Risk Communication

Overview

Risk communication is communication intended to provide a general or specific audience with the information they need to make informed, independent judgments about risks to their health, safety and the environment. Risk communication should be meaningful, understandable, and actionable. Risk communication works best when it is a two-way process where the Agency listens to, learns from, and meets the needs of specific audiences. Continually improving our understanding of the needs of our audiences and responding to those needs is critical to effective risk communication.

In carrying out our mission to protect human health and the environment, EPA staff across the Agency practice risk communication every day. Effectively communicating to the American public on potential health and environmental risks is one of the most important jobs we have and is integral to most, if not all, the work we do across our many offices and regions. This includes staff who are researching and writing regulations, those who are developing risk assessments or developing tools for data sharing, scientists exploring questions of dose-response or exposure; program managers developing early warning mechanisms, staff engaged formally in community outreach or emergency management; public affairs staff across every office and region, and more.

EPA's Risk Communication Workgroup developed a framework for approaching risk communication challenges, called the SALT framework. The SALT framework is based on a process of Strategy, Action, and Learning, and is supported by Tools that together provide a research-based approach and best practices for communicating risk (See Attachment 1: *SALT Framework*). Basic principles of the SALT framework have been incorporated to this tool.

Why This Is Important

Risk communication at Superfund sites is meant to be a dialogue—an interactive process of information exchange—among the site team and the community about the nature of risk and how to manage it. This dialogue should be a genuine and sincere conversation that aims to identify mutual solutions and responds to public concerns. Site teams should strive for effective risk communication throughout the Superfund cleanup process. All members of the site team, including on-scene coordinators (OSCs); remedial project managers (RPMs); risk assessors; community involvement coordinators (CICs); state, tribal, and local government partners; and staff from the Agency for Toxic Substances and Disease Registry (ATSDR) should be involved in planning and implementing risk communication.

*This and all tools in the Community Involvement Toolkit should be used in conjunction with the **Community Involvement Handbook**, which provides guidance to EPA staff on how EPA typically plans and implements community involvement activities at Superfund sites.*

This activity is important because effective risk communication can help establish mutual trust and a productive relationship between EPA and the community by providing an opportunity for the exchange of information, facilitating community participation in the decision-making process, and helping the site team understand and appreciate the community's perception of risk.

The **need for effective risk communication is addressed at several points in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP)**. For removal actions, the NCP at 40 CFR §300.415 (n)(1) requires that a spokesperson be designated by the lead agency to inform the community of actions taken, respond to inquiries, and provide information concerning the release (i.e., the contamination). For remedial actions, the NCP at 40 CFR §300.430(c)(2)(C) requires that the lead agency provide appropriate opportunities for the community to learn about the release and the affected area.

Another reason that risk communication is important is because community members often have important

information that can improve the accuracy of the site characterization and the baseline human health risk assessment. Local community knowledge can help the site team:

- Better understand the site's history and the type and extent of contamination.
- More accurately characterize exposure pathways due to human behavior.
- Identify unique ways in which the community uses local resources, such as consuming high quantities of one type of food (e.g., fish from a contaminated river) or incorporating plants grown near the contaminated site into food, medicinal remedies, or traditional practices.
- Develop appropriate exposure scenarios and cleanup approaches by identifying suitable future land uses.
- Become aware of whether certain segments of the community may have a disproportionate burden of exposure or environmental health effects due to race/ethnicity, national origin, or income compared to other nearby communities (i.e., issues related to environmental justice). EJSCREEN, EPA's environmental justice screening and mapping tool, also can be a valuable resource for obtaining this information.

When Is Risk Communication Used?

Effective risk communication begins early in the Superfund cleanup process and should be tailored to the needs of each community. The community needs to understand how the Agency arrives at the determination of risk, what information is used, how the information is used, which uncertainties are inherent in the process, and how uncertainties are addressed. Members of the site team should be prepared to discuss site-related risks at any point in the Superfund cleanup process, such as:

- During the site assessment stage, when residents may be asked to complete an access agreement that allows EPA to sample on their property.
- During the remedy selection stage, when the site team works to help people understand the technical aspects of the cleanup approaches.
- During the construction completion stage, when the discussion may focus on the future of the site and returning it to productive use. However, site ***reuse and redevelopment planning*** may begin much earlier in the process. Reasonable anticipated site reuses should be part of the discussion from the earliest stages of the Superfund process.

The goal of risk communication is to increase the community's involvement in the cleanup process, the Agency's awareness of the community's perception of site-related risks, and the public's understanding of how the Agency uses risk assessment in decision-making at a site. Effective, on-the-ground risk communication is essential, and requires a variety of communication techniques and platforms based on your audiences' needs (such as ***public meetings***, ***fact sheets***, and press releases), as well as a level of trust between EPA and the community. Even an effective risk communication process does not guarantee consensus on the appropriate cleanup approach among all affected parties.

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.

All site team members should familiarize themselves with the Superfund human health risk assessment process[1] and how it is used in site decision-making regarding risk management. Knowing these processes will help the site team answer technical questions from the public more effectively. It is important for the site team to present consistent risk messages when discussing site-related risks with the community, to avoid confusion, and maintain credibility and trust with the community.

The risk communication techniques discussed in this tool are suggestions rather than requirements. Explaining the risk assessment process is an essential component of risk communication and involving communities in the Superfund risk assessment process, as outlined in *Risk Assessment Guidance for Superfund (RAGS), Volume 1 - Human Health Evaluation Manual Supplement to Part A: Community Involvement in Superfund Risk Assessments*.

Implementation

Understanding Risk Communication Factors

Effective risk communication is based on an understanding that risk means different things to

[1] U.S. Environmental Protection Agency. 2000. ***Presenter's Manual for: "Superfund Risk Assessment and How You Can Help"***, EPA/540/R-99/013.

different people. Any explanation of the risk around a Superfund site must be coupled with a recognition of the issues that drive the public's perception of risk at the site. The general public does not judge risk based on numbers or statistics alone. Instead, risk is both a real and a perceived threat of an event occurring. It also is a judgment people make about the likelihood, severity, or importance of a threatening event or condition.

For example, a situation that seems to put children specifically at risk will be perceived as having a higher risk than a situation that does not. Similarly, risks arising from a situation that is not familiar to the community, such as leaching of contaminants into groundwater, will be perceived to be higher than risks arising from a familiar situation (e.g., the risks of a nearby slag pile to people in mining communities who have lived next to slag piles their entire lives). People use their instincts and life experience to gauge how risky a situation is.

Research shows that there are risk factors that have a clear impact on how people perceive a risk, including whether they can hear and act on specific information. While some of these factors cannot change, taking them into account and using appropriate risk communication tools can improve the chances that an activity will achieve strategic risk communication goals and objectives.

A few examples of these factors are listed below, but this list is not exhaustive. (See Attachment 2: *Qualitative Factors Affecting Risk Perception* for a more comprehensive list.)

- **Hazard Factors:** There are certain factors inherent in a given hazard that can affect how an audience feels about the risk. Many of these factors are defined as issues of "risk perception" in the research.[2] Risk perception issues are issues of perspective. They are valid ways for an audience to assess risks, but they may not strictly align with the data. For example, people generally are more concerned with risks that are seen as uncontrolled or related to children. *Two strategies that can help are to:*
  1) *put the risk into context, and*
  2) *provide meaningful and achievable action steps that can help reduce stress and make risk-reducing behavior change more possible.*
- **Relationship Factors:** These are variables that are based on the relationship between the communicator and the audience. Trust is one example. Trust underlies an audience's ability to hear a message and willingness to act on it. At Superfund sites, trust can take a long time to build and can be eroded in minutes. *Establishing shared values early in building relationships is one way to build trust.*
- **Audience Factors:** These are variables that are related to the audience. Some examples include language, literacy, numeracy, identity, cultural norms and biases, community history, time and economic stressors. *One example of communicating risk with all audiences, but especially those with low numeracy, is to include visual representations of risk.*
- **Communicator Factors:** These are variables that are connected directly to the communicator. Several examples include identity, competence and expertise, stress level, and comfort with engagement. *Conducting mock presentations, selecting communicators who share identity characteristics with the audience, or matching the right communicator to the task are a few ways to increase the credibility and acceptance of the communicator.*
- **EPA and Science Factors:** These are factors that connect directly either to EPA's role or to the science that drives our decision making. Sometimes, the regulations governing a specific contaminant affect the messaging about it. As one example, EPA determines an "acceptable cancer risk" expressed as the number of cancer cases per million people resulting from a lifetime exposure. At other times, uncertainty in data must be addressed, such as with emerging contaminants where there is inconclusive information about cancer risks in humans. These are inherently complicated concepts to explain, and, in many communities, no cancer risk is going to be considered "acceptable."

  To help address these factors it is important to:
  1) *show empathy for the very real concerns of the audience regardless of whether those concerns are seen as falling under EPA's regulatory mandate, and*
  2) *be transparent about what we know and what we don't know.*

[2] SCIENCE • 17 Apr 1987 • Vol 236, Issue 4799 • pp. 280-285 - https://www.science.org/doi/10.1126/science.3563507

Identifying the Type of Communication Environment You Are Working In

Using effective strategies to deliver important risk communication messages will convey the information the site team needs to communicate while addressing the community's needs, concerns, and site-related expectations. When considering risk communication strategies, identify the type of communication environment you are working in and adjust accordingly. There are essentially four types of communication environments[3]:

Concern ↑ / Trust →	
High Concern Low Trust *(Box 1)*	High Concern High Trust *(Box 2)*
Low Concern Low Trust *(Box 3)*	Low Concern High Trust *(Box 4)*

Effective risk communication is especially important whenever the community has a high level of concern. However, high concern and low trust environments (Box 1) in particular create barriers that can completely impede the flow of information. When the community has a high degree of trust in the site team (Boxes 2 and 4), risk communication messages tend to have credibility and information can be conveyed relatively easily. For this reason, gaining the community's trust and building a sense of confidence in the site team is of utmost importance. Trust and credibility can be built through communication that considers the audience and the community's perception of risk, provides clear and concise messages that carry positive information, and uses an effective delivery mechanism (as described in the following sections).

Planning for Effective Risk Communication Using the EPA's SALT Framework Planning Process

The key to effective risk communication is planning and preparation. Once risk perception factors have been identified, follow a simple 6-step strategic planning process, based on the principles of the Agency's *SALT Framework* (See Attachment 1: *SALT Framework*), to effectively communicate risk to the community. This includes:

1. Take stock to identify your audiences and understand their questions/concerns
2. Establish goals and objectives for the communication
3. Develop risk communication messages tied to the goals and objectives of your communication
4. Choose appropriate platforms and tactics
5. Tailor platforms and tactics to the needs of your audiences
6. Obtain feedback and evaluate the effectiveness of the risk communication

Risk communication plans at Superfund sites are needed to address specific events, issues, or concerns, such as an emergency response to a release, or communicating the specific risk at a site.

