less structured alternatives to public meetings. These informal forums are preferred in situations where public meetings are not required. Poster sessions are a refinement of public availabilities; posters are prominently displayed and guided by an expert who discusses the topic specified in the poster.

When and How to Use

In general, use this tool to present detailed, compartmentalized information or to cover special topics that are likely to generate concern. This tool also is useful for providing periodic updates, maintaining continued contact with the community, obtaining feedback, and clarifying misunderstandings to demonstrate your agency's/organization's commitment to provide information throughout the process. Public availability/poster sessions are commonly used to reassure people and to answer questions about risk assessment. These sessions can be used to develop a public meeting agenda. Finally, you may schedule

a session before your agency/organization leaves the affected community to bring closure for the residents and provide the last opportunity for citizens to question what your agency/organization has accomplished for them. Do not use this tool as the first communication effort for a specific topic or to make major or controversial announcements. These forums are most useful for answering questions regarding information that has already been distributed. Below are steps to take for proper public availabilities/poster sessions:

Set-up
Determine the purpose of the session and choose the message. Decide whether to have a poster session or a public availability. The event should be held during hours that are convenient for community members and provide access during day and evening hours or weekend afternoons. Do not schedule sessions during national holidays or special community events.

Content and Format
Decide which topics to cover, and schedule a knowledgeable expert to discuss each topic. Include children as a target audience. Ensure that all members of your risk communication group are in complete agreement about what information will be distributed to avoid inconsistencies. Offer residents the opportunity to express their concerns and comments. This implies that your agency/organization will take what they say into consideration.

Response to Questions
Take every opportunity to make your points, especially about the community's safety. If the same comments are repeated, additional outreach might be necessary. Limit the amount of time per question.

Follow-up

Meet with the members of your risk communication group to discuss lessons learned. Keep a list of, and follow through on, your promises.

Tip: The facility should meet the requirements of the Americans with Disabilities Act (ADA).

In addition to poster sessions, public notices are used to inform the public.

Public Notices
Description
Public notices are advertisements that announce public comment periods for agency/organization decisions and major project milestones. They can be published in local newspapers, broadcast on local radio, or sent as mailings. The public notice is one of the methods that your agency/organization may use to solicit community participation. The goal of publishing a public notice is to communicate an important announcement to as many people as possible in the affected community.

When and How to Use
In addition to meeting the specific legal and regulatory requirements for publishing public notices, a public notice can be used to announce the beginning of your agency's/organization's involvement with a project, the availability of fact sheets, and scheduling of public comment periods and public meetings. Public notices should not be used to provide updates on site progress or to inform or educate the public about specific site activities. Public notices are only effective if they reach the intended audience. They must present a simple, clear message in a conspicuous place. Follow the steps listed below to prepare and publish an effective notice.

Identify the Community to Reach
Define the size and character of the community you are trying to reach before deciding how to communicate your message.

Identify Best Ways to Reach the Community
Identify the methods to reach your target audience by asking how people usually get information.

Community Interviews
Include questions on media consumption habits in your initial community interviews. Consult local leaders for suggestions about the most effective publications in which to place public notices.

Choose Appropriate Media Outlets
While the law requires public notices be published in a major newspaper, large city newspapers may not appeal to segments of the population. Small communities or neighborhoods may have their own newspapers that are more widely read. Foreign-language radio can be a particularly effective method for reaching non-English speaking communities. Choose the outlets that are most widely consulted by members of your intended audience. Notices also can be published in church bulletins, community and homeowner association newsletters, and weekly newspapers and shopping guides. They can be placed in grocery stores, libraries, and other frequently visited locations in the community. Radio and television can broadcast announcements. In some cases, a mailing to everyone on the site mailing list can be the most effective way to notify people of an event.

Provide Ample Notice
Provide at least a one-week notice to ensure the greatest level of participation. Two weeks notice is recommended for public comment periods. Try to run multiple advertisements.

Prepare the Notice
Use a simple message stated in easily understood language. Make sure dates, times, and locations are prominently and clearly displayed. To capture attention, use an attractive design and place the notice in well-read sections of newspapers. Translate the notice if necessary.

Meet Publication or Broadcast Schedules
Many newspapers are published on a weekly basis, so plan ahead to coordinate the publication of the notice with the event. Local radio stations may run free public service announcements if they are submitted in advance. Broadcast (radio or television) the notice at appropriate times of the day.

Provide Name, Address, and Telephone Number of Contact Person

A clip-out coupon may be added for people to send their names and addresses to your agency/organization to be placed on the mailing list.

Along with public notices, a resource book may provide a broad range of information.

Resource Book

Description

A resource book is a notebook that presents general risk assessment and affected area information for citizens, media representatives, and new members of your team. A resource book is a broad collection of introductory materials about the affected community, and it provides a concise summary of activities to date.

When and How to Use

A resource book can be used to educate community leaders, citizens, and the media about the overall risk assessment process and activities. The book is often provided to residents at outreach activities or to the media at press events. A resource book also can provide information for briefings and can serve as an archive of information about risk assessment progress. The book is most effective when used as a community document in combination with other resources (e.g., public availabilities, local library resources, your agency's/organization's information hotlines, and Internet). The resource book can be stored at the local library to ensure easy access for the public.

To construct a resource book, condense and summarize information. Consult community representatives to gather information about the affected community. Include local information developed about the affected community, including stories on community participation to date. Existing local information often provides the most approachable, understandable, and contextual introductory resources for someone new to the community. Use non-technical language whenever possible. Your agency's/organization's management should review all information internally, and publication restrictions must be observed. Provide a date and citation for each resource. Also include a comprehensive list of the contact information for people directly involved with the affected community, including community leaders, and other federal, state, and local agency officials. Some additional content suggestions are listed below:

1. Generic information about the risk assessment process (e.g., pipeline steps, glossary).
2. Fact sheets presenting general or specific information about risk assessment.
3. Community involvement information, such as scheduled events for community participation and locally issued area information.
4. Timeline of past/planned affected community activities.