They do not have to be formal written documents. They can simply involve taking the time to think about a communication problem or issue and determining the best approach for communicating the message or information. However, at Superfund sites with high levels of public concern or site cleanup issues that are expected to be controversial, a more formal written strategy may be needed to ensure that all stakeholders are reached, and all key messages are communicated effectively.

Step 1 - Take Stock to Identify Your Audiences and Understand Their Questions/Concerns

Risk communication is more effective if the type, content, and distribution of outreach products are specifically tailored to the target audience. The community's response to the messages conveyed can be driven by risk perception factors or other site-specific concerns or fears, such as their health and the health of their families, property values, liability, and damage to the environment.

In developing a risk communication strategy, it is important to take stock and get a good understanding of the specific details about your community that will help you plan your approach. Start by looking at a wide range of interested parties to identify one or more target audiences. The target audience may include the general public, landowners, local businesses, schools, developers, activist groups, community groups, or the ***media***. To help identify your audience, ask questions such as:

- Who is the current landowner?
- Have there been recent instances of public concern about other local issues? If so, local action groups or local media may be target audiences.

[3] Based on the work of Peter Sandman.

- Are any schools, colleges, or child care facilities located in the vicinity?
- Are healthcare facilities (e.g., doctor offices, urgent care centers, hospitals) located in the vicinity?
- Are there any community groups, such as homeowners associations or local chambers of commerce, located in the vicinity?
- Are there religious/sacred buildings or tribal sacred/cultural landmarks nearby?
- What are the appropriate regulatory bodies for human health and environmental considerations?

Review the site's ***community involvement plan*** (CIP) to better understand the characteristics of the community, as well as the community's needs, concerns, and site-related expectations. If a CIP is not available or is out of date, developing a new ***community profile*** that describes the affected community is a good idea. Also consider whether it might be appropriate to offer ***technical assistance*** services to help the community understand site issues and actions.

After identifying your audience, prepare a list of key questions and concerns for each major group of stakeholders. Analyze the answers to these questions to identify the underlying concerns. (See Attachment 3: *Frequently Asked Questions at Superfund, Environmental Cleanup, and Hazardous Waste Sites*).

These questions generally fall into three broad categories:

- Overarching questions that are broad in topic and focus on the general status of a situation.
- Informational questions about a specific aspect of the situation.
- Challenging questions that tend to be tense or even have a hostile tone.

Step 2 - Establish the Goals and Objectives of the Communication

Many people start risk communication with the view that if they can just give their audience the facts, it will change their beliefs, attitudes and behaviors related to a given risk and EPA's work to address it (this is known as the knowledge deficit model of communication). Decades of research from the psychological and decision, risk, and management sciences has shown that this is not true.

People make decisions for many complex reasons, and not all of them have to do with what a scientist or EPA official might see as a numerical, factual risk. The good news is that there is also much research that points the way to what does work. One of the first steps to moving beyond the deficit model is to strategically broaden goals and objectives to go beyond providing information.

- **Goals:** Goals are the big picture of what you hope to accomplish with a risk communication effort. Goals are connected to the Agency mission to protect human health and the environment. *Example:* Decreasing a specific risk-taking behavior, such as consuming fish from a contaminated river.
- **Objectives:** Objectives are *measurable* interim steps clearly linked to achieving the goal. Objectives typically involve beliefs and feelings held by an audience and/or increasing their knowledge. *Example:* Increase self-reported trust in EPA as a messenger on issues of health in the community.

Step 3 - Develop Risk Messages Tied to the Goals and Objectives of Your Communication

When you have developed your strategy as outlined above, you will need to define the key risk messages to convey to meet your goals and objectives. One tool to use in developing messages is a message map. A message map is a detailed description of hierarchically organized answers to anticipated questions and concerns from stakeholders in the event of a disaster, crisis, or alarming situation. Creating a message map allows you to think through tough questions and deliver consistent messages for multiple stakeholders and communication outlets. A message map should bring focus and clarity to potentially high-stress, high-concern, or emotionally charged situations (See Attachment 4: *Message Map - A Tool to Help You Develop Messages About Risk*).

Message Map Template
Question
Audience/Stakeholder: "Core" Concern:
Key Messages
Key Message #1 (most important) Supporting information Supporting information Supporting information
Key Message #2 Supporting information Supporting information Supporting information
Key Message #3 Supporting information Supporting information Supporting information

A message map has three main components, or tiers:

- Tier 1 identifies the audience and the question being addressed.
- Tier 2 consists of the key messages pertaining to the situation. Consider the information that you want to convey and the main information your community wants and needs to know. Identify three key messages to deliver to the target audience, keeping each key message to nine words or less. The three key messages together should be about 27 words.
- Tier 3 provides supporting information for the three key messages. Like the key messages, supporting information should consist of details the community wants and needs to know about the situation. Supporting information should address the audience's perception of risk. For example, you may want to acknowledge that the situation is unfamiliar to the community or that the situation may pose risks specifically to children.
- Use the template above to develop a message map.[4] (See Attachment 4: *Message Map - A Tool to Help You Develop Messages About Risk*).
- Note that message maps are a way to guide delivery of risk information to the public. They are not meant to be read verbatim. Their purpose is to provide consistency throughout all communications between the site team and the public, thereby increasing the credibility of the Agency and building trust in the community.

A message box is another tool that can be used to help organize thoughts and identify key points. See Attachment 5: *Message Box – A Tool to Help you Organize Your Thoughts and Identify Key Points* for more information.

Step 4 - Tailor Platforms and Tactics to the Needs of Your Audiences

Deliver the messages effectively by selecting appropriate communication platforms and tactics that will help you address the specific characteristics of your community and any barriers to good communication that you perceive, as well as manage difficult situations:

- **Platforms:** Platforms are sometimes called vehicles or channels. They are the way the message will reach your audience. *Example:* Website content, social media content or public meeting.
- **Tactics:** Tactics are techniques used to build or convey content. Some tactics are shown to be more effective than others at reaching specific audiences or achieving specific objectives. *Example:* Narrative storytelling vs. standard Q and A, accessible interactive meeting design vs. public forum style.

Again, the key is preparation. Use the ***Communication Strategies*** tool, which provides a thorough discussion about selecting appropriate communication methods and using the site's CIP, which outlines a site-specific communication plan with the community's preferred communication delivery mechanisms.

For example, risk messages can be delivered via interactive forums such as public meetings, workshops, and one-on-one discussions, and through indirect means such as media appearances and publications (e.g., pamphlets, fact sheets, handbooks). Messages delivered through indirect means should include information about how EPA plans to collect and respond to community feedback, questions, and concerns. Partner with local community or cultural institutions to assist in conveying risks in appropriate cultural and trusted ways (for example, work through trusted community organizations to communicate fish consumption advisories).

Below are examples of the types of tactics that can be used to convey complex information:

Example #1 - Consider applying indexing or color-coding to explain sampling data.

- Indexing is a data interpretation tool that expresses one or more quantitative measurements as part of a scale, such as "poor" to "excellent." This may be a useful tool with certain audiences and in certain situations, however when using indexing to explain sampling data that reflects different levels of contamination, it is important to provide specific steps people can take to reduce their risks when reflecting levels of contamination that may be concerning to the community.
- Indexing requires the development of weighting factors where important variables are assigned more weight than less important factors to combine the relevant data into an index scale. Complex data may be difficult to categorize and summarize.
- Color-coding is a type of indexing that works well with maps, graphs, icons, and other risk

[4] U.S. Environmental Protection Agency. 2007. Risk Communication in Action: The Tools of Message Mapping. Office of Research and Development, Cincinnati, OH. EPA/625/R-06/012, August, 51pp.

communication tools. (See example in Table 1 below.) Appropriate choices of colors (and ranges of colors) can enhance a viewer's understanding. However, keep in mind that some individuals may be color blind and that color printing may not be readily available in all instances. As a result, it is important to make sure that color distinctions also are visible in gray scale. As with indexing, the biggest challenge with color-coding is reaching a consensus of where to make distinctions—where the "green" ends and the "yellow" begins. Generally, the color-coding should use colors (such as green, yellow and red) that are easily understood, and should be used to distinguish the different levels of risk that require different types of actions or precautions by the public.

Table 1: Example of Color-Coding on Recommended Best Management Practices for Gardening in Lead Contaminated Areas[5]

Soil-Lead Concentration	Category	Recommendation: Gardening Practices	Recommendation: Choosing Plants
<100 ppm	Low risk	▪ No specific remedial action needed. ▪ Wash hands, produce, clothes (good gardening and housekeeping practices).	▪ No restrictions of crop types.
>100–400 ppm - - - - - - - - - - - - 400–1200 ppm	Potential risk	▪ Increasing use of good gardening and housekeeping practices. ▪ Relocate garden to lower risk garden areas. ▪ Increasing use of soil amendments (e.g., compost, clean fill), barriers (e.g., mulch), and other remedial measures up to and including raised beds and containers. ▪ Ensure gardeners wear gloves and use tools to reduce soil contact and ingestion.	▪ Decrease planting of root vegetables or relocate root crop planting to lower risk areas. ▪ Increase use of soil amendments and barriers to reduce soil deposition onto leafy vegetables. ▪ Increase planting of fruiting vegetables, vegetables that grow on vines, and fruit trees.
>1200 ppm	High risk	▪ All of the above good gardening and housekeeping practices. ▪ Raised beds, soil containers, soil replacement (i.e., excavate contaminated soil and replace with soil containing low lead concentrations) are strongly recommended. ▪ Consider finding other locations for garden. ▪ Restrict child access to only established safe areas. ▪ Restrict all gardening by or for children in contaminated soils.	▪ Select plants with shallow roots for raised beds or areas with replacement soil to ensure that roots do not reach contaminated soil that is left in place, if any, otherwise, no restrictions.

[5] U.S. Environmental Protection Agency. 2014. Technical Review Workshop Recommendations Regarding Gardening and Reducing Exposure to Lead-Contaminated Soils. OSWER 9200.2-142. Consult Table 1 on page 6 for references and caveats.

Example #2 - Consider using visuals to describe complex scientific concepts.

- Data visualization tools present information primarily through images such as maps, icons, and pie charts, rather than through words, which enable communication of the results to a broader audience. If you choose to use visuals make sure you tailor them to the level of literacy and numeracy of your audiences, otherwise you could confuse or frustrate your community and reduce EPA's credibility and trust at the site. Here are some examples of visuals:
  - **Diagrams** - to show exposure pathways of contaminants in a groundwater plume.
  - **Graphs** - to show the decrease of contamination over time.
  - **Maps** - to display the current contamination and predicted paths of migration, as well as illustrate receptors of the contamination.
  - **Pictures** - to show ongoing progress at a site or specific events and the history of the site.
  - **Geographic Information Systems (GIS)** Presentations - e.g., Google Earth or EJSCREEN, to display multiple layers of information at a Superfund site, such as population demographics, water resources, roads, and other features of the area.
  - **3-D Data Visualization Tools** - to create realistic simulations and display environmental information in a three-dimensional space, which can help the community understand site conditions, depth of contamination, and other environmental data.

Example #3 - Use risk comparisons effectively and cautiously.

- Risk comparisons can be an effective way to provide context for a situation and help individuals put site-related risks in perspective. However, an inappropriate comparison can have disastrous results for the credibility and efforts of the communicator. See examples below:

Acceptable Risk Comparison	Examples
Comparing risk level of the solution to risk from lack of action.	Informing the community that the risk present if Polychlorinated biphenyls (PCBs) are allowed to remain in the sediment and fish continue to be exposed to the contaminants is far greater than the risk posed by removing the contaminant and disposing of it in a landfill.
Before and after comparisons.	The community is concerned about the safety of a remedial or removal action at the site. It is acceptable to tell community members that by removing contaminated sediment, the risk of eating fish from the river will be reduced tenfold.
Comparing site contaminant levels to regulatory standard levels for that contaminant. Note: When using this approach, it is important to explain what regulatory standard levels are being used and how they are derived; some contaminants, such as lead, do not have a safe or acceptable level.	Informing the community that the concentration of copper in its water is half of the Agency's Maximum Contaminant Level (MCL) drinking water standard.

Unacceptable Risk Comparisons	Examples
Comparing voluntary risks to involuntary risks.	Comparing health risks from smoking or driving to health risks from groundwater contamination.
Trivializing risk.	Stating that one has a greater risk of developing cancer from eating a contaminant in peanut butter than from living near a Superfund site.

Step 5 - Obtain Feedback and Evaluate the Effectiveness of the Risk Communication

An integral component of an effective risk communication plan is laying out how you are going to evaluate and learn from your efforts. Evaluating risk communication efforts by soliciting feedback from audiences and colleagues can produce valuable insights to inform future efforts.

This practice can be implemented both internally on the individual or team level and with external audiences. By using a guided discussion, a short survey, or focus groups, this can easily become a routine part of risk communication. It will help identify how audiences are responding to risk messages and point to key adjustments that will help ensure improvement over time. Whether the process is formal or informal, it is important to document results, so they are available to inform future efforts.

Examples of questions to use in evaluating your efforts:

- What happened?
- What went well? What didn't go well?
- Why or why not?
- Did we achieve the goals and objectives laid out in our strategy?
- Why or why not?
- What did we learn about the community and their concerns?
- What other insights did we gain?
- What would we do differently next time, and why?
- What changes will I make in my next risk communication?

Tips for Working with Superfund Communities

Interacting with the Community:

- Earn trust and establish credibility. A credible person is accurate, keeps promises (and makes sure others do the same), listens to community members, and appreciates their concerns. Trust and credibility are difficult to earn; once lost, they are extremely difficult to regain.
- Inform the public of Superfund's mandate to address human health and environmental threats from site-related hazardous waste, rather than achieving zero risk or returning waste sites to their best use.
- Developing your risk communication carefully by integrating the risk assessment and management activities with other community involvement activities.
- Make use of outside experts but continue to serve as the lead contact person for the communication of technical risk information.
- Coordinate all communication, including risk communication, with the site team. Do not act alone.
- Select your messages with care. Problems often arise when either too much or too little information is provided.
- Be transparent. Do not withhold information unless there is a plausible reason for doing so and that reason is communicated to the community.
- React honestly and admit to mistakes and past problems. Let the community know that EPA is trying to do better and acknowledge how difficult it is for some experts to remember that most people need more background information to understand some concepts.
- Be patient and compassionate. The site team should empathize with the community. Remember, every new audience is hearing this information for the first time, and many people must hear information more than once to understand it. Show the audience members that you are listening to their positions and concerns (See Attachment 6: *Non-Judgmental Language—Helpful Phrases*). Remember that people often do not care what you know until they know how much you care.
- Return telephone calls or emails within 24 hours. If the answer to a question is not ready, explain what is being done to investigate and when an answer will be available.
- Use the Seven Cardinal Rules of Risk Communication as a guide. (*See text box on the next page for more information.)*

Seven Cardinal Rules of Risk Communication

As the site team interacts with the community and prepares its risk communication strategy for the site, remember the Seven Cardinal Rules of Risk Communication[1]:

1. ***Accept and involve the public as a legitimate partner.*** *The goal is to produce an informed public, not to defuse public concerns.*
2. ***Plan carefully and evaluate your efforts.*** *Successful risk communication planning involves having clear objectives, being attentive to the needs and interests of various groups, rehearsing and testing your message, and assessing efforts and lessons learned.*
3. ***Listen to the public's specific concerns.*** *People often care as much about credibility, competence and empathy as they do about risk levels, statistics and details. Take the time to find out what people know, think, or want, and recognizing their feelings.*
4. ***Be honest, frank, and open.*** *Trust and credibility are difficult to obtain/ once lost they are almost impossible to regain. Try to share more information with the community, not less; otherwise, people may think you are hiding something.*
5. ***Coordinate and collaborate with other credible sources.*** *Take the time to coordinate with other organizations and credible sources, and jointly communicate the issue.*
6. ***Meet the needs of the media.*** *The media usually are more interested in simplicity than complexity, danger than safety. Be sure they have what they need to portray the situation fairly. Be open with and accessible to reporters. Establish long-term relationships of trust with specific editors and reporters.*
7. ***Speak clearly and with compassion.*** *Never let your efforts prevent acknowledgement of the tragedy of an illness, injury or death Communicate on a personal level by using vivid, concrete images or examples and anecdotes that make technical risk data come alive. Acknowledge and respond with the words and emotions that people express—anxiety, fear, anger, outrage, and helplessness.*

[1] Adapted from: U.S. Environmental Protection Agency. 2007. *Risk Communication in Action: The Tools of Message Mapping.* Office of Research and Development, Cincinnati, OH. EPA/625/R-06/012, pp. 4-5.

Explaining Risk:

Help the community interpret risk information and put risk-related data into perspective. This can be accomplished by doing the following:

- **Explain the Superfund risk assessment process.**

  EPA uses risk assessment to characterize the nature and magnitude of health risks to humans and ecological receptors from chemical contaminants and other stressors that may be present in the environment. The risk assessment is a critical component of risk communication.
  It is important to educate the community—early and often—about what a Superfund risk assessment is and how a risk assessment measures risk. Even before the risk assessment has begun, consider offering a workshop to explain the risk assessment process to the community. Reviewing the process can help demonstrate that the risk numbers used in a risk assessment are not derived from a "black box." A 40-minute video—*Superfund Risk Assessment and How You Can Help*—is available that helps explain the Superfund human health risk assessment process in plain terms and addresses how communities can be involved. The accompanying *Presenter's Manual for: "Superfund Risk Assessment and How You Can Help"* highlights the key messages described in the video and other issues that audiences might raise. In addition, Attachment 7: *Useful Terms and Definitions for Explaining Risk*, defines commonly used terms for explaining risk-related concepts.

- **Explain the significance of exposure pathways (i.e., routes of exposure).**

  Frequently, the issue is not whether a dangerous contaminant exists in relatively high quantities, but whether exposure to the contaminant puts people at risk. Help the community understand that for a risk to exist, the following factors must be present: 1) contamination; 2) pathways for that contaminant to reach surrounding populations; and 3) populations that may be exposed to the contaminant. If any of these fac-

tors are missing, little or no risk is present. If all three factors are present, explain the exposure pathways (the course a substance takes from its source to the point at which there is contact with people), as well as the exposure route (the means of entry of the substance into the body).

- **Involve the community in the risk assessment process.**

  A good opportunity for community involvement in the risk assessment process is during the exposure assessment step. Exposure information may be gathered from the public during ***community interviews*** or through a workshop.

Attachments

- Attachment 1: *EPA's SALT Framework*
- Attachment 2: *Qualitative Factors Affecting Risk Perception*
- Attachment 3: *Frequently Asked Questions at Superfund, Environmental Cleanup, and Hazardous Waste Sites*
- Attachment 4: *Message Map - A Tool to Help You Develop Messages About Risk*
- Attachment 5: *Message Box - A Tool to Help You Organize Your Thoughts and Identify Key Points*
- Attachment 6: *Non-Judgmental Language – Helpful Phrases*
- Attachment 7: *Useful Terms and Definitions for Explaining Risk*

Attachment 1: EPA's SALT Framework

The SALT Framework

A PROCESS FRAMEWORK TO GUIDE RISK COMMUNICATION

U.S. Environmental Protection Agency

About this Framework

As the U.S. Environmental Protection Agency pursues its mission to protect human health and the environment, EPA staff practice risk communication every day. Effectively communicating science and potential health risk is one of the most important jobs we have. The SALT Framework is based on a process of **S**trategy, **A**ction, and **L**earning and is supported by **T**ools that together provide a research-based approach and best practices for communicating our work to the American people.

The SALT Framework:

- Includes an overview of key risk communication principles,
- Outlines some of the science and research behind those principles, and
- Provides clear, practical guidance for implementing a consistent approach to communicating risk across all EPA activities and programs.

Contents

What is Risk Communication?

Risk communication is communication intended to provide a general or specific audience with the information they need to make informed, independent judgments about risks to their health, safety and the environment. **Risk communication should be meaningful, understandable, and actionable.** Risk communication works best when it is a two-way process where the Agency listens to, learns from, and meets the needs of specific audiences. In practice, this is not always possible in the short term or in all situations, but improving our understanding of the needs of our audiences and responding to those needs should remain an ongoing EPA goal.

What is the Difference Between Risk Communication and Crisis Communication?

EPA often needs to communicate about risk during an immediate threat to human health or the environment during a crisis situation that we were unable to, or did not appropriately, plan for. Crisis communication is a subset of risk communication in response to an event or a crisis. All the elements of risk communication apply in crisis communication, but urgency is paramount, and audience stress is typically elevated.

Who is this Framework for?

This framework is for anyone who communicates risk on behalf of EPA. Due to the nature of EPA's mission to protect human health and the environment, communicating risk is inherent to any mission-relevant work at the Agency. Risk communicators at EPA include a wide spectrum of employees, including staff working on policy, in public affairs, and as scientists, in addition to those working directly on community outreach and engagement, and in emergency operations.

Strategy

Moving Away from the Deficit Model

Many people start risk communication with the view that if they can just give their audience the facts, it will change their beliefs, attitudes and behaviors related to a given risk and EPA's work to address it (this is known as the knowledge deficit model of communication). Decades of research from the psychological and decision, risk, and management sciences has shown that this is not true. People make decisions for many complex reasons, and not all of them have to do with what a scientist or EPA official might see as a numerical, factual risk. The good news is that there is also much research that points the way to what does work. One of the first steps to moving beyond the deficit model is to broaden goals and objectives that go beyond providing information *strategically*.