The resource book should be brief, regularly updated, user-friendly, accessible, and well organized. A three-ring binder allows for easy addition or removal of documents; tabbed sections and an annotated table of contents enables easy access to information. Divide information into separate volumes or create summaries of key documents to reduce notebook size. Design a cover for the resource book that is tailored to the community, for example, a local landmark.

As the resource book provides a summary, responsiveness summaries will seek to address public concerns.

Responsiveness Summaries

Description

Responsiveness summaries address public comments, criticisms, and new data. Responsiveness summaries provide a comprehensive response to all major comments, issues, and concerns raised by the community. These comments include oral or written citizen input submitted at public meetings and public hearings. Your agency/organization and the public can use responsiveness summaries. Your agency/organization can use information about community preferences and general concerns to communicate risk better to the community. Members of the public may use the responsiveness summaries to determine how their comments were considered by your agency/organization.

When and How to Use

It is recommended that you consider all significant comments, regardless of when they are received. Your response to those comments may be grouped into general topical areas to simplify your response. The responsiveness summary should not be viewed as a substitute for other community relations techniques and should not be a point-by-point recitation of each comment. Use fact sheets and other methods to distribute information on community concerns and your agency's/organization's responses to the public.

Responsiveness summaries usually contain three sections: 1) overview, 2) background on community involvement, and 3) summary of comments received and agency/organization responses (topics of comments). The summaries document major community concerns and your agency's/organization's response to the comments. Responsiveness summaries are intended to be concise, complete reports that the public can understand. The national average reading level is considered to be at an eighth-grade level. Your agency's/organization's technical and legal staff may be needed to respond to some comments. However, laypersons must be able to understand all technical information. Be sure to maintain good records of all comments.

The tools just mentioned are used as educational devices in understanding a risk of concern. Below is a listing and description of various decision-making tools.

7.3 Decision-Making Tools

Fact Sheets

Description

The fact sheet is a brief document written in plain English to help residents understand highly technical laws, concepts, and information. The purpose of fact sheets is to provide information to affected communities. Two types of fact sheets are relevant to risk communication:

1. Basic information fact sheets that provide community residents with general information and keep them abreast of current activities by your agency/organization.
2. Special purpose fact sheets that convey information about only one issue or event.

When and How to Use

Fact sheets are appropriate to use throughout the risk communication process. Do not use fact sheets to break bad news to the community. There are more effective tools to convey upsetting information. Also, do not rely solely on fact sheets to inform residents because many people do not read them and not everyone will receive one.

Focus groups have shown that several single-page fact sheets spread out over time are more effective than one long fact sheet. Many people agreed that fact sheets are reassuring even if they announce nothing other than the fact that your agency/organization is still involved in the affected community. The focus groups have also indicated that many citizens would be more inclined to read something called an "update" rather than a "fact sheet."

Below provides information pertaining to fact sheets.

Message

Before writing, identify your message. Most people cannot retain more than three primary messages from a document.

FYI Content

Include special information, such as dates of upcoming meetings, and the names, addresses, local and toll-free phone numbers, fax numbers, and e-mail addresses of your agency/organization and yourself. Always put special information in a text box in the lower right corner. Include the fact sheet date and number.

Format

The font should be easy to read (10 to 12 point typeface with serif). Make fact sheets visually interesting by using pictures, graphs, or diagrams to accompany textual information. Too much text and too little white space make the page appear gray and daunting. Place pertinent facts in text boxes, or highlight them some other way.

Presentation

Make the affected community name and your agency/organization name prominent in the banner. Always start with the primary message in the upper left comer. Put it in a box or highlight it. Use a catchy headline, and vary the color of new fact sheets.

Writing

Material prepared for the general public usually should be written at a level of someone who has achieved eighth grade education. However, check site demographics and write at the grade level indicated (the U.S. Census Bureau, among other sources, provides demographic information through local libraries and over the Internet). Use the grammar function available in most word processing programs to check for readability. Avoid bureaucratic jargon or highly technical language. Contaminant information should contain the chemical name, media contaminated, and contaminant concentration in the affected community versus the normal range. If necessary, translate fact sheets into alternative languages to serve large populations in the community (i.e., Spanish, Vietnamese).

Distribution

Mail fact sheets to all residences within the affected community area. Use press releases, public service announcements, and public TV and radio to announce when fact sheets are available. State where fact sheets are available and include a contact name, address, and phone number. Ask permission to distribute fact sheets at meetings, churches, libraries, and schools, and encourage people to take copies to friends. Hand fact sheets to residents during community visits. Distribute door-to-door with door hangers; never use a mailbox for anything but mail. Pay to have the fact sheet printed in the local paper or offer fact sheets as inserts in neighborhood association newsletters. Also, consider adding fact sheets to an appropriate Web page.

Message, FYI content, format, presentation, writing, and distribution are all important areas of fact sheets. Fact sheets are an important decision-making tool and can be used with several other types of tools when dealing with risk communication issues. Fact sheets can be used in community groups.

In addition to fact sheets, community groups can enhance understanding of a specific concern.

Community Groups

Description

Community groups include familiar organizations, such as the Lions, Kiwanis Club, Rotary, Parent Teacher Associations (PTA), church-sponsored groups, Boys and Girls Clubs, environmental groups, and Neighborhood Watch groups. Community groups also include less-familiar organizations, such as local home-owner associations, tenant organizations, gardening clubs, arts groups, and beautification committees. While these groups may not focus specifically on environmental or hazardous waste issues, they can provide you with early insight into community dynamics.

Working with a variety of community groups is an effective way to encourage discussions about the needs of diverse community populations. The involvement of community groups can help you reach particular segments of the population and obtain important site-related information.