Strategic risk communication should include: taking stock and leveraging existing sources of knowledge; setting big picture goals and corresponding objectives; and matching platforms and tactics to those goals and objectives. This process should also focus on how success will be measured and how the project will be refined as needed to achieve it. The strategic planning step can end with a simple list or a more formal risk communication plan that includes many parts and roles. The important thing is to use this planning process to design risk communication activities to achieve EPA's goals and objectives.

Strategy Steps and Definitions:

Take Stock

Leverage knowledge inside the Agency and with partners before undertaking a risk communication project.

Example: Seek out information from colleagues in the Region, from the EJ office, and from other offices that have a history in the community, the contaminant, or other relevant issues.

Establish Goals

Goals are the big picture of what you hope to accomplish with a risk communication effort. Goals will be connected to the Agency mission to protect human health and the environment.

Example: Decrease a specific risk taking behavior in an audience.

Set Objectives

Objectives are *measurable* interim steps clearly linked to achieving the goal. Objectives typically involve beliefs and feelings held by an audience and/or increasing their knowledge.

Example: Increase self-reported trust in EPA as a messenger on issues of health in the community.

Choose Platforms

Platforms are sometimes called vehicles or channels. They are the way the message will reach your audience.

Example: Website content, social media content or public meeting.

Match Tactics

Tactics are techniques used to build or convey content. Some tactics are shown to be more effective than others at reaching specific audiences or achieving specific objectives.

Example: Narrative storytelling vs. standard Q and A, accessible interactive meeting design vs. public forum style.

Action

Considering Risk Communication Factors to Help Ensure a Positive Outcome

When it comes to taking action and implementing the plan developed in the strategy step, it is important to consider a variety of factors that can affect the success of a given risk communication. Research shows that these risk communication factors have a clear impact on whether an audience can hear, understand, accept and act on a specific message. While some of these factors cannot change, taking them into account and using appropriate tactics can improve outcomes. A few examples of these factors are listed below, but this list is not exhaustive. Considering these factors can help the communicator take steps to improve the chances that an activity will achieve strategic risk communication goals and objectives.

2

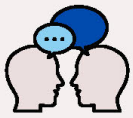
Risk Communication Factors

A wide variety of factors can impact if an audience can hear, understand, accept and act on a given risk communication message. While some of these factors cannot themselves be changed, taking them into account and using appropriate tactics can improve outcomes.


Hazard Factors


Relationship Factors


Audience Factors


Communicator Factors


EPA and Science Factors

Hazard Factors

There are certain factors inherent in a given hazard that can affect how an audience feels about the risk. Many of these factors are defined as issues of "risk perception" in the research. Risk perception issues are issues of perspective. They are valid ways for an audience to assess risks, but they may not strictly align with the data. For example, people generally are more concerned with risks that are seen as uncontrolled or related to children.

Two tactics that can help are: 1) to put the risk into context and 2) to provide meaningful and achievable action steps that can help reduce stress and make risk-reducing behavior change more possible.

Relationship Factors

These are variables that are based on the relationship between the communicator and the audience. Trust is one example. Trust underlies an audience's ability to hear a message and willingness to act on it. Trust can be hard to build, especially if it has eroded over time.

Establishing shared values early in a communication is one tactic to build trust.

Audience Factors

These are variables that are related to the audience. Some examples include language, literacy, numeracy, identity, cultural norms and biases, community history, time and economic stressors.

One example of a tactic that can help with all audiences but especially those with low numeracy is to include visual representations of risk.

Communicator Factors

These are variables that are connected directly to the communicator. Several examples include identity, competence and expertise, stress level, and comfort with engagement.

Tactics that can help include mock presentations, selecting communicators who share identity characteristics with the audience, or matching the right communicator to the task.

EPA and Science Factors

These are factors that connect directly either to EPA's role or to the science that drives our decision making. Sometimes, the regulations governing a specific contaminant affect the messaging about it. As one example, during risk reviews of the regulations governing air toxics, EPA determines an "acceptable cancer risk" expressed as the number of cancer cases per million people resulting from a lifetime exposure. At other times, uncertainty in data must be addressed, such as in the results of a monitoring study. These are inherently complicated concepts to explain, and, in many communities, no cancer risk is going to be considered "acceptable."

Two tactics that can help are 1) to show empathy for the very real concerns of the audience regardless of whether those concerns are seen as falling under EPA's regulatory mandate, and 2) be transparent about what we know and what we don't know.

Coordinating with Partners to Make Messages More Meaningful

Sometimes a community partner can be a far better communicator of EPA risk communication messages than EPA staff. There are times when issuing communications jointly with other trustworthy sources (for example, credible university scientists, physicians, or trusted local officials) can lead to a more positive outcome than EPA communicating alone. It is important to take time to coordinate communications both within EPA and across organizations in order to make messaging from all partners more meaningful, understandable and actionable. With credible and authoritative intermediaries, determine who is best able to answer questions about risk. Audiences typically do not distinguish between different governmental partners. ***Coordinating in advance can improve perceptions of trust in all partners.***

Learning

An integral component of implementing the risk communication plan is using a process to evaluate and learn from risk communication efforts across the EPA. Evaluating risk communication efforts by soliciting feedback from audiences and colleagues can produce valuable insights to inform future efforts. Through using a reflective practice model (see text box), communicators can identify new knowledge and lessons learned that will help them continually improve their risk communication practice.

What is Reflective Practice?

Reflective practice is an approach to continuous learning and improvement. In EPA's risk communication work it includes the following steps:

1 Lay out clear expectations for what you want to achieve with your communication in the risk communication strategy:
- What are my/our expectations?
- What informs those expectations (identify potential assumptions and biases)?

2 Collect individual and/or group reflections after communication occurs:
- What happened?
- Did it meet the expectations laid out in our strategy? Why or why not?
- What did I/we learn? What insights did I/we gain? What would I/we do differently next time, and why?

3 Incorporate insights and lessons learned into next communication:
- What changes will I/we make based on learnings through reflective practice?

How to Incorporate Reflective Practice into your Risk Communications

A reflective practice approach identifies lessons learned but goes further by specifying how this learning will inform future individual or group efforts. It also helps risk communicators apply the strategy in this framework to a variety of situations by encouraging learning from past outcomes. Following the steps of reflective practice have been shown to improve future outcomes.

The practice can be implemented both internally on the individual or team level and with external audiences. By using guided discussion, a short survey, or focus groups, reflective practice can easily become a routine part of risk communication. It will help identify how audiences are responding to risk messages and point to key adjustments that will help ensure improvement over time. Whether the process is formal or informal, it is important to document results, so they are available to inform future efforts.

Examples of Reflective Practice: After-action assessment, such as a debrief, "hot wash," or other type of assessment is a key part of a reflective practice approach. ***When using this approach, it is important to incorporate questions about your expectations and the reasons for them in your strategy (the first step in the SALT framework) so you can assess whether you met those expectations afterwards.***

> **Example:** "I expect the stakeholders will have a lot of questions about this message, because it is significantly different than our original communication with them. I expect there will be gaps in their understanding, and they will want an explanation to help them understand what has changed."

When you engage in a debrief, hot wash, or focus group to assess the experience against your strategy's expectations, identify insights and surprises, and consider changes you might make in your approach.

> **Example:** "Stakeholders were more interested in our current assessment than in how it has changed from the past, so I overestimated the level of detailed explanation they would want about that. Next time I might want to assess that at the beginning of the meeting, so I don't provide unnecessary information."

The cycle of reflective practice continues when the insights gathered are applied to the next risk communication effort to inform expectations and approaches.

Tools

The tools that support this document are currently being built and will include contaminant specific toolkits, case studies, practical tools and templates, and more. Visit our EPA Risk Communication website to discover the most up-to-date resources and tools.

4

Attachment 2: Qualitative Factors Affecting Risk Perception

Factor	Conditions Associated with Increased Public Concern	Conditions Associated with Decreased Public Concern
Catastrophic Potential	Fatalities and injuries grouped in time and space	Fatalities and injuries scattered and random
Familiarity	Unfamiliar	Familiar
Understanding	Mechanisms or process not understood	Mechanisms or processes understood
Controllability (own)	Uncontrollable	Controllable
Exposure Willingness	Involuntary	Voluntary
Effects on Children	Children specifically at risk	Children not specifically at risk
Effects Manifestation	Delayed effects	Immediate effects
Future Generation Effects	Risk to future generations	No risk to future generations
Victim Identification	Identifiable victims	Statistical victims
Dread	Effects dreaded	Effects not dreaded
Trust in Institutions	Lack of trust in responsible institutions	Trust in responsible institutions
Media Attention	Much media attention	Little media attention
Accident History	Major and/or minor accidents	No major or minor accidents
Equity	Inequitable distribution of risks and benefits	Equitable distribution of risks and benefits
Benefits	Unclear benefits	Clear benefits
Reversibility	Effects irreversible	Effects reversible
Origin	Caused by human actions/failures	Caused by acts of nature/God

National Research Council. 1989. Improving Risk Communication. Washington, DC: The National Academies Press.

Attachment 3: Frequently Asked Questions at Superfund, Environmental Cleanup, and Hazardous Waste Sites

NOTE: These questions are meant to give you a sense of the types of questions that residents living near contaminated sites will often ask. Keep in mind that good risk communication takes an audience first approach by listening to and addressing your audiences' specific concerns. Often the first thing communities want to know is whether they are safe.

Health Questions

1. Am I at risk from the contamination?
2. What are my past exposures?
3. How could I have been exposed?
4. What are the risks to my children?
5. I'm pregnant (or planning to be). Will the contaminants affect my unborn child?
6. What health effects can I expect to see if I've been exposed to site contaminants?
7. Have any health problems been reported so far?
8. How many people have become ill as a result of the site?
9. Does this explain why _____ is sick?
10. I have a recent health problem (i.e., headaches, rashes) that I never had before. Could the site contamination have caused this problem?
11. What does my doctor know about this?
12. Is my doctor qualified?
13. Is there any medical person I can talk to about what I am experiencing to see if it is related to the contamination I may have been exposed to?
14. Will EPA pay my medical bills? (*EPA cannot pay medical bills. It is suggested that you contact your local health department for information on how you may be able to get assistance.*)
15. Can you set up a temporary, local health center or clinic where we can be tested?
16. Where can I go to learn more about the risk from the site?
17. What are the short-term effects?
18. What are the long-term effects?
19. Can you guarantee we won't get cancer in 30 years?
20. What is the risk of dying from cancer?
21. Are you going to test residents for exposure?
22. Can we drink the water/breathe the air?
23. Is it safe to bathe or shower in the water?
24. Is it safe to water our lawns with the potentially contaminated water?
25. Is it safe to mow our lawns if the soil underneath is potentially contaminated?
26. Can I eat food from my garden?
27. Will you provide us with bottled water?
28. Why have some people received bottled water and not others?
29. What are the impacts to natural habitat (i.e., fish and other species)?
30. Is it safe to use the river for fishing and other recreational purposes?
31. How do you know whether it's safe to go fishing?
32. Is it safe to eat the fish?
33. Can my children play outside?
34. What are the risks to my pets?
35. Why is EPA wearing protective clothing and we are not?
36. What can I do to protect myself and my family?
37. What's being done right now to protect my health and the health of my family?
38. Will capping the site protect my health?
39. What happens if my ventilation system shuts down?

40. What is the ATSDR?
41. What is a Public Health Assessment?
42. How do we get rid of the risk?

Site-Specific Questions

1. What are the contaminants of concern?
2. How much contamination is there?
3. How widespread is the contamination?
4. Is the contamination moving, and if so, in what direction?
5. Where did the contamination come from?
6. Who brought it to your attention?
7. Are there any other contaminants besides the ones we were told about?
8. How can you be sure there are no other contaminants?
9. How will you decide where to sample and where not to sample?
10. Who is responsible for cleaning up the contamination?
11. Who is going to perform the cleanup?
12. How long will the cleanup take?
13. What about schools nearby?
14. When will you start cleanup?

Investigation/Data Concerns

1. Do I have to give you access to sample my property?
2. What if I refuse access to my property?
3. Would EPA take samples on my property upon my request?
4. Can I see the results of the testing you've done on my property?
5. Can I see the results of testing you've done on other properties in the neighborhood?
6. I'm moving into the area. Can I see the results of sampling that's been done?
7. Who will be doing the sampling?
8. How can we be sure the sampling data is accurate?
9. Can you guarantee the accuracy of sampling results?
10. How can we be sure that future sampling won't find things that you didn't find now?
11. What is the worst-case scenario?
12. Where else has this happened?
13. Where can I get more information about similar sites that have already been cleaned up?
14. Can damages be reversed?
15. What is the evidence that my drinking water is contaminated or my yard has contaminated soil?
16. Why hasn't my well or home been sampled?

Cleanup Concerns

1. How exactly are you going to clean up the site? Why was this particular cleanup method chosen over other options?
2. What process was used (or will be used) to select contractors to perform the cleanup?
3. How will cleanup performance be monitored or evaluated?
4. How much will the cleanup cost?
5. Who will pay for the cleanup?
6. Why not dig up the contamination?
7. Why are you going to just "cap" everything and leave the contamination there?
8. Is dredging safe?
9. Won't dredging just stir up things and contaminate the water even more?
10. How will my quality of life be affected during the cleanup (i.e., noise, traffic, odors)?
11. After you finish the cleanup, then what? What happens next?
12. After the cleanup, will you continue to test to make sure it's still working?

Superfund Process Questions

1. Do you have enough money to cover the cleanup costs?
2. What if you don't have the funds to finish the job?
3. If you discover the cleanup is going to cost more than estimated, what happens then?
4. Why aren't you cleaning up the entire site?
5. Why don't you clean up all of the contamination, instead of allowing some to remain?
6. Who determines what levels of contamination are considered safe?
7. Is there someone local residents can talk to if we have questions or concerns?
8. How will you pay?
9. Will my tax dollars be used to address this problem that someone else caused?
10. What is a PRP?
11. Who can we sue?
12. Are our local officials aware?
13. Will we be compensated?
14. What guarantees the cleanup is effective?
15. How will you know when everything is clean?
16. Can you guarantee that all of the contamination will be removed?
17. What if the cleanup doesn't work?
18. What happens if my water (or other exposure pathway) is still contaminated after the cleanup?
19. Who's in charge?
20. Who makes the final decision?
21. How/why is a site a Superfund Site?
22. Why does EPA study a site to death? Why doesn't EPA just get in there and clean it up?
23. What is the process to come to a solution?
24. Can you guarantee you won't damage our house?
25. Can we get jobs helping with the cleanup?
26. Has an EPA decision ever been reversed?
27. There's another site down the road. Can you tell me what's going on there?
28. How does a homeowner know if EPA has investigated pollution problems on their property?
29. Will EPA release specific addresses where samples have been taken?
30. If we can't eat the fish anymore because of health risks, can you give us a food subsidy?

Communication Concerns

1. How will you communicate information to me?
2. How will I be informed of what's going on?
3. What happens if you find high concentrations of contaminants near my home? How will I know?
4. Will you share the testing data with residents?
5. Will you let us know if something unexpected happens during the cleanup and things get worse?
6. If a cleanup plan is selected that residents disagree with, is there an appeal process?
7. How will you address public comments?
8. Will you address ALL of the public comments?
9. How do you decide which comments NOT to address?
10. Does a database exist that shows contaminated areas? For example, can I type in an address and find out if there is anything within a five-mile radius that is being cleaned up or has been cleaned up by EPA or the state?

Relocation/Buyout Questions

1. Will you relocate me?
2. Will the government buy me out?
3. What is EPA going to do?
4. Why did you let this happen?
5. Will you move me or buy my home?
6. Should I move or relocate?
7. I was told residents might have to relocate during the site cleanup. Who will pay for my moving costs? What about other expenses I may be forced to incur (i.e., costs of transporting my children to school because they won't be able to take the bus, or daily food costs because I won't have access to my stove and refrigerator)?

Property Values, Owner Liability, Buying or Selling Property, Takings

1. How will this affect my property value?
2. My property value has decreased because of the site contamination problem. Will I be compensated for this?
3. What can citizens do if their property value goes down because of a polluted (Superfund) site?
4. The site has placed a negative stigma on our community that may affect potential investors, developers, or homeowners. What will be done about this?
5. Will there be an immediate appraisal of my property to adjust my tax status?
6. Do property values rebound? How long will it take? Can you provide examples?
7. Can I be held responsible for pollution on my residential property?
8. If my property sits on a contaminated aquifer, am I liable?
9. As a prospective purchaser of a piece of property that is on or near a Superfund site, what would my responsibility be for contamination that existed at the time of purchase?
10. Is a bank or other lender liable for contamination if it lends money (or has lent money) to owners or developers of contaminated property?
11. What information can EPA provide to potential buyers?
12. Do I have to disclose the contamination on my property to potential buyers?
13. If my loan is denied because of concerns about contamination, can EPA call my bank or appraiser?
14. Will I be able to refinance my loan due to the devaluation of my property?
15. Can I refuse to limit EPA access to my property? If EPA uses my property for sampling or well installation, will I be paid?
16. Can EPA take part or all of my property? How long can EPA keep me away from my property?
17. Can a homeowner perform a cleanup to ensure that he/she will be able to sell their property?
18. Will this keep our community from developing?
19. If soil is excavated from my yard, will I receive financial assistance to replace plants and shrubbery?

Challenge Questions

1. Is it the fault of the state or city or another federal agency?
2. Why have we been ignored?
3. How could this have been avoided?
4. How can you sleep when our children are dying?
5. Why does EPA cover up its actions?
6. Why won't you share all the information?
7. Would you live here?
8. Why are you here?
9. Why did it take you so long to tell us about the contamination?
10. When you first discovered there MIGHT be a problem, why didn't you tell us then?
11. Why can't you clean it up right away?
12. Why should we trust you? How can I trust what you're telling me about the site? How can I trust what you're telling me about my safety?

13. Who's to blame?
14. You would not do this in a white neighborhood. Why do it here?
15. Would you live in my house?
16. What are your qualifications for handling this type of cleanup?
17. Do comments from community members really make a difference, or has EPA already made the decision and this is just an exercise it has to go through?
18. I'm concerned that cost will be the driving force behind the agency's selected cleanup option. Does community opinion really matter?
19. If the majority of residents disagree with how EPA [or other agency] is planning to clean up the site, will EPA [or other agency] change its mind?
20. Why do you care?
21. Who pays you?
22. Are you being paid off?
23. Do YOU agree with the science?
24. Do you agree with the decision?
25. Are you telling the truth?
26. Is it EPA's official position that we are safe?
27. Why did EPA allow this to happen?
28. Why have you been covering this up for years?
29. Who can give me answers if you can't?
30. Where can I get more information about this site?
31. Did EPA allow the company to operate because you are on the take?

*This list is a modified version of frequently asked questions derived by a workgroup of Community Involvement Coordinators in the U.S. Environmental Protection Agency Superfund Program, and questions developed by Vincent T. Covello, Ph.D., Center for Risk Communication, August 2008

Attachment 4: Message Map - A Tool to Help You Develop Messages About Risk

A message map should be completed for every important stakeholder question. The top level of the message map identifies the audience and the question or concern that the map is intended to address. The second level of the template contains three key messages that answer the question or concern. The last level contains supporting information that amplifies the key messages. This information also provides additional facts or details.[1]

Question
Audience/Stakeholder:
Core Concern:
Key Messages
Key Message #1 (most important) Supporting information Supporting information Supporting information
Key Message #2 Supporting information Supporting information Supporting information
Key Message #3 Supporting information Supporting information Supporting information

1 U.S. Environmental Protection Agency. 2007. Risk Communication in Action: The Tools of Message Mapping. Office of Research and Development, Cincinnati, OH. EPA/625/R-06/012, August, 51pp.

Message Map Example: Credible threat involving chemical contamination of a water reservoir

Should people be worried about the drinking water?
Audience/Stakeholder: Public/Media
Core Concern: Human health, trust in government
Key Messages and Supporting Information
Our mission is to protect human health and the environment, and we are concerned about any threat to drinking water. We are working closely with public health authorities and others to minimize any potential harm. We have experts on staff trained to respond to events such as this. We are using all available resources to protect public health.
We are testing the water for {insert chemical name}. We are testing the water in the reservoir and all associated distribution points. We have highly qualified people taking samples. We are following testing procedures recommended by EPA.
We ask you to be alert and await updates. People should call {insert phone number} or go to {insert website} for information and updates. People should stay tuned to local radio or television stations. Until we know more, people in the impacted area {insert area} should use an alternative supply of water.

Attachment 5: Message Box - A Tool to Help You Organize Your Thoughts and Identify Key Points

COMPASS

The Message Box

The Message Box is COMPASS's tool to help you organize your thoughts and identify key points to share with your audience. It is designed to be flexible and can be used to help develop a presentation, draft written materials, outline a proposal, prepare for an interview, and more.

Humans can only absorb a limited amount of information. Your goal as an effective communicator is to identify the information that is critical to your audience, whoever they may be: what really matters to them, what they really need to know. The Message Box can help you do that. Start by clearly identifying your audience (*Audience?*)—the more specific you can get, the better!—and listing the central issue (*Issue?*), then "frame" the issue with the relevant information in the other sections.

Fill in the rest of the boxes by answering the following questions as concisely as you can:

- What are the problems/conflicts/issues involved (*Problems*)?
- Why does this information matter to my audience (*So What*)?
- What are some of the possible solutions to the problem, especially that my audience can help make happen (*Solutions*)? What are the potential benefits of resolving this problem (*Benefits*)?
- What kind of pushback might you expect from your audience (*Challenges/ Objections*)?