When and How to Use

Involvement of community groups is particularly useful in affected communities with significant environmental concerns and diverse community perspectives. Reaching out to community groups during the community information-gathering phase will help you obtain information about community issues, concerns, and needs in order for you to produce outreach and risk communication products for the community. Work with community groups before important decisions are made, even if only a few

groups are involved. Community groups can be effective communication vehicles for obtaining and disseminating information. To work most effectively with community groups, a broad range of groups should be contacted early and kept informed and involved throughout the risk communication process. By making a long-term commitment to work each group and by respecting each organization's communication process, you can establish necessary trust and credibility. Church groups often reach a variety of groups in the community. Groups such as community health clinics, English-as-a-Second-Language programs, Boys and Girls Clubs, senior centers, and Head Start programs can provide outreach to low-income and disadvantaged residents who can be hard to reach through traditional community involvement channels. If there is a significant foreign-language population in the community, there may be community-based organizations that work on issues affecting these residents. Contact these groups to receive input, reviews, and possibly translation support for your materials. Include research on community groups in each phase of the information-gathering process. For instance, during community interviews, ask residents to identify community groups they belong to and groups that they consider to be influential in their community. Contact community groups to learn about their activities and how you can participate in them. Consider holding a special meeting to explain your agency's/organization's activities. Set up a table at a civic association function or make a presentation to the PTA.

Then, include representatives of key community organizations in focus groups to obtain stakeholders' views and to gather community input. Community groups provide communication vehicles that have established trust in the community. To disseminate information via a community group, use community groups' existing communications vehicles—newsletters, bulletin boards, meetings, and mailing lists. Information received from a trusted community organization has instant credibility; the same information received from a stranger may not.

As mentioned, along with community groups, interviews are an important decision-making tool.

Community Interviews

Description

Community interviews are formal information gathering sessions. Typically, they are one-on-one interviews conducted in the citizen's home or office; occasionally, however, phone interviews or focus groups may also be appropriate.

Community interviews allow you to gather valuable information about the community in the affected area and to learn what information the community wants from your agency/organization. Community interviews also can establish a positive relationship with the community.

When and How to Use

Meet with the representatives of any state or federal agencies already involved with the community as a first step. They can provide community insight; suggest potential interviewees, and request specific questions to be asked during the interview. Second, acquire background information about the community. Demographic information can be obtained from the U.S. Census Bureau via their Internet Web site: www.census.gov. Community information can also be found in online databases such as Envirofacts, Surf Your Watershed, and the Department of Housing and Urban Development's database maps. It is recommended that you conduct interviews personally. You should bring another person to the interview to take notes, clarify issues, ensure completeness, and prepare written summaries.

When conducting an interview, it is important to clarify the following information:

Who

- Use as large a sample of interviewees as possible—25 is the minimum for most sites. If resources are limited, consider using focus groups to supplement the initial 25 interviews.
- Make sure that all segments of the community are included. Consider conducting interviews with local officials, public interest groups, or other interested or affected parties, as appropriate.

When

- Plan on at least three days to complete the interviews. Allow an hour for each interview, plus travel time between appointments, time to review each session, time for meals, etc.
- Create a schedule and make the appointments two weeks before your trip.
- Do interviews in people's homes unless they express another preference.
- Interviews should not be scheduled during national or religious holidays.

How

- Interviews should be limited to the individual and perhaps other members of the immediate household.
- Be on time, and dress professionally with cognizance of community standards.
- Avoid forming pre-conceptions of the people, the neighborhood, or the homes.
- Do not use a recording device.
- Be prepared and be flexible. Know what information you need and what questions you will ask.
- Know something about the interviewee and as much about the community as possible.
- Plan and manage the interview to acquire the necessary information, but be prepared to alter the agenda based on the individual's responses.
- Spend at least five minutes to establish a relaxed atmosphere. To put the interviewee at ease, mirror the tone and attitude of the interviewee. Also, be aware of your body language. Sitting back, slumping, folding your arms across your chest all may convey lack of interest or a closed mind. Smile and maintain eye contact.
- Consider cross-cultural issues. Examine the cultural behavioral expectations of the community and the interviewee, and modify your behavior accordingly.
- Be careful not to misinterpret the interviewee's response.

Restating the answer ensures that you heard it correctly and demonstrates to the interviewee that you are interested in understanding the issues.
- Remain impartial and never be defensive. You are not there to justify, defend, or explain your agency's/organization's position. Remember, your goal is to gather information about the community.
- Assure anonymity. Tell interviewees that their information will be combined with all other interviews and will be made public. However, the information will not be attributed to any individual, and the list of interviewees and the interview schedule are not released.
- When finished, thank the interviewee in person. Follow up with a thank you note.
- Review each session with those who assisted you. Upon returning from the community, prepare a summary. Consider using focus groups rather than interviews for any other information needs that may arise.
- Whether a community group is formed, or whether or not interviews are conducted, a community visioning process will help assist in the area's goals and ambitions toward a public health risk.

Community Visioning Process

Description

The community visioning process enables citizens to realize their vision for the future of their community. This process encourages the full participation of all community members in goal development, action planning, and implementation. By considering a community's vision, your agency/organization can tailor its work to fit community goals. The enthusiasm, broad-based support, and commitment that are often generated through the visioning process can enable communities to implement projects without the opposition often seen in community change projects.

Through early community involvement, your agency/organization can motivate citizens to work actively towards the future they desire, while demonstrating your agency's/organization's willingness to work with the community. Visioning is best used for projects that are large in scope. Your agency/organization should begin the process in the earliest stages. For instance, you may begin with a set of questions to ask during the community interviews. Most importantly, the visioning process should be implemented before decisions are made. The overall goal of the visioning process is to empower communities and provide them with a method of comprehensive goal setting. There are four steps generally identified with the visioning process:

Step 1: Community Brainstorming and Suggestions.
Step 2: Establishing Goals and Developing a Vision.
Step 3: Bringing Commitment to the Vision.
Step 4: Implementing the Vision.

A visioning process can last one day, several days, or months depending on the complexity of issues facing the community. An independent facilitator may be used to help the community through the visioning process. Before beginning the visioning process, invite media representatives, key community leaders, and the public to a 30- to 45-minute presentation on the cleanup. For a formal project kickoff, hold a public meeting to introduce the visioning initiative. During the project, conduct surveys and focus groups to gather feedback from community members to refine the process. Use accurate and succinct press releases to maintain contact with the media. Also, provide for neighborhood or town meetings when planners can inform the public about the project and receive feedback.

In conducting a vision for the community, focus groups may be necessary to help narrow down issues at hand.

Focus Groups

Description

In focus groups, small groups of stakeholders participate in facilitated discussions about the affected area and the community. A focus group usually consists of seven to 12 individuals who meet for three group sessions. Each group is somewhat homogenous (e.g., one group may contain residents living near the site with children at home). Focus group discussions are structured around a series of questions carefully designed to help people talk freely. Focus groups help you understand stakeholders' knowledge, motivations, needs, expectations, and opinions. By holding separate focus group sessions with different groups, you can find out exactly how different groups feel and why. This information helps you address group concerns and find common ground to unify the community.

When and How to Use

Focus groups foster communication better than large public meetings where individual discussion is not practical. They also may provide feedback to improve outreach tools. If a particular group of stakeholders is unhappy, a focus group is an excellent way to begin a meaningful dialogue without exposing the entire community to issues that only pertain to a small group. Identify and invite potential focus group participants who will contribute to the process, who may have something thought provoking to say, who won't be intimidated, and who won't argue for argument's sake. The facility should comfortably accommodate up to 13 people (the facilitator plus 12 participants) around one table. There should also be room for an additional desk and chair for the assistant moderator, and several additional chairs to accommodate observers, such as you. Select a place, date, and time that is convenient. Focus group meetings usually last about two hours.

Use a trained, objective, third party facilitator or moderator. Meet with the facilitator to clarify objectives and to choreograph the session—help the facilitator develop questions to elicit information that you want. If you plan to attend the sessions, restrict your role to non-reactive observation and do not participate; your involvement could affect participants' reactions. Have the moderator tape record the entire session, and announce during the scripted introduction that the meeting will be recorded. Inform participants that the purpose is to gather information, not to reach consensus. Ask participants to complete an evaluation form before they leave, and respond to any information requests.

Since it is important to know the community's needs, focus groups could help understand these needs among a specific group of folks. Public comment periods, however, provide an opportunity for the entire community to voice their opinion.

Public Comment Periods

Description

The public comment period is the time during which your agency/organization accepts comments from the public on proposed actions and decisions. Public comment periods enable citizens to communicate their concerns, and participate formally in the administrative decision-making process.

When and How to Use

To effectively use the public comment period as a tool for community involvement, ensure that community members know when comments will be accepted, how long they will be accepted, and how to submit them. For formal comment periods, you can use Public Notices Find Fact Sheets to inform the public of when and how to direct comments to your agency/organization. In some cases, it is best to put a small legal notice in some newspapers and buy a display ad in more popular local publications. For comments on proposed actions, make sure that residents understand that decisions have not been reached. For ad hoc or informal comment periods, consider an appropriate use of communications tools for the community. Develop an organized system to receive, catalogue, and respond to comments. In the responses, provide the interpretation of the comment and the decision about the comment (i.e., whether the comment was useable as submitted, useable with some modifications [explain], or not useable). Although public comment periods have an end date after which the period is closed, some agencies receive public comments after the close of the comment period.

Tip: Try to receive comments from the public throughout the time your agency/organization is involved in an action.

Described above were several tools, which can be used when making a decision about a specific risk of concern. Upon making a decision, further action may be taken in regard to the concern. One other area of tools are the implementation tools used to effectively communicate a problem and its needs.

7.4 Implementation Tools

Cross-Cultural Communication

Description

Cultural differences can affect cross-cultural communication. Certain behaviors may be interpreted in opposite ways by different cultures. This tool provides general information and specific resources to help you observe and understand the behaviors of different cultures identified by demographic research. This tool also is designed to help you communicate verbally and non-verbally with different cultures and to avoid cultural conflict.

When and How to Use

Please note the sensitive nature of this endeavor; it is recommended that you eschew even the appearance of stereotyping and reach out to all people individually. It is best to observe the behaviors of different groups and follow their lead.

Effective cross-cultural communication is an important part of an overall communication strategy for each affected community. It is recommended that you track demographic trends in the affected community and develop understandable messages for all groups in the community. As soon as you are assigned an affected community to work with, you should research demographics and recognize differences in behavior, such as language, religion, family patterns, gender roles, education, and aspirations that can affect behavior. You should also examine your own cultural behaviors and make adjustments that will facilitate your interaction with the community. This research will help you adapt your message and avoid cultural conflict. Cultural conflict can occur when two or more groups with different cultural behaviors clash. The results of cultural conflict vary in degree of intensity, from initial miscommunication to reinforcement of false perceptions and hostile eruptions.

Your demographic research should identify the cultural groups in your community. Each affected community, and the cultures of which it is comprised, must be considered individually. Even among immigrant groups from the same country, there are significant cultural variations arising from differences in education, degree of assimilation, and socio-economic status. Note that hidden cultures of poverty and illiteracy also exist within nearly all communities and must be addressed when planning community interviews and preparing for public meetings. Every effort must be made to reach these neglected segments of affected communities.

The following are some forms of cross-cultural communication:

High- and Low-Context Cultures

Communication in high-context cultures depends heavily on the context, or non-verbal aspects of communication; whereas low-context cultures depend more on explicit, verbally expressed communication. A highly literate, well read culture is considered a low-context culture, as it relies heavily on information communicated explicitly by words.

Non-verbal Communication

In low-context cultures, such as in academic communities, communication is mostly verbal and written. Very little information in this culture is communicated non-verbally. In high-context cultures, much of the communication process occurs non-verbally. Body language, status, tonality, relationships, the use of silence, and other factors communicate meaning. Studies show that more than 60% of communication is non-verbal and will be remembered long after your actual words. Many cultures determine the seriousness of your message by your actions and emotions during your delivery.

Eye Contact

Most U.S. children are taught to look at the teacher or parent when they are being scolded, and during interpersonal communication. However, in some cultures, looking down is considered a sign of respect for the person who is scolding. Many adult

Americans regard someone who does not look them in the eye as untrustworthy. However, some cultures may regard direct eye contact as confrontational. It is often considered rude or aggressive to look into someone's eyes for more than 4–5 seconds.

Smiling
Rather than being a sign of friendliness, some cultures regard smiling as false or overbearing.

Smiles may disguise embarrassment, mask bereavement, or conceal rage, while happiness may hide behind a straight face. Do not define the acceptance of a presentation to a group that seems inexpressive as being a failure. Audiences from different cultures express acceptance in unfamiliar ways (e.g., straight faced, eyes closed, heads bowed). A smile and a head nod may not indicate acceptance or agreement. It is often a polite gesture, and not one of agreement or understanding.