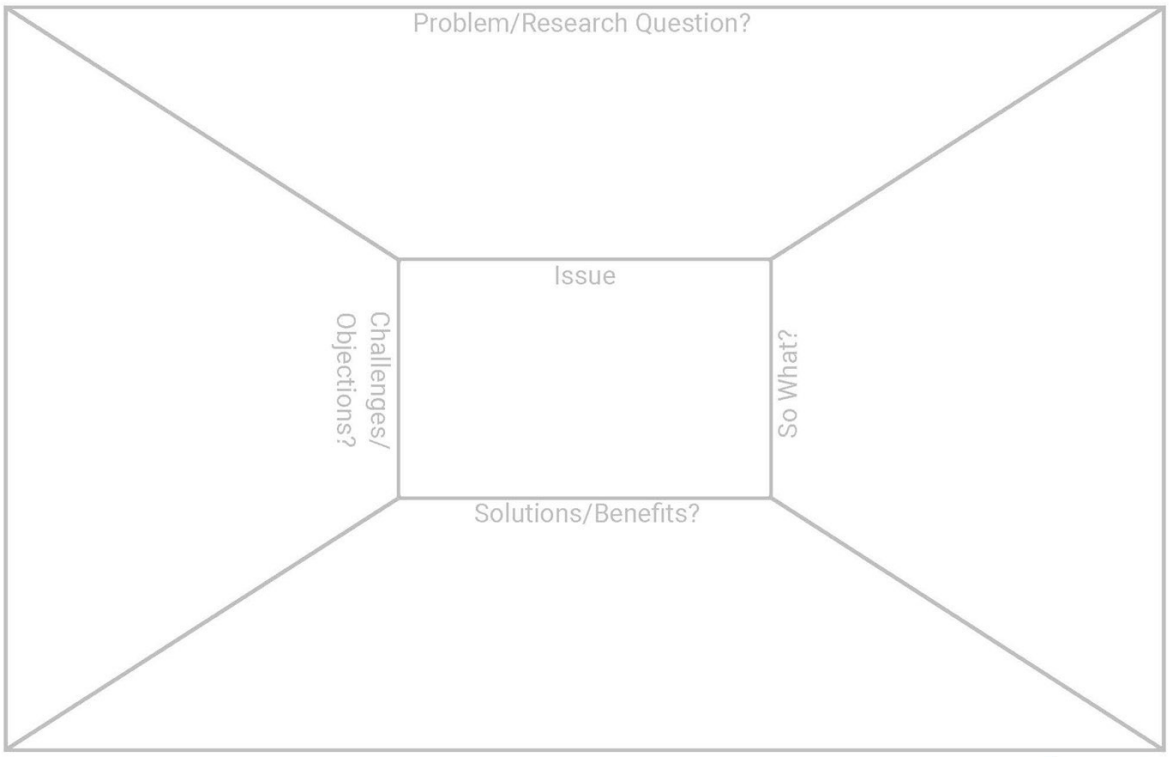
Consider these questions as your starting point. If you're struggling to identify which information is most relevant, put yourself in your audience's shoes: what will make them sit up and pay attention? What is their "*So What*"?

Pare down your ideas so that each section has just a few concise sentences or bullet points. Once you have honed in on your key points, you can add in anecdotes, sound bites, and data that reinforce your messages.

The Message Box is deceptively simple, because it takes time to develop messages that work for you and your audience. Keep working to refine your messages—your Message Box will change over time as your work evolves. As you communicate with new audiences, you'll also want to draft new Message Boxes for them. Explore The Message Box Workbook online for a more in-depth guide on how to use The Message Box, further examples, and more.

The Message Box

Audience: _____



COMPASS

Attachment 6: Non-Judgmental Language — Helpful Phrases

Instead of saying/thinking:	Consider saying/thinking:
That's ridiculous. That's unreasonable.	I hadn't considered that. How will that work for both of us? I don't understand how that will work. It seems as though ____ may be getting in our way. I think we can find a solution. Let's look at we have accomplished so far. What makes that a fair solution?
That doesn't make sense. You're not making sense.	I'm not following you… Help me understand… I don't understand; how will that work?
That's not workable. That will never work.	I'm not comfortable with that because… That's one option; here are my concerns… I'd like to hear your thinking on how this would work.
You aren't doing this right. You didn't do this right.	This is different than what I expected. Does this way of doing it still meet the requirements?
We're not going anywhere. We're not getting anywhere. If only you would stop... We'll never agree.	I'm happy to stay and... I'd like to better understand… Can we pause here to regroup? Let's work together to…
Why do you want X?	How did you get to X? What makes you want X? What makes X a good solution/choice?
Why did you do that?	What motivated you to do that?
That has nothing to do with this.	How does that relate to this?
The fact is… This is how it is:	Correct me if I'm wrong; I understand (state facts as you see them). The way I see it is…
I won't do X.	I am not comfortable doing X. X makes me nervous (etc.) because…
Yes, but…	Yes, and…
You haven't done X.	I appreciate your willingness to do X. How far away you are from completing it?
You're wrong.	My experience has been… I see this differently… I need to understand _____ better…
Do X. You should do X.	I need help with X. We need to get X done; what suggestions do you have? I'd like you to do X; will that work? Can you do X? Are you willing to do X?

Instead of saying/thinking:	Consider saying/thinking:
I want X. I must have X.	One option I see is X; how does X work for you? One way I see to resolve this is X; what do you think of X? One option is X; X is important to me because…
We have nothing in common.	We agree on…
You're lying. I don't believe that.	I'm confused about…
You said… But you did…	Let me see if I have this right; you are saying… I'm not clear about… Let's focus on the future.
That's not fair.	Let's find a solution that is fair for both of us.
You make me mad. You're making me feel…	I get upset when… I feel…
I…You…	We…

Remember – TONE and BODY LANGUAGE make all the difference in any communication.

U.S. Institute for Environmental Conflict Resolution. 2010. Non-Judgmental Language: Helpful Phrases [Handout]. Training Workshop on Introduction to Managing Environmental Conflict, Washington, D.C. September 14-15.

Attachment 7: Useful Terms and Definitions for Explaining Risk

Note: These terms and definitions are very useful if you are talking to knowledgeable audiences or using it as a training tool for CICs, but the language may be too technical for general community audiences.

Specific sources are listed where available. '' indicates no official EPA glossary definition is available.*

Acceptable Exposure Levels: Concentration levels to which the human population, including sensitive subgroups, may be exposed without adverse effect during a lifetime or part of a lifetime, incorporating an adequate margin of safety. For known or suspected carcinogens, they are generally concentration levels that represent an excess upper-bound lifetime cancer risk to an individual of between 10-4 and 10-6 using information on the relationship between the dose and response. The 10-6 risk level shall be used as the point of departure for determining remediation goals for alternatives when applicable or relevant and appropriate requirements (ARARs) are not available or are not sufficiently protective because of the presence of multiple contaminants at a site or multiple pathways of exposure. (NCP 1992)

Acute: Occurring only once or more than once within a short period of time. (OLEM 2010b)

Acute Exposure: A single exposure to a toxic substance which may result in severe biological harm or death. Acute exposures are usually characterized as lasting no longer than a day, as compared to longer, continuing exposure over a period of time. (EPA 2009)

Acute Risk: Health risks associated with exposure to a contaminant within a short time period (acute exposure). Acute risk typically occurs in occupational settings where workers are using chemicals as part of their job. Health effects are often reversible. However, exposure may also result in harmful effects to major organs, depending upon the contaminant and its concentration. *

Acute Toxicity: Any poisonous effect produced within a short period of time following an exposure, usually 24 to 96 hours. (IRIS 2011)

Additive Risk Assessment: A process that considers the aggregate (i.e., additive) ecological or health risk to a target organ caused by the accumulation of risk from multiple stressors (any physical, chemical, or biological entity that can induce a harmful response) and multiple pathways of exposure. *

Adverse/Harmful Health Effect: A biochemical change, functional impairment, or pathologic lesion that affects the performance of the whole organism, or reduces an organism's ability to respond to an additional environmental challenge. (IRIS 2011)

All Appropriate Inquiry (AAI): A process for the Brownfields Program of evaluating a property's environmental conditions and assessing the likelihood of any contamination. It is required for those purchasing or acquiring property to assert a defense against Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) liability and must comply with ASTM E-1527-05. A Phase I environmental site assessment (ESA) examines historical property records, interviews neighbors, and includes a site inspection, but doesn't generally include sampling. Phase II ESAs and subsequent phases involve soil sampling and data analysis. *

Aquifer: An underground geological formation, or group of formations, containing water. Aquifers are sources of groundwater for wells and springs. (EPA 2009)

Asbestosis: A disease associated with inhalation of asbestos fibers. The disease makes breathing progressively more difficult and can be fatal. (EPA 2009)

Background: Two types of background levels may exist for chemical substances: (a) naturally occurring levels, which are ambient concentrations of substances present in the environment, without human influence; and (b) anthropogenic levels, which are concentrations of substances present in the environment due to human-made, non-site sources (e.g., automobiles, industries). (IRIS 2011)

Bioaccumulation: The general term describing a process by which chemicals are taken up by a plant or animal by either being directly exposed to a contaminated medium (soil, sediment, water) or by eating food containing the chemical. Related terms are bioconcentration, in which chemicals are absorbed by an animal or plant to levels higher than the surrounding environment; and biomagnification, in which chemical levels in plants or animals increase from transfer through the food web (e.g., predators have greater concentrations of a particular chemical than their prey). (OSRTI 2012)

Bioavailability: The rate and extent to which an agent can be absorbed by an organism and is available for metabolism or interaction with biologically significant receptors. Bioavailability involves both release from a medium (if present) and absorption by an organism. (EFH 2011)

Biologically Effective Dose: The amount of a deposited or absorbed compound reaching the cells or target sites where adverse effects occur, or where the chemical interacts with a membrane. (EPA 2009)

Brownfields: Abandoned, idled, or underused industrial and commercial facilities/sites where expansion or redevelopment is complicated by real or perceived environmental contamination. They can be in urban, suburban, or rural areas. EPA's Brownfields Program helps communities mitigate potential health risks and restore the economic viability of such areas or properties. (EPA 2009)

Carcinogen: An agent capable of inducing cancer. (IRIS 2011)

Carcinogenesis: The origin or production of a benign or malignant tumor. The carcinogenic event modifies the genome and/or other molecular control mechanisms of the target cells, giving rise to a population of altered cells. (IRIS 2011)

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA): The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), enacted in 1980 and nicknamed Superfund. This law provides the authority through which the federal government can compel people or companies responsible for creating hazardous waste sites to clean them up. It also created a public trust fund, known as the Superfund, to assist with the cleanup of inactive and abandoned hazardous waste sites or accidentally spilled or illegally dumped hazardous materials. (OLEM 2010b)

Chronic: Occurring over a long time. (ATSDR 2016)

Chronic Exposure: Repeated exposure by the oral, dermal, or inhalation route for more than approximately 10 percent of the life span in humans; more than approximately 90 days to two years is typically used for laboratory animal species. (EFH 2011)

Chronic Risk: Long-term health risk. Chronic risk usually occurs at lower doses and may occur in residential or commercial (e.g., office) settings. Health effects associated with chronic exposures may not become apparent for many years. *

Chronic Toxicity: The capacity of a substance to cause adverse human health effects as a result of chronic exposure. (IRIS 2011)

Cohort: In epidemiology (the study of the disease in human populations), a group of people sharing one or more characteristics. A birth cohort consists of all persons born within a certain time period, usually a year. A group of people exposed to similar levels of a contaminant during a similar period is a cohort. *

Cohort Study: An epidemiologic study comparing those with an exposure of interest to those without the exposure. These two cohorts are then followed over time to determine the differences in the rates of disease between the exposure subjects. (IRIS 2011)

Comparative Risk Assessment: A process that generally uses a professional judgment approach to evaluate the relative magnitude of effects and set priorities among a wide range of environmental problems (e.g., U.S. Environmental Protection Agency, 1993d). Some applications of this process are similar to the problem

formulation portion of an ecological risk assessment in that the outcome may help select topics for further evaluation and help focus limited resources on areas having the greatest risk-reduction potential. In other situations, a comparative risk assessment is conducted more like a preliminary risk assessment. For example, EPA's Science Advisory Board uses professional judgment and an ecological risk assessment approach to analyze future ecological risk scenarios and risk management alternatives. (OLEM 2010)

Congenital: Existing at birth, particularly birth deformities or anomalies. Congenital anomalies may originate from genetic, infectious, or environmental origins, although in most cases, it is difficult to identify their cause. *

Contaminant: Any physical, chemical, biological, or radiological substance or matter that has an adverse effect on air, water, or soil. (EPA 2009)

Contaminants of Concern: Contaminants which have been shown through analysis to be those that are likely to be causing risk to the plants and animals at a site. (OSRTI 2012)

Contaminants of Potential Concern: Also called "chemicals of potential concern" in EPA guidance, these chemicals that are potentially site-related and where data are sufficient quality for use in the quantitative risk assessment. (EPA Risk Assessment Guidance for Superfund Volume I Human Health Evaluation Manual [Part A], 1989)

Cumulative Ecological Risk Assessment: A process that involves consideration of the aggregate ecological risk to the target entity caused by the accumulation of risk from multiple stressors. (OLEM 2010)

Cumulative Risk Assessment: An analysis, characterization, and possible quantification of the combined risks to health or the environment from multiple agents or stressors. (EPA 2003)

Developmental Toxicity: Adverse effects on the developing organism that may result from exposure prior to conception (either parent), during prenatal development, or postnatally until the time of sexual maturation. The major manifestations of developmental toxicity include death of the developing organism, structural abnormality, altered growth, and functional deficiency. (IRIS 2011)

Dose: The amount of a substance available for interactions with metabolic processes or biologically significant receptors after crossing the outer boundary of an organism. The potential dose is the amount ingested, inhaled, or applied to the skin. The applied dose is the amount presented to an absorption barrier and available for absorption, although not necessarily having yet crossed the outer boundary of the organism. The absorbed dose is the amount crossing a specific absorption barrier (e.g., the exchange boundaries of the skin, lung, and digestive tract) through uptake processes. The internal dose is a more general term denoting the amount absorbed without respect to specific absorption barriers or exchange boundaries. The amount of the chemical available for interaction by any particular organ or cell is termed the delivered or biologically effective dose for that organ or cell. (IRIS 2011)

Dose-Response Relationship: The relationship between a quantified exposure (dose) and the proportion of subjects demonstrating specific biologically significant changes in incidence and/or in degree of change (response). (IRIS 2011)

Dread risk: A risk that has characteristics that are considered less acceptable and can be associated with emotional reactions including anxiety, fear, and anger. Dread risks typically show some combination of the following attributes: they are perceived as uncontrollable, the impacts are catastrophic and/or fatal, their distribution is perceived as unfair or unequitable, they are considered unpredictable. People are generally less tolerant toward dread risk and are more willing for resources to be spent to avoid dread risk, however this aversion may or may not be connected to personal action.

Ecology: The relationship of living things to one another and their environment, or the study of such relationships. (EPA 2009)

Endocrine Disruptors: Synthetic chemicals (e.g., PCBs, dioxins) that disrupt normal endocrine system functions in humans and wildlife by blocking or mimicking hormones. The endocrine system consists of glands located throughout the body. Hormones are made by the glands and released into the bloodstream or the fluid surrounding cells; receptors in various organs and tissues recognize and respond to hormones.

Endpoint: An observable or measurable biological event or chemical concentration (e.g., metabolite concentration in a target tissue) used as an index of an effect of a chemical exposure. (IRIS 2011)

Epidemiology: Study of the distribution of disease, or other health-related states and events in human populations, as related to age, sex, occupation, ethnicity, and economic status in order to identify and alleviate health problems and promote better health. (EPA 2009)

Excess Lifetime Risk: The additional or extra risk of developing cancer due to exposure to a toxic substance incurred over the lifetime of an individual. (IRIS 2011)

Exposure: Contact between an agent and a target. (EFH 2011)

Exposure Assessment: The process of estimating or measuring the magnitude, frequency, and duration of exposure to an agent, along with the number and characteristics of the population exposed. (EFH 2011)

Exposure Route: The way a chemical pollutant enters an organism after contact (e.g., by ingestion, inhalation, or dermal absorption). (EFH 2011)

Federal Facility: Any building, installation, structure, land, public work, equipment, aircraft, vessel, or other vehicle and property owned by, or constructed or manufactured for the purpose of leasing to the federal government. *

Fence Line Property: Property located at the property boundary of another (e.g., a house next to a Superfund site). *

Groundwater: Water beneath the earth's surface in the spaces between soil particles and between rock surfaces. (ATSDR 2016)

Hazard Ranking System (HRS): The scoring system used by EPA's Superfund program to assess the relative threat associated with actual or potential releases of hazardous substances. The HRS is the primary screening tool for determining whether a site is to be included on the National Priorities List (NPL). (OSWER 1992)

Hazardous Waste: *Definition 1:* EPA interprets "hazardous wastes" to include all wastes that are hazardous within the statutory definition in RCRA Section 1004(5), not just those hazardous wastes that are listed or identified by EPA pursuant to RCRA Section 3001. *Definition 2:* Use of the term "hazardous constituents" is interpreted to indicate that, within the broad category of wastes that might be "hazardous" under RCRA Section 1004(5), corrective action should be focused on the specific subset of "hazardous constituents." It also means that corrective action is not limited to "hazardous wastes" but extends to hazardous constituents regardless of whether they were derived from hazardous wastes. This means that hazardous constituents that are (or were) contained in nonhazardous solid wastes are subject to corrective action. (ORCR 2012) *NOTE: CERCLA and the National Contingency Plan [NCP] also contain definitions of hazardous waste, but they are expressed in legal, rather than strictly descriptive terms.*

Health Advisory: An EPA document that provides guidance and information on contaminants that can affect human health and that may occur in drinking water, but which EPA does not currently regulate in drinking water. (OW 2012)

Hot Spot: An area of very high contaminant concentrations relative to other areas of the site. (EPA Risk Assessment Guidance for Superfund Volume I Human Health Evaluation Manual [Part A], 1989)

Incidence: The number of new cases of a disease that develop within a specified population over a specified period of time. (IRIS 2011)

Institutional Controls: Non-engineered instruments, such as administrative and legal controls, that help to minimize the potential for exposure to contamination and/or protect the integrity of a response action. (OSWER 2012)

Malignant Tumor: An abnormal growth of tissue which can invade adjacent or distant tissues. (IRIS 2011)

Maximum Contaminant Level (MCL): The maximum permissible level of a contaminant in water delivered to any user of a public system. MCLs are enforceable standards. (EPA 2009)

Maximum Contaminant Level Goal (MCLG): Under the Safe Drinking Water Act, a non-enforceable concentration of a drinking water contaminant, set at the level at which no known or anticipated adverse effects on human health occur and which allows an adequate safety margin. The MCLG is usually the starting point for determining the regulated Maximum Contaminant Level. (EPA 2009)

Metastasis: The dissemination or secondary growth of a malignant tumor at a site distant from the primary tumor. (IRIS 2011)

Milligrams per Kilogram (Mg/Kg): A unit of measure commonly used to report concentrations of a contaminant. A concentration of 1 mg/kg is equal to 1 part per million (ppm). For example, a concentration of arsenic in the soil is 15 mg/kg, or 15 milligrams of arsenic per kilogram of soil. *

Mitigation: Measures taken to reduce adverse impacts on the environment. (EPA 2009)

National Oil and Hazardous Substances Contingency Plan (NCP): The federal regulation that guides determination of the sites to be corrected under both the Superfund program and the program to prevent or control spills into surface waters or elsewhere. (EPA 2009)

National Priorities List (NPL): EPA's list of the most serious uncontrolled or abandoned hazardous waste sites identified for possible long-term remedial action under Superfund. The list is based primarily on the score a site receives from the Hazard Ranking System. EPA is required to update the NPL at least once a year. A site must be on the NPL to receive money from the Superfund Trust Fund for remedial action. (EPA 2009)

Naturally Occurring Background Levels: Ambient concentrations of chemicals that are present in the environment and have not been influenced by humans (e.g., aluminum, manganese). (EPA Risk Assessment Guidance for Superfund Volume I Human Health Evaluation Manual [Part A], 1989)

Particulate Matter (PM): Very small pieces of solid or liquid matter such as particles of soot, dust, fumes, mists or aerosols. The physical characteristics of particles, and how they combine with other particles, are part of the feedback mechanisms of the atmosphere. (OAR 2013)

Parts per Billion (ppb): Units commonly used to express contamination ratios, as in establishing the maximum permissible amount of a contaminant in water, land, or air. (EPA 2009) *(see text box to the right)*

Parts per Million (ppm): Units commonly used to express contamination ratios, as in establishing the maximum permissible amount of a contaminant in water, land, or air. (EPA 2009) *(see text box to the right)*

1 part per billion (ppb) is equivalent to:

- 1 microgram in a kilogram (µg/kg)
- 1 second in almost 32 years
- 1 drop of ink in a large fuel tanker truck

1 part per million (ppm) is equivalent to:

- 1 milligram in a kilogram (mg/kg)
- 1 inch in 16 miles
- 1 minute in two years
- 4 drops of ink in 55 gallons of water

Pathogens: Microorganisms (e.g., bacteria, viruses, or parasites) that can cause disease in humans, animals, and plants. (EPA 2009)