Laughing
In some cultures, laughing is an expression of concern, embarrassment, or distress. Do not assume someone is laughing at you; it may be an expression of distress regarding the situation.

Touching
In many cultures, it is considered improper to touch a stranger. When in doubt, do not touch, other than a formal handshake. Do not touch with the left hand, which in many cultures is considered taboo.

Space
In the United States, many people unconsciously stand an arm's length apart. In some Asian cultures, people stand even farther apart. In some Hispanic or Latino cultures, people are comfortable standing closer to each other than arm's length. As always, you should observe the behaviors of the group and follow their lead.

Time
Different cultures have different concepts of punctuality. When some people agree to meet at a certain time, 8:00 for example, they see 8:00 as a displacement in time when the meeting is scheduled to begin, and anyone who arrives after 8:00 is considered late. Other cultures see the meeting time as a discreet point in time, and anyone who arrives between 8:00 and 8:30 is considered punctual. You always must be on time, but you must also be prepared to be delayed.

Verbal Communication

Avoid technical phrases, jargon, and acronyms. Explain the meaning of technical language and acronyms throughout your conversation or presentation. Pause between sentences and ask, "Any questions so far?" Facial expressions, body language, and other signs of emotion will enhance your message.

Emotional Responses
Emotional responses will vary among different cultures. Do not become concerned if there are emotional outbursts during your presentation. Be prepared to compassionately acknowledge the emotional impact that your message may have on individuals.

Figure 7-5. The thumbs-up sign is a non-verbal communication that can be misinterpreted.

Interpreters
Get to know the interpreter in advance. Your phrasing, accent, pace, and idioms are important to a good interpreter. Ensure a shared understanding of your general message and any particular terms before you speak. Speak slowly and clearly, and phrase your thoughts into single ideas of two sentences. Write out important numbers to assure understanding. Be aware of your body language while your words are being translated. The interpreter cannot transmit your inflections or tone, so you must find other ways to underscore your message. Watch the audience to see if the interpreter's words seem to register with them. Avoid humor or jokes since American humor often depends on word plays that do not translate well. Rely on a pleasant facial expression. Use visuals where possible—the language of pictures is universal. Allow the interpreter to become acquainted with your visual material.

General Reminders

Observe the behaviors of different groups and follow their lead. Communicate respect; judge not; value diversity; tolerate ambiguity; recognize your assumptions; show empathy; and demonstrate flexibility.

Cross-cultural communication is an important tool when communicating to the public. Facilitation is also important when working with various cultures.

Facilitation

Description

Facilitation is used to guide meetings, mediate conflicts, and deal with contentious situations. A facilitator is a neutral party who moderates discussions, monitors speaking time, records key discussion points, periodically summarizes the discussion, and provides constructive feedback. Facilitators help create an atmosphere of trust and fairness by ensuring that all groups have equal say in the discussion and that everyone understands each other. In contentious situations, the facilitator maintains civility and keeps the discussion focused.

When and How to Use

Risk communicators are often required to assume a facilitative role in meetings to help community groups define goals, avoid or resolve conflict, and make decisions without actually participating in the discussions. Because a facilitator must be accepted as objective and neutral, you sometimes need outside facilitators; neutral facilitation is appropriate in affected communities with contentious issues or high-conflict situations. The Regional Alternative Dispute Resolution (ADR) Specialist can provide information about when to use facilitation or other ADR techniques, and they can help site teams obtain third-party neutral facilitation or mediation services.

You may play a facilitative role by planning and conducting public meetings or informal community meetings. You may help plan meeting arrangements, develop an agenda, and play a role in conducting and recording the meeting. The facilitator's role is different from that of group leader, who often has a stake in the outcome of the meeting. At meetings where the primary purpose is to share information, generate ideas, or make decisions and there is minimal potential for conflict within the group, the facilitator can assist the leader of a community group. While the leader retains authority and conducts the meeting, the facilitator reinforces the group leader's efforts and acts as an observer and provides constructive feedback on the process. At other times, the facilitator acts as an objective mediator so the group's leader can actively participate in the proceedings. This is especially useful when the leader has a vested interest in the outcome, or when there is a potential for conflict to arise. Facilitators in any situation should:

1. Explain the facilitator's role and responsibilities to participants up front.
2. Remain neutral.
3. Ask participants to reserve judgement.
4. Direct the focus from personalities to process and results.
5. Set a positive tone for finding solutions.
6. Pose open-ended questions to generate participation.
7. "Listen as an ally"—build empathy, increase comfort level, repeat speaker's words to confirm understanding.
8. Share observations about the effectiveness of the process.
9. Suggest alternative procedures to help the group accomplish its goals.
10. Designate a recorder to write down key points on a blackboard or flip chart to focus attention on what has been accomplished.

The following are various avenues of facilitation:

Planning the Meeting

The facilitator must determine the purpose and context of the meeting and choose an appropriate method for decision-making as well as assist in the meeting logistics.

Building an Agenda

The agenda guides the meeting through sequential steps to reach a desired outcome. Follow these basic steps to develop an effective meeting agenda:

1. Explain the purpose of the meeting.
2. Outline the desired outcomes.
3. List and order topics that must be covered to reach desired outcomes.
4. Define participants' roles.
5. Determine the time necessary to complete each step or topic.
6. Identify potential problems and solutions.

Solving Problems

Guide participants through a sequence of steps that requires them to take responsibility for addressing the following questions: What is the problem and why does it exist? What is the ideal state related to this issue? What are the best solutions to this problem? How will we implement these solutions? Build upon small agreements and focus on collaborating to reach mutual gains.

Mediating Conflict

Conflict occurs when participants are not willing to move from positions based on a win/lose mentality. When there is potential for serious conflict, skilled mediation may be necessary. One useful technique for mediating minor conflicts consists of the following steps:

1. Restate points made to empathize with each party's situation.
2. Paraphrase what is said to compare your perception with that of the speaker.
3. Discover underlying issues without assuming you know anything: ask probing questions and listen attentively. Verify your perceptions of unspoken assumptions, feelings, and thoughts.
4. Encourage disputing parties to propose options without asking them to make commitments. Ask for and propose ideas for how to resolve parts or all of each issue in dispute. Explore options without pressuring movement toward agreement. Try not to move too quickly to the solution.
5. Address one idea at a time. Concentrate on areas of agreement, not on disagreements. Search for additional opportunities for agreement.

6. If all else fails, agree to disagree, but do not move to this option until all opportunities for reaching agreement have been explored and exhausted.

Getting to a Decision

Decision making requires participants to identify problems, process possible solutions, and develop action plans. Two common decision-making methods are majority rule and consensus. When choosing a method, consider that the degree to which individuals "buy into" an agreement depends on how much ownership they have in the decision-making process.

Majority Rule

Majority rule requires group members to consider options, discuss pros and cons, and vote. Participants agree that the group will adopt the option that receives a plurality or majority of votes cast. Majority rule works best when the group has demonstrated a willingness to work together cooperatively, and when no one is so heavily invested in one or more options that they will not abide by the group's collective decision.

Consensus

Consensus requires the group to reach agreement. The facilitator creates a safe atmosphere for discussion and information exchange, identifies areas of agreement, fosters collaboration, and helps the group move through the steps necessary to reach agreement. Agreement is reached after group members talk freely and at length, listen to each other's views, and thoroughly review all ideas. This method is very time consuming, and a series of meetings is often necessary. A back-up method should be available to use if the group cannot reach consensus. Consensus gives each participant ownership in the decision-making process, and it works best when stakeholders are heavily invested in the outcome and the cooperation of all parties is necessary to achieve goals.

In addition to facilitation, on-site activities serve as an implementation tool.

On-site Activities

Description

On-site activities, such as site tours and observation decks, help people understand the project.

When and How to Use

Anxiety and frustration over agency/organization actions often result because people feel intimidated by the technical nature of the activities and do not see progress being made. On-site activities can be used at any point in your project to explain site activities, educate residents, present technical information, or highlight progress. Use celebrations or special events to involve your public. For example, you may wish to hold an on-site activity when a particular phase of work gets underway.

Plan on-site activities with a specific goal or purpose in mind. On-site activities should not mean a lot of extra work for your agency/organization. You can schedule activities on-site that you would normally hold off-site, or you can design creative activities that address community concerns. You may ask the community for activity suggestions. Coordinate your activities so that the person in charge of the project can be present to explain what is happening with the project and be accessible to community members. For example, if an observation deck is built at the site, be available on the deck for an afternoon to meet with local residents. Site tours can include walking tours through areas where your agency/organization is conducting activities. During site tours, distribute written materials such as background information, a chronology of your agency's/organization's activities, or a fact sheet to summarize the aspects of the site activity being addressed. Also, invite the local media to tour the site with you, and take advantage of on-site activities to highlight site successes. Set up an on-site information center if the site is centrally located in the community. Try to include activities for children. Always be aware of the site's safety precautions.

Special events may also take place at on-site activities, or simply serve alone as an implementation tool.

Special Events

Description

Special events are activities near the affected community that celebrate the accomplishment of key milestones. Special events educate people about risk assessment activities while highlighting the progress made. Moreover, special events can add a sense of closure for you and the community. Special events are an excellent way to involve community members in a positive activity surrounding the affected community.

When and How to Use

Special events can be planned to mark the beginning or the completion of major milestones. Special events can also be used to educate the community about a particular topic. Be creative in determining when such an event might be appropriate.

The activities at the special events should be tailored to a given community's interests or concerns. Consider creative activities for a variety of audiences, including children. Fact sheets and media packages can be used at special events. Involve local residents in the design and planning so the community will have ownership of the event. Community members may form panels to organize games and refreshments; or local businesses may sponsor the event by donating supplies, services, printing, or food and beverages. Also contact the media. In addition to providing publicity, they may co-sponsor the event. Think about the pictures, graphics, and message that you can give the media to highlight your event. If you are planning a large special event, consider inviting a local news anchorperson, the regional administrator, or a local congressional representative to be master of ceremonies. Promote the event well in advance.

Example of a Special Event by a Superfund Site Team

At one Superfund site, the metal, lead, was a major threat to children. The site team borrowed a program called "Get the

Lead Out" from the State of New Jersey and held a special event at the local firehouse to educate kids and their families on the dangers of lead. Parents of the children who attended provided refreshments. There was a coloring contest for the children (children received pages from the coloring book that accompanies the Superfund slide show, and they brought the colored pages to the event for judging). Lots of prizes were provided for the winners, the local newspaper agreed to publish the winning entries, and the firehouse was decorated with all the children's artwork. The Superfund slide show for kids was shown at the event, and narrated in terms they could understand. The site Remedial Project Manager also attended and described his job in simple terms. He also brought two protective suits with masks, respirators, and gloves and explained their uses. Children took turns putting on the gear and explaining what it did, and EPA took Polaroid pictures for them to keep.

8.0 Workbook

This section is designed to enhance your hands-on experience with relaying risks to the public. There will be two exercises to work through. The first exercise involves an opportunity to see how indexing can be a powerful tool when portraying facts.

8.1 Exercise 1

Indexing

Indexing techniques are powerful tools to communicate complex information. We are all familiar with many indices that are used in daily life: the various economic indices, such as the consumer price index, the stock market indices, etc. Most of these tools compress complicated multivariate analyses into a single number. With respect to the environment, there are air-quality indices, water-quality indices, a fish-quality index, an urban-sprawl risk index, a heat index, and a host of others. In this exercise, we will create a variety of new indices to illustrate the process. In your work, if you are routinely asked to communicate similar information that is difficult to explain, development of an index might serve as a marked asset.

First Step

Identify the potential subject of the index and the metric that captures the risk(s) or benefit(s). For a water-quality index, the subject is water and the risk-related metric might be the concentration of a chemical or biological contaminant.