Plume: A volume of a substance that moves from its source to places farther away from the source. Plumes can be described by the volume of air or water they occupy and the direction they move. For example, a plume can be a column of smoke from a chimney or a substance moving with groundwater. (ATSDR 2016)

Polycyclic Aromatic Hydrocarbons (PAHs): A group of over 100 different chemicals that are formed during the incomplete burning of coal, oil and gas, garbage, or other organic substances like tobacco or charbroiled meat. PAHs are usually found as a mixture containing two or more of these compounds, such as soot. Some PAHs are manufactured. These pure PAHs usually exist as colorless, white, or pale yellow-green solids. PAHs are found in coal tar, crude oil, creosote, and roofing tar, but a few are used in medicines or the manufacturing of dyes, plastics, and pesticides. (ORCR 2009)

Potentially Responsible Party (PRP): Any individual or company—including owners, operators, transporters, or generators—potentially responsible for, or contributing to a spill or other contamination at a Superfund site. Whenever possible, through administrative and legal actions, EPA requires PRPs to clean up hazardous sites they have contaminated. (EPA 2009)

Preliminary Remediation Goals (PRGs): Initial cleanup goals developed early in the remedy selection process based on readily available information. They are modified to reflect results of the baseline risk assessment. They also are used during analysis of remedial alternatives in the remedial investigation/feasibility study (RI/FS). (OLEM 2010)

Prevalence: The proportion of disease cases that exist within a population at a specific point in time, relative to the number of individuals within that population at the same point in time. (IRIS 2011)

Public Health Advisory: A statement made by ATSDR to EPA or a state regulatory agency that a release of hazardous substances poses an immediate threat to human health. The advisory includes recommended measures to reduce exposure and reduce the threat to human health. (ATSDR 2016)

Public Health Assessment (PHA): An ATSDR document that examines hazardous substances, health outcomes, and community concerns at a hazardous waste site to determine whether people could be harmed from coming into contact with those substances. The PHA also lists actions that need to be taken to protect public health. (ATSDR 2016)

Public Health Consultation: A review of available information or collection of new data to respond to a specific health question or request for information about a potential environmental hazard. Health consultations are focused on a specific exposure issue. Health consultations are therefore more limited than a public health assessment, which reviews the exposure potential of each pathway and chemical. (ATSDR 2016)

RCRA: The Resource Conservation and Recovery Act, which was enacted by Congress in 1976 and in the subsequent Hazardous and Solid Waste Amendments of 1984. RCRA's primary goals are to protect human health and the environment from the potential hazards of waste disposal, to conserve energy and natural resources, to reduce the amount of waste generated, and to ensure that wastes are managed in an environmentally sound manner. (ORCR 2012)

Reference Concentration (RfC): An estimate (with uncertainty spanning perhaps an order of magnitude) of a continuous inhalation exposure to the human population (including sensitive target groups) that is likely to be without an appreciable risk of deleterious effects during a lifetime. It can be derived from a No Observed Adverse Effect Level (NOAEL), Lowest Observed Adverse Effect Level (LOAEL), or benchmark concentration, with uncertainty factors generally applied to reflect limitations of the data used. It is generally used in EPA's noncancer health assessments. Durations include acute, short-term, subchronic, and chronic. (EFH 2011)

Reference Dose (RfD): An estimate (with uncertainty spanning perhaps an order of magnitude) of a daily oral exposure to the human population (including sensitive target groups) that is likely to be without an appreciable risk of deleterious noncancer effects during a lifetime. It can be derived from a NOAEL, LOAEL, or benchmark dose, with uncertainty factors generally applied to reflect limitations of the data used. It is generally used in EPA's noncancer health assessments. Durations include acute, short-term, subchronic, and chronic. (EFH 2011)

Regional Removal Management Levels (RMLs): Risk-based concentrations derived from standardized equations used to support the decision for EPA to undertake a removal action under CERCLA. RMLs are calculated without site-specific information but may be recalculated using site-specific data. *

Regional Screening Levels (RSLs): Risk-based concentrations derived from standardized equations used to support screening level decisions early in the Superfund cleanup process. RSLs are not cleanup standards. EPA considers RSLs to be protective for humans, including sensitive groups, over a lifetime. *

Relative Risk: The relative measure of the difference in risk between the exposed and unexposed populations in a cohort study. The relative risk is defined as the rate of disease among the exposed divided by the rate of the disease among the unexposed. A relative risk of two means that the exposed group has twice the disease risk as the unexposed group. (IRIS 2011)

Risk: A measure of the probability that damage to life, health, property, and/or the environment will occur as a result of a given hazard. (EPA 2009)

Risk Assessment: A process intended to calculate or estimate the risk to a given target organism, system, or population, including the identification of attendant uncertainties, following exposure to a particular agent, taking into account the inherent characteristics of the agent of concern as well as the characteristics of the specific target system. The risk assessment process includes four steps: hazard identification, hazard characterization, exposure assessment, and risk characterization. It is the first component in a risk analysis process. (EFH 2011)

Risk Factor: Characteristics (e.g., race, sex, age, obesity) or variables (e.g., smoking, occupational exposure level) associated with increased probability of a toxic effect. (EPA 2009)

Risk Management: A decision making process that accounts for political, social, economic, and engineering implications together with risk-related information in order to develop, analyze, and compare management options and select the appropriate managerial response to a potential chronic health hazard. (IRIS 2011)

Superfund Amendments and Reauthorization Act of 1986 (SARA): Superfund Amendments and Reauthorization Act of 1986. SARA is the 1986 act amending CERCLA that increased the size of the Superfund trust fund and established a preference for the development and use of permanent remedies and provided new enforcement and settlement tools.(OLEM 2010)

Slope Factor: An upper bound, approximating a 95 percent confidence limit, on the increased cancer risk from a lifetime exposure to an agent. This estimate, usually expressed in units of proportion (of a population) affected per mg/kg-day, is generally reserved for use in the low-dose region of the dose-response relationship (i.e., for exposures corresponding to risks less than 1 in 100). (IRIS 2011)

Smelter: A facility that melts or fuses ore, often with an accompanying chemical change, to separate its metal content. Emissions cause pollution. "Smelting" is the process involved. (EPA 2009)

Solvent: A liquid (e.g., acetone or mineral spirits) capable of dissolving or dispersing another substance. (ATSDR 2016)

Superfund: The program operated under the legislative authority of CERCLA and the Superfund Amendments and Reauthorization Act (SARA) that funds and carries out EPA solid waste emergency and long-term removal and remedial activities. These activities include establishing the National Priorities List, investigating sites for inclusion on the list, determining their priority, and conducting and/or supervising cleanup and other remedial actions. (EPA 2009)

Surface Water: Water on the surface of the earth, such as in lakes, rivers, streams, ponds, and springs. (ATSDR 2016)

Toxicity: Deleterious or adverse biological effects elicited by a chemical, physical, or biological agent. (IRIS 2011)

Toxicology: The study of harmful interactions between chemical, physical, or biological agents and biological systems. (IRIS 2011)

Vapor Intrusion: The migration of volatile chemicals from contaminated groundwater or soil into an overlying building. *

Volatile: Any substance that evaporates readily. (EPA 2009)

The Three Types of Superfund Response Actions

Emergency Response: *An emergency response is a short-term, emergency action that may be necessary to address a release or threat of release of a hazardous substance into the environment. EPA's emergency response program responds to chemical, oil, biological, and radiological releases and large-scale national emergencies, including homeland security incidents.*

Removal Response: *A removal response generally is a short-term action that may be necessary to address a release or threat of release of a hazardous substance into the environment. Removal responses are common at Superfund sites when the contamination poses an immediate threat to human health and the environment. Removals are classified as either time-critical or non-time-critical depending on the extent and type of contamination.*

Remedial Response: *A remedial response generally addresses long-term threats to human health and the environment caused by more persistent contamination sources. Remedial actions permanently and significantly reduce the risks associated with releases or threats of releases of hazardous substances that are serious but lack the time-criticality of a removal action.*

Note: This attachment was developed for EPA's Office of Land and Emergency Management (OLEM) staff who work with communities and is not intended to be a standalone document. Instead, it envisions staff will adopt definitions in this document to meet their communication needs (e.g., on fact sheets, in risk communication conversations, and in other communications). This document is intended to aid field staff in their risk communication efforts and to continually build community capacity to engage with EPA.

Sources:

- U.S. Environmental Protection Agency. Office of the Administrator. Office of External Affairs and Environmental Education. *Terms of Environment: Glossary, Abbreviations, and Acronyms.* 2009. (EPA 2009)
- U.S. Environmental Protection Agency. *National Oil and Hazardous Substances Pollution Contingency Plan.* EPA-540-Z-00-001. January 1992. (NCP 1992)
- U.S. Environmental Protection Agency. Office of Solid Waste and Emergency Response. *Hazard Ranking System Guidance Manual.* EPA 540-R-92-026. November 1992. (OSWER 1992)

- U.S. Environmental Protection Agency. Risk Assessment Forum. *Framework for Cumulative Risk Assessment.* EPA-630-P-02-001F. May 2003. (EPA 2003)
- U.S. Environmental Protection Agency. Office of Resource Conservation and Recovery. *Brownfields Profile Glossary.* 2009. (ORCR 2009)
- U.S. Environmental Protection Agency. Office of Land and Emergency Management. *Waste and Cleanup Risk Assessment Glossary.* 2010. (OLEM 2010)
- U.S. Environmental Protection Agency. Office of Land and Emergency Management. *Superfund for Students and Teachers Glossary.* 2010b. (OLEM 2010b)
- U.S. Environmental Protection Agency. *Exposure Factors Handbook 2011 Edition (Final Report).* Washington, DC, EPA/600/R-09/052F, 2011. (EFH 2011)
- U.S. Environmental Protection Agency. Office of Research and Development. *Integrated Risk Information System (IRIS) Glossary.* 2011. (IRIS 2011)
- U.S. Environmental Protection Agency. Office of Resource Conservation and Recovery. *Corrective Action 101 Key Terms,* 2012. (ORCR 2012)
- U.S. Environmental Protection Agency. Office of Solid Waste and Emergency Response. *Institutional Controls: A Guide to Preparing Institutional Control Implementation and Assurance Plans at Contaminated Sites.* EPA-540-R-09-002. December 2012. (OSWER 2012)
- U.S. Environmental Protection Agency. Office of Superfund Remediation and Technology Innovation. *Ecological Risk Assessment Glossary of Terms.* (OSRTI 2012).
- U.S. Environmental Protection Agency. Office of Water. *Drinking Water Glossary.* 2012. (OW 2012)
- U.S. Environmental Protection Agency. Office of Air and Radiation. *Glossary of Climate Change Terms*. 2013. (OAR 2013)
- Agency for Toxic Substances and Disease Registry. *Glossary of Terms.* 2016. (ATSDR 2016)