Second Step

Measure the potential range of the risk- or benefit-related metric. If the range is potentially huge, such as the case in a biologic agent like bacteria, then this range may need to be compressed. For bacteria, which could range from one to ten billion quite easily, that range will be difficult to communicate since people don't readily understand such large numbers. One way to compress these ranges is to use the logarithm of the number, so that the range mentioned previously (one to ten billion) becomes zero to ten. If you wished, you could take the log and multiply it by ten to give you a range from 0-100. These scales, like 1-5, 1-10, or 1-100, are the easiest for people to understand.

Third Step

Assign risk (benefit) ranges. This could establish simple safe/not-safe ranges, where there is a cut-off for which risk is below some safety threshold. If there are ranges to risk (or benefit) the range of potential values of the index could be subdivided further. You could use a three-tier system like good, bad, and ugly, or a five-tier system of good, moderate, unhealthy, very unhealthy, hazardous. The choice of how many tiers to use depends mostly on whether you need to communicate safe or unsafe, or whether there are big ranges of risk values that demand a finer shading of risk.

Fourth Step

Color-coding and iconizing. These tools put a user-friendly public face to the index. For a two-tier system, red (for bad) and green (for good) might be sufficient; for a three-tier system the stoplight metaphor works well (green for good, red for bad, yellow for in-between). For a five-tier system, a variation on the stoplight that uses orange for the range between red and yellow, and chartreuse for the range between green and yellow works well. People don't understand the visible-light color spectrum and using that metaphor (where blue is better than green) confuses people (just think about the terrorist threat index, where blue is the good range). For icons, you can use the outline of the subject. For example, a heat index might use a stylized thermometer icon. An air-quality index might use a color-coded cloud, for example.

Some examples for creating a risk index could be:

- Bottled Water Quality Index
- Restaurant Quality Index
- Turkey Quality Index
- Leaf Color Index
- Wine Index

Examples of indices can be found at Appendix 10.1 and Appendix 10.2. Both describe the air quality index. 10.1 demonstrates the color-coding and values of the system. Figure 10-1 is an example of air quality on a specific day in the United States. Figure 10-2 is a common index, which can be found in many newspapers.

In addition to risk indices, risk comparisons provide a sound way of understanding the magnitude of a specific risk.

8.2 Exercise 2

Risk Comparisons

The goal of this exercise is to develop an understanding of how comparing risks can help determine the level of concern of that specific risk.

The best risk comparisons are of the same risk at two time points (an example would be 1990 and 2000) or a comparison with a recognized standard (e.g., a regulatory standard). Another good comparison is of different estimates of the same risk-(EPA says the risk is .0005%; Sierra Club says .001%).

Some ineffective comparisons are comparisons between local risk and risk in another state or city and comparisons between two different risk management alternatives (there could be one you haven't mentioned that's even better).

Other ineffective comparisons:

- Comparisons between peak levels at an incident with normal levels.
- Additive risk: The pollutant only adds .001% to the normal cancer rates.
- Risk/benefit tradeoff comparisons, e.g., the facility brings in a million dollars in tax revenue…if you shut us down the city will lose hundreds of jobs.
- Comparisons between risks from the same source.

Note: Tell people at a public meeting that the risk of toxic X is less than the risk they took driving to the meeting or smoking a cigarette during the break.

Exercise—Rank the Comparisons

- Smoking 1.4 cigarettes—living 20 years by a PVC plant.
- Eating 40 TBS of peanut butter—living 50 years within 5 miles of a nuclear power plant.
- Drinking 30 cans of soda—living two days in a big city (air pollution).

More Comparisons

- Traveling 300 miles by car—traveling 1000 miles by jet.
- Traveling 10 miles by bicycle—traveling 1000 miles by jet.
- Eating 100 charcoal-broiled pieces of meat—getting a chest X-ray.
- Getting struck by lightning (in one year)—living 2 years with a smoker.

By taking a chance to look at these risk comparisons, various risks can be assessed.

9.0 Summary

This workbook has been designed to help local public health officials in dealing with various risks. Since there is a diverse number of risks that can occur, it is important officials have an understanding of how to communicate information to the public. A basic understanding of risk was outlined so officials may know how much of a risk an issue may be. The communication section showed how to creatively communicate in various manners to the public. The successful risk communication section combined the understanding of risk and communication and showed how communication is essential when dealing with various risks. Examples were provided, such as the SunWise program, to lend ideas to reach an audience. The public participation tools and techniques brought light to the various ways in which risks can be understood and dealt with. Upon an explanation of risk communication, two brief exercises were presented to provide a hands-on opportunity for local public health officials to think of how they would deal with a risk situation. The bibliography is an extensive source to allow the opportunity for further research into the field of risk communication. This workbook has been designed as a risk communication tool to help others understand the need for successful risk communication.

10.0 Appendix

10.1 Air Quality Index

Air Quality Index (AQI)

The Air Quality Index (AQI) is an index for reporting daily air quality. It lets you know how clean or polluted the air is and what the potential health effects might be. The AQI focuses on health effects you may experience within a few hours or days after breathing polluted air. EPA calculates the AQI for the so-called "criteria pollutants," which are air pollutants regulated by the Clean Air Act: ground-level ozone, particle pollution (abbreviated PM10 and PM2.5), carbon monoxide, sulfur dioxide, and nitrogen dioxide. For each of these pollutants, EPA has established health-based national air quality standards. Ground-level ozone and airborne particles are the two pollutants that pose the greatest threat to human health in the United States.

The AQI is a scoring system for air quality. The higher the AQI value, the greater the level of air pollution and the worse the health concern. For example, an AQI value of 50 represents good air quality with little potential to affect public health, while an AQI value over 300 represents hazardous air quality. An AQI value of 100 generally corresponds to the national air quality standard for the pollutant, which is the level EPA has set to protect public health. AQI values below 100 are generally thought of as satisfactory. When AQI values are above 100, air quality is considered to be unhealthy — at first for certain sensitive groups of people and then for everyone as AQI values increase. Many AQI maps show color codes for the various ranges of scores. Areas of good air quality (AQI scores from 0–50) are colored green, moderate areas (51–100) are yellow, areas unhealthy for sensitive groups (101–150) are orange, while unhealthy areas (151–200) are red. AQI scores above 200 are now uncommon.

- **Good (green):**
When the AQI value for your community is between 0 and 50, air quality is considered satisfactory in your area.

- **Moderate (yellow):**
When the AQI value for your community is between 51 and 100, air quality is acceptable in your area. (However, people who are extremely sensitive to ozone may experience respiratory symptoms.)

- **Unhealthy for sensitive groups (orange):**
Some people are particularly sensitive to the harmful effects of certain air pollutants. For example, people with asthma may be sensitive to sulfur dioxide and ozone, while people with heart disease may be sensitive to carbon monoxide. Some groups of people may be sensitive to more than one pollutant. When AQI values are between 101 and 150, members of sensitive groups may experience health effects. Members of the general public are not likely to be affected when the AQI is in this range.

- **Unhealthy (red):**
When AQI values are between 151 and 200, everyone may begin to experience health effects. Members of sensitive groups may experience more serious health effects.

- **Very unhealthy (purple):**
AQI values between 201 and 300 trigger a health alert for everyone.

- **Hazardous (maroon):**
AQI values over 300 trigger health warnings of emergency conditions. Such values rarely occur in the United States.

10.2 AQI—Selected Cities November 4, 2003

Figure 10-1. Smog in the L.A. basin results in poor air quality in the Air Quality Index.

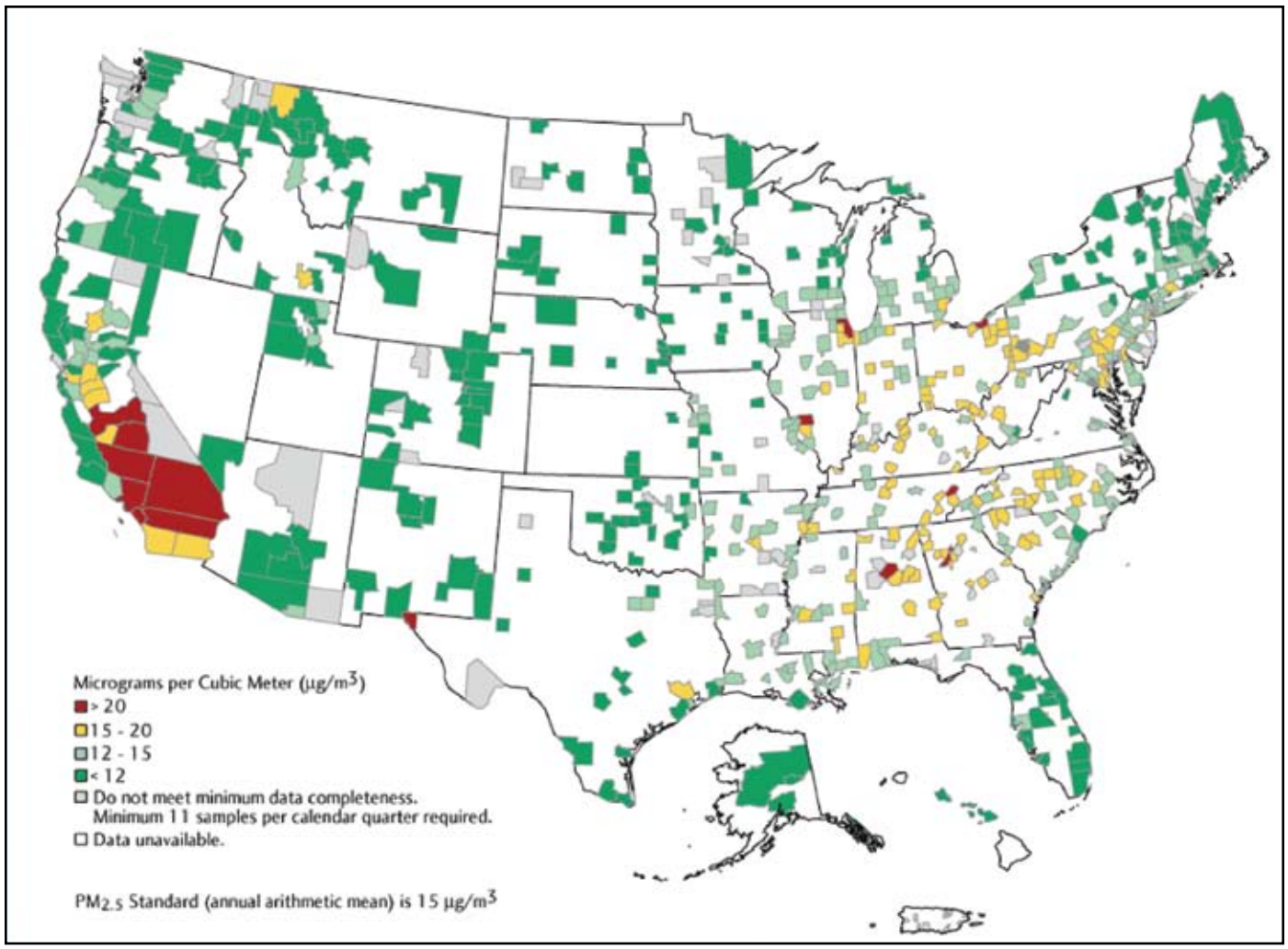

Figure 10-2. Particulate matter concentrations in the atmosphere also affect air quality and produce negative health effects.

11.0 Glossary

The following are definitions to help understand risk communication.

Risk:

- Judgment concerning the likelihood, severity, or importance of a threatening event or condition.
- Adds to the hazard and its magnitude the probability that the potential harm or undesirable consequence will be realized.
- =Hazard x Exposure
- The probability of loss of which people value.

Communication:

- An exchange between two or more people for the purpose of creating or sharing meaning. The conveyance of ideas, concepts of information to others.

Risk Communication:

- An exchange among two or more people for the purpose of sharing or creating meaning relative to a threatening event or condition.

Risk Message:

- Written, verbal, or visual statement containing information about risk.
- May or may not include advice about risk reduction behavior.
- A formal risk message is a structured package with the express purpose of presenting information about risk.

Objective Risk:

- The probability of an adverse health impact, based on an interpolation of a dose-response curve.

Subjective Risk:

- The probability of the same event, based upon intuition.

Backside Risk:

- The risk to your backside, by assuming the public is using the first definition.

